



PROMOTING EFFECTIVE
SPILL RESPONSE

OCEAN ORBIT

February 2021



Shoreline clean-up during Covid, Mauritius

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Managing Director's review

"I am proud of the way in which the entire team has not only pulled together to ensure that ITOPF's work could continue remotely and uninterrupted but worked hard to ensure the work could be done safely and to enhance the wellbeing of the team."

It is hard to reflect on 2020 without it feeling a bit like trying to wake from a bad dream; a sense of the unreal and of things still being a bit 'foggy' until the dawn finally breaks. Whilst many foretold the coming of a global pandemic, did we really expect it to happen in 2020?! Did we imagine that Covid-19 would cause so much disruption to our lives, our businesses, and the global economy? One thing is clear and that is the pandemic has forced many of us to do things differently, to think differently, and to re-focus on what matters most.

It has also been interesting to observe how scientific knowledge has underpinned the response to Covid-19, as politicians, businesses, and the public have grappled with what to do next. Clearly, with science at the core of the work ITOPF does, continuing to provide our emergency response services, despite the challenges brought about by Covid-19, has been critical. We activated our Business Continuity Plan on 16th March 2020 and since that time, staff have worked effectively from home (wherever in the world that might be).

I am proud of the way in which the entire team has not only pulled together to ensure that ITOPF's work could continue remotely and uninterrupted but worked hard to ensure the work could be done safely and to enhance the wellbeing of the team.

You will see from the articles in our



Dr Karen Purnell, ITOPF's Managing Director

newsletter that we have supported the response to several incidents, both on-site and remotely, despite some borders being closed and onerous quarantine requirements. In fact, although we attended fewer incidents in 2020, the total number of days spent on site is not far off the norm observed in previous years. The 'life cycle' of a response illustrates why it is that ITOPF's involvement in some incidents can extend over many months or even years and explains why the team remains busy even after many of our overseas engagements in 2020 had to be cancelled.

ITOPF's statistics issued in January reinforced the trend towards fewer and fewer oil spills from tankers; the result of industry and governments continuing to improve safety and environmental standards. Because spills of oil and

different cargoes can still occur for a variety of reasons, ensuring that activities to improve preparedness and response continue despite Covid-19 restrictions has been important. Our work to support contingency planning, R&D, and best practice in sensitive environments, such as coral reefs, has continued; in several instances reaching bigger, more global audiences through remote engagement than would have been possible if we had attended in person.

During 2020 we welcomed our new Chairman, Erik Hånell of Stena Bulk, to the helm, along with four new members of the team. Fortunately, three of the four new staff members knew their colleagues before the first 'lockdown' in March, but our Chairman and new Company Secretary have yet to meet many of the team 'in person'. I sincerely hope that this will be possible soon.

Writing this now, the UK is still in the midst of a third national 'lockdown' and when ITOPF can begin travelling normally again is anyone's guess. Science has made it possible to find a way out of this bad dream but after the 'shock' of Covid-19, like many, we are asking 'what should ITOPF's new normal look like?' Perhaps the words of one of the most famous scientists of all time will help: "Learn from yesterday, live for today, hope for tomorrow." – Albert Einstein.

We hope you enjoy this edition of *Ocean Orbit*.

Deserted streets near ITOPF's office, London during the first national lockdown



Delivering our services during a pandemic

The Covid-19 pandemic has had a huge impact on lives and businesses worldwide. In these challenging and unprecedented times, ITOPF has continued to provide its key services, albeit within the 'new normal' rules of social distancing, Covid-tests, travel restrictions, quarantine and self-isolation.

Spill response

Responding to spills of oil, chemicals and other cargo in the marine environment is ITOPF's priority service and for decades our usual *modus operandi* has been giving on-the-ground advice. All of this involves substantial travel, which has been severely disrupted during the pandemic.

In line with UK government guidelines, ITOPF closed its office in March 2020 and staff have for the most part been working from home and operating virtually since that time. The enhanced use of video conferencing tools and other technology has enabled us to provide a near-normal service remotely, including both emergency and non-emergency work.

From March to December 2020, ITOPF provided information or remote advice for 18 new incidents. These included a nickel mine storage tank spill in Russia, a power barge incident in the Philippines and a potential spill from an FSO anchored off the coast of Venezuela.

Early on, plans were put into effect to explore options for attending incidents which, due to their severity or complexity, would still require our presence in person. For example, we ran scenarios for selected key countries to determine the best way to obtain the information necessary to gain entry into the country and to operate effectively whilst there. As part of our planning, we also produced a specific Covid-19 risk assessment procedure, to ensure the safety and wellbeing of our staff.

These procedures were put into practice when we successfully mobilised

to Mauritius for the widely reported WAKASHIO incident in mid-August. Borders were closed in Mauritius and no direct commercial routes were possible; in addition, strict quarantine procedures had been imposed. ITOPF remained on site until mid-December, with five staff rotating in and out at intervals. Changing government protocols during this time meant that we had to remain flexible and adapt to ever-changing circumstances. This included prolonged quarantine procedures, a stay in hospital and a government isolation centre for one member of the team, longer than usual periods away from home for all staff on site, and self-isolation on their return. Numerous PCR (Polymerase

Chain Reaction) swab tests were required and different routings into country were necessary due to flight alterations and new transit country impositions and restrictions.

In September, we also successfully mobilised to an incident in Sri Lanka, another country whose borders were closed for all but a few repatriation flights. The P&I Club involved expedited our entry by providing direct transportation (charter flight) with their local correspondents, helping our navigation through immigration procedures. This incident involved a fire on board a laden VLCC, which proved difficult to extinguish and tragically involved the loss of a crew member. Thankfully, there was no



Covid testing centre en route to site in Mauritius



Arriving on-site in Sri Lanka

major oil spill beyond a relatively small release of bunker fuel. Consequently, our involvement in country was mainly restricted to virtual meetings, confined by government protocols to an isolation hotel.

The same month, we returned to site in Georgia, USA to support the response and salvage team during the initial 'cuts' of the wreck of the GOLDEN RAY, a car carrier that grounded in September 2019. Following strict quarantine procedures on entry to the USA, ITOPF was permitted access to the incident command post and worked with the authorities and spill managers to review contingency plans in the event of an oil release during cutting operations, and to agree a baseline for shoreline oiling.

In November, we mobilised for two missions to South Africa, both involving spills of nurdles (plastic pellets). One was a return visit for a joint survey to terminate clean-up activities following the loss of an estimated two billion nurdles from a container ship incident in 2017. The other was a new case involving large quantities of nurdles washing ashore along the south-east coast of the country.

Interestingly, despite an initial hiatus, we spent as many days on site attending spills in 2020 as for a typical year. We are grateful for the help and support of the P&I Clubs who have provided assistance to enable us to navigate through some of the Covid challenges faced on the road.

Although we have a process in place for mobilisations during the pandemic, successful implementation of that process is dependent on the location

and the severity of local restrictions in place. It is expected that Covid-related hurdles for spill attendance will need to be overcome for many months to come.

Other key services

Some of our 'preparedness' activities have also been affected by the pandemic and the associated restrictions on travel. We have continued to support events remotely where we can, often reaching a far wider audience than through face-to-face meetings. These include the GI-WACAF Project webinar series on

oil spill preparedness and response; a panel discussion which replaced the Oil Spill India conference in September, and contingency planning workshops held in connection with the West MoPoCo project (see page 17).

It remains to be seen what the long-term ramifications of Covid-19 on our working practices will be. Until things change, we are embracing the 'new normal' and endeavouring to continue delivering our services to the optimum, for the benefit of our shipowners, their P&I insurers, governments and the wider shipping and spill response community.



Social distancing during a SCAT survey, USA

Behind the scenes

Much work has gone on behind the scenes to ensure 'business as usual' during these challenging times. Staff across all functions have had a role to play in enabling and supporting the effective delivery of our key services.

In March 2020, before the first UK lockdown, our business continuity plan (BCP) was put into action to ensure that we could all work effectively and safely from home. The 'BCP' team, comprising staff from all departments, continues to meet regularly to review our processes and activities, in line with government guidance.

IT projects planned for 2020 were accelerated into the first half of last year to provide cloud storage solutions, digital communication software, and a new phone system to allow office calls to be taken remotely. ITOPF transitioned to a digital first practice, from finance and administration to HR and communications. All staff were



Remote working

provided with laptops and additional equipment to set up comfortable workstations at home. Security hardware and systems were enhanced to mitigate the increased risk of cyber-attacks.

The administration team worked to ensure our risk assessments for travellers were updated to include a Covid-19 addendum and have dealt with ever changing circumstances over

flight availability, travel corridors, Covid testing and quarantine. Our London office was made Covid-secure for the periods when we were allowed to return, and an office risk assessment was undertaken and regularly reviewed to ensure safe practice whilst on the premises.

Throughout the period, HR has provided timely updates to the team about ongoing working practices, developing and updating a series of Q&As to keep everyone abreast of any changes. They have introduced weekly 'well-being' sessions with ideas and suggestions for promoting staff health and welfare, and provided access to external sources of support available.

Finally, and not least, the 'Admin' team have organised a number of socials, including a summer escape room quiz and a Christmas cheese and wine tasting. These, along with new social clubs and 'chat' channels over Microsoft Teams, have helped to keep the team spirit alive and maintain staff morale as the long period of working separately continues.

How to report a spill

To report a spill of oil, chemicals or other substance, please call us on the numbers below for advice and/or to mobilise us to site. Please do **not** rely on notifications of emergencies to ITOPF by email.

9 AM – 5 PM
(UK BUSINESS HOURS)
+44 (0) 20 7566 6999

This is our office number.
Please ask to speak to a member
of the technical team.

OUTSIDE UK BUSINESS HOURS
(spill emergencies only)
+44 (0) 20 7566 6998

Your call will be forwarded
to the member of the
technical team on duty.

IMPORTANT INFORMATION

- Contact details of the person reporting the incident
- Name of vessel and owner
- Date and time of the incident (specifying local time or GMT/UTC)
- Position (e.g. latitude and longitude or distance and direction from the nearest port or landmark)
- Cause of the incident (e.g. collision, grounding, explosion, fire, etc) and nature of damage
- Description and quantity of cargo and bunker fuel on board
- Estimate of the quantity spilled or likelihood of spillage
- Name of the cargo owner
- Action, both taken and intended (and by whom), to combat pollution
- Status of the vessel and any planned salvage activities

ADDITIONAL USEFUL INFORMATION

- Weather and sea conditions, wind speed and direction
- Length, breadth and appearance of any slicks or plumes, including direction of movement
- Type of resources that may be at risk (e.g. fisheries or residential areas)
- Distribution of cargo and bunkers and location relative to damage

HNS Chemicals

- State – solid, liquid, gas, bulk, packaged
- UN or CAS number, MSDS, cargo manifest

Oil

- Density, viscosity, pour point, distillation characteristics, wax & asphaltene content (or bunkering certificate)



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Incidents in the spotlight

ITOPF has attended 12 new cases since we last reported in *Ocean Orbit*. The majority involved a mix of bulk or general cargo vessels, four involved tankers, one incident involved a container ship, and one arose from an unknown source. In terms of the pollutant spilt, one incident involved plastics; all the others involved spills (or the threat of a spill) of a variety of oils. Our role in a selection of these incidents is reported below.

Above: New mobilisations and new remote advice cases from September 2019 – December 2020

Spill from an unknown source, Brazil

Incident date: End of August 2019
 Location: North-east Brazil
 Vessel: Unknown source
 Pollutant: Not identified to date, however laboratory analysis indicates a heavy fuel oil

Nature of incident: At the end of August 2019, oil from an unknown source was reported coming ashore in the north eastern region of Brazil. The contamination comprised mainly tar balls and oil patties and eventually spread across hundreds of sites along about 3,600 km of coastline in 11 states. The national contingency plan was activated, and an extensive clean-up operation



Shoreline oiling in Brazil



ITOPF providing advice to clean-up contractors, Brazil

was undertaken primarily by workers employed by the local municipalities, personnel from the navy, army and the Brazilian state-run oil company, Petrobras, with support from volunteers. Despite several attempts to hindcast the oil trajectory, and the analysis of numerous samples, its source remains a mystery.

ITOPF involvement: ITOPF's involvement was requested directly by IBAMA, the Brazilian Institute of Environment and Renewable Natural Resources. ITOPF would not normally attend unattributable incidents. However, in certain circumstances, where the team's technical experience and objectivity would be highly beneficial, shipowners and their insurers fully support our attendance for the 'greater good', without the need to seek reimbursement of costs. We initially provided advice remotely from London, primarily on trajectory modelling and reviewing satellite imagery, but soon after travelled to Brazil, where we were integrated within the response command structure as an adviser to the government. In total, our team spent over 100 days on site, helping to determine the scope and severity of the pollution and advising

on clean-up techniques. In 2020 we received a formal letter of thanks from the Brazilian Navy for assistance in the response effort. Going forward, ITOPF has been invited to participate in a government-led workshop in Brazil to review the response to this incident and produce recommendations for developing the country's oil spill response preparedness. We have also received a request from Petrobras to assist in reviewing their pollution contingency plans for their entire offshore operations.

Oil pollution risk from a grounded VLOC, Brazil

Incident date: 25th February 2020
Location: North-east Brazil
Vessel: Very large ore carrier
Pollutant: Very low sulphur fuel oil (sheen only)

Nature of incident: A very large ore carrier, fully laden with approximately 300,000 MT of iron ore fines, ran aground on a sandbank 100 km from

shore in Maranhão State, north-east Brazil. Oil, in the form of a light sheen, was observed around the casualty. This was reported to be oil that had been washed off the deck at the time of the grounding and quickly dispersed. No environmental impacts from the release were reported by the government authorities, but the risk of pollution from the wreck remained a concern during subsequent debunkering and cargo removal operations. Following a refloat operation in June 2020, the vessel was declared a constructive total loss and scuttled in deep water.

ITOPF involvement: ITOPF's primary role on-site was the provision of technical advice to the Brazilian authorities and spill managers during the preparation of pollution contingency plans for the salvage activities. We also provided technical input into the spill manager's response plans in the event of shoreline impact and advised on the preparation of claims. After leaving site, we provided a report at the request of the salvors on the environmental impacts of dumping iron ore fines at sea, produced a risk assessment for the scuttling operation and reviewed water sample test results.



The casualty leaking oil, Mauritius



Collected oily waste

High profile incident in Mauritius

Incident date: 25th July 2020 (grounding); 6th August (oil spill)
 Location: Pointe d'Esny, Mauritius
 Vessel: Iron ore carrier
 Pollutant: Very low sulphur fuel oil

Nature of incident: As widely reported in the international press, a bulk carrier in ballast spilt an estimated 800-1,000 tonnes of low sulphur fuel oil after grounding on a fringing coral reef off the south-east coast of Mauritius. Oil was carried into the lagoon by prevailing winds and currents and stranded along approximately 30 km of shoreline of the mainland and various islands and islets. Of particular note, thick

accumulations of oil stranded along large stretches of environmentally sensitive mangrove habitat. The national oil spill contingency plan was activated by the Mauritian government, and groups of volunteers with improvised equipment came out in force to support the local response effort. The government issued a state of environmental emergency and, following a call for international assistance, additional equipment along



ITOPF advising on clean-up activities



Flushing oil to release it from the substrate for collection

with teams from France, Japan, India, the UK, the EU and UN mobilised to site to support the response operation. The vessel's P&I Club appointed two spill contractors to undertake the clean-up. A variety of techniques have been used, including containment and recovery in the lagoon, the manual removal of bulk oil using scoops and shovels, low-pressure flushing using absorbents to collect the released oil, and, in some areas, high pressure washing. Large quantities of liquid and solid waste have been collected and will be transferred to Greece for final treatment. As at December 2020, the clean-up operation was ongoing, with the expectation that it will be completed in early 2021.

ITOPF involvement: Initially, ITOPF provided remote technical advice on the potential impacts of the grounding on the coral reef, and on preparedness for a spill. Following the release of oil on 6th August, we were mobilised to site by the vessel's P&I Club. Our role has been liaising with the authorities, contractors, institutes, international experts and NGOs; drafting the clean-up plan for the authorities; overseeing the clean-up of affected shorelines and lagoon-based clean-up operations; providing guidance to contractors and stakeholders on the response techniques and end-

points; and delivering critical technical advice to all levels of government ranging from environmental officers to the Prime Minister. Our deployment and the response effort as a whole was complicated by Covid-19 and the associated restrictions (see page 3). We have also provided advice to the authorities and institutes on the development of an integrated environmental monitoring programme and to the insurers on independent environmental damage assessments. ITOPF remained on site in Mauritius until December, with a team of five staff in rotation.

Explosion and fire aboard VLCC, Sri Lanka

Incident date: 3rd September 2020

Location: South-east Sri Lanka

Vessel: Very large crude carrier

Pollutant: Very low sulphur fuel oil & low sulphur marine gas oil

Nature of incident: An explosion and fire occurred onboard a laden oil tanker, 35 NM off the south-east coast of Sri Lanka. Tragically one crew member died but the remaining 22 were rescued. The

vessel suffered extensive damage to its superstructure and fuel tanks, and an unknown quantity of fuel oil leaked intermittently from 8th September for five days. This moved north-easterly with prevailing weather conditions away from the shore and was treated with dispersants. The Sri Lankan authorities were assisted by India under the SACEP (South Asia Co-operative Environment Programme) Agreement for coordinating pollution response in the South Asian Seas region, and joint firefighting and pollution response operations were carried out by the Indian Coast Guard, the Indian Navy and their Sri Lankan counterparts. The fire was brought under control and all cargo tanks remained intact. The vessel was then taken under tow to Fujairah for the cargo to be offloaded via ship-to-ship transfer.

ITOPF involvement: Due to Covid-related restrictions, ITOPF's primary role on site was to carry out daily trajectory modelling and analyse satellite imagery to assess and monitor the likely fate and behaviour of any cargo spilled. In addition, a joint overflight was carried out with the authorities to map the slick and validate the model predictions. We also identified additional response resources should the situation escalate.

Life cycle of a spill



Notification

ITOPF is notified of an incident usually by the vessel's P&I insurer or by our network of contacts including correspondents, surveyors, spill response organisations, government agencies, port authorities or media outlets.

ITOPF asks a series of questions to find out as much information about the incident as possible, including:

- relevant contact details
- timing, cause & location of incident
- description and quantity of cargo and bunkers onboard
- estimated spill size
- actions taken and planned
- status of the vessel
- local conditions



Evaluation

ITOPF carries out a preliminary assessment of the likely extent of pollution, its behaviour, fate and likely impact. This may include:

- running computer-based pollutant trajectory and fate models
- if appropriate, contacting specialist providers for information on the behaviour of chemicals or other cargo
- Sourcing and interpreting satellite imagery to assist with understanding oil movements and to assess the ongoing spill situation
- Checking in-house and online resources for information on local preparedness, such as availability of contingency plans and local stockpiles of response equipment
- Identifying sensitive resources at risk and mapping them using our in-house GIS capabilities
- Reviewing our previous in-country experience and identifying useful contacts



Lessons learnt

Once spill response operations have been brought to a close, this is an ideal opportunity to review the actions undertaken, determine what went well and what could have been done better, and use these findings for training and contingency planning purposes.

Our role may include:

- Working with national authorities, the P&I insurer and/or IOPC Funds, and other relevant stakeholders to review various aspects of the case
- Supporting government agencies with training activities and reviewing contingency plans
- Incorporating lessons learnt into future publications and training material



Claims assessment

Organisations, companies and individuals that have spent money on the response, or have suffered a loss due to pollution damage, may decide to submit a claim to the P&I insurer concerned and/or the IOPC Funds.

ITOPF is often requested to evaluate the technical merits of claims, including the reasonability of clean-up costs, the merit of claims for damage to economic resources, such as property or businesses, and for monitoring and restoration of the environment. Our advice is given according to criteria agreed internationally through IMO and associated bodies.

For significant incidents, our involvement in the claims process can be extensive, lasting several years.

ITOPF does not decide the extent to which particular claims are paid. Instead, the bodies paying compensation take into account many other factors, in addition to purely technical considerations, which may influence the final decision.



Sign-off

This signals the end of active operations at each worksite, when equipment is demobilised and returned to stores for cleaning and maintenance, temporary waste storage sites and access routes restored, and other work areas cleaned.

Our role may include:

- participating in joint surveys with all parties involved, determining when pre-agreed end points have been reached and worksites can be signed off by regulatory authorities
- If required, advising on longer-term environmental monitoring to determine the effects of oil on sensitive resources over time or to initiate restoration measures to accelerate natural recovery

An overview of some of the activities we commonly undertake at different stages of a response.
(Some of the actions may fall into more than one phase and some may be applicable for oil spills only.)



Mobilisation

Depending on the specific circumstances of the incident, our attendance on-site may be required.

Our early mobilisation is recommended as decisions made in the initial stages of an incident may have a lasting effect on the response.

Working with our travel agents, we determine the quickest and most effective way of getting to site.

Our risk assessment process is activated to identify any travel, security or health risk concerns for the Technical Adviser mobilising. Covid-19 has increased the importance of this process.

Arrangements are made with the insurer's local correspondent (if relevant), surveyors and/or local authorities, to facilitate our arrival and integration into the response operation.



Emergency phase

This is the early stages of an incident when the situation is still dynamic, i.e. when the vessel is still spilling or at risk of spilling, when oil or other pollutants remain at sea or arrive in bulk ashore.

Throughout the process, our role is always advisory. It may involve:

- advising all parties on the behaviour, potential fate and effects of the pollutant
- undertaking surveys (on foot, by boat or in the air) to assess the extent of contamination and monitor the clean-up operation
- advising and assisting all parties on the most appropriate clean-up techniques for the situation and highlighting priority areas for clean-up
- helping to source equipment, liaising with contractors and assisting in organising the clean-up, particularly in cases where the shipowner is required to mount the response operation
- advising on environmental monitoring and assisting in identifying suitable laboratories for sample analysis
- advising on the handling and disposal of waste generated
- attending meetings with government agencies and other parties to review progress, response decisions and logistical requirements, including waste management

In all cases, our aim is to cooperate, bring together, and work closely with all parties involved in an incident – government agencies, the shipowner, insurer, contractors, claimants, wildlife agencies, etc – and to reach agreement on measures that are technically justified and best suited to the particular circumstances.



Project phase

This is the later stages of an incident when the casualty has been stabilised, the threat of further releases of oil reduced, sufficient response resources have been mobilised, and the clean-up operation is working effectively.

ITOPF may be involved in:

- Surveys to assess the ongoing clean-up operation
- Revision and update of techniques used as work progresses
- Joint surveys with the authorities and other stakeholders to agree on and establish clean-up end points
- Investigating damage to the marine environment and to coastal resources, such as fisheries and aquaculture
- Advising on methods to mitigate environmental and economic losses, including restoration options
- Reviewing proposals for longer-term work, such as disposal, which may be put out to tender


Depending on the complexity of the incident, ITOPF may leave site during this period and monitor the remainder of the operation remotely, providing advice as necessary.

ITOPF is available for spills of oil, chemicals and other bulk or packaged cargoes in the marine environment.

No two incidents are the same. There are many variables involved, not least the type of pollutant, the quantity spilt, location, time of year, and state of preparedness.

ITOPF's role and involvement also varies from case to case.





Ship groundings on coral reefs

Coral reefs are amongst the most biodiverse ecosystems on earth. Occupying less than 0.1% of the seabed, they account for 25% of all marine species.

ILOPF is best known for providing technical advice for oil spills, but we are also ready and available to advise on damage to coral reefs resulting from ship groundings.

In the last ten years, ILOPF has been involved in numerous incidents, both on-site and remotely, that involved damage to coral reefs. Our role typically includes facilitating site surveys; advising parties on contractors qualified to undertake damage assessments and rehabilitation; providing technical comments on damage assessment reports; and assessing claims arising from the incident.

Coral reefs

Coral reefs support a phenomenal diversity of organisms and provide habitat, spawning and nursery grounds for many commercial fish species. They protect coastlines from storms and erosion and can be an important source of income for local communities through tourism.

It is widely recognised that coral reefs face a multitude of stresses, both natural and anthropogenic, which affect their health. These include severe weather events, climate change, ocean acidification, overfishing, destructive fishing, coastal development and chronic pollution. Ship groundings tend to be a

more localised threat, but their impact can often be severe and complex.

Nature of damage from ship groundings

The impact of a ship grounding on a reef can lead to both physical and biological damage for these shallow water, slow-growing habitats.

Physical damage may include the destruction or displacement of coral colonies, or potentially, removal of the reef's structural complex. Initial damage can be exacerbated by movement of the grounded vessel, either due to tides, strong swells, winds, or from attempts to re-float the ship. Areas adjacent to the grounding site may also suffer damage from the movement of mobile reef boulders, fragments or sediments. Biological damage can include the mortality or displacement of marine organisms.

Ship groundings can also upset the ecological balance of a reef. If the reef structure is fractured, loose substrate may be exposed allowing for opportunist

species to exploit the area, delaying recovery. Any fractured area may expand over time, especially during storms or hurricanes, further preventing or delaying the recovery of the reef.

As well as damage caused by the physical impact of a vessel grounding, other impacts may arise from the physical or toxicological effects of any lost sections of the vessel, oil or cargo¹. Exposure to chemicals within the anti-fouling coating of ship's hulls may also result in impacts to corals and other reef biota.

Severity of damage

The severity of the damage to the reef is determined by a number of factors including the size of the vessel, the characteristics of the area impacted and the nature of the grounding event (including the speed of impact and the time spent aground).

Response actions may also have consequences on the final scale of the incident. For example, there may be collateral impacts such as prop-wash and anchor damage from supporting vessels. Salvage operations could generate further impacts through loss of cargo, contact by salvage vessels or by cables dragging across the reef. The final removal of the stranded ship may also widen the overall 'footprint'

¹ For further information on the effects of oil on corals, please refer to TIP 13 'Effects of Oil Pollution on the Marine Environment'.

of the damage. Specifically, if the ship is dragged rather than floated off the reef, the reef front can be 'ripped' away causing large quantities of rubble to fall down the reef slope, smothering a wider area of benthic habitat.

Critically, when considering the potential consequence of a reef grounding, the background condition of the habitat will have a significant bearing on its rate of recovery. Not surprisingly, healthy reefs, i.e. those that are well-established and biodiverse, and free from existing pressures like pollution or bleaching, will tend to be more resilient and recover faster than those that are already under stress.

Damage assessment

Depending on the scale and nature of a reef grounding incident, local or national agencies may require an assessment of the impacted site to determine the degree of impact. It is good practice to establish a team of experts representing the affected country and shipowner interests to perform the evaluation and agree on the extent of damage.

The primary purpose of damage assessment surveys is to determine the boundaries of the impacted area, whilst also identifying the nature of the damage within that space. Estimating the character of the affected area and the degree of injured or dislodged organisms may also be considered. If extensive resources are impacted, the potential loss of resource function and the reef's ability for natural recovery may be examined.

If details of the site condition prior to the incident are not known, a reference



Ship groundings can result in relatively small-scale crushing of individual coral heads to widespread levelling of a section of reef, along with damage to associated marine life

site (or sites) must be agreed upon and used for comparison.

Reef rehabilitation

The damage assessment can be used to determine the most appropriate course of action to address the impacts to the reef. Actions can range from monitoring natural recovery to coordinated rehabilitation programmes. The actions agreed depend upon the severity of damage and the state of the local environment.

At one extreme, if local environmental conditions are favourable, the damaged area is relatively small, and there are limited physical impediments to recovery (e.g. no loose rubble), the degraded section of reef may conceivably recover naturally within 5-10 years. In such a case, active restoration may have limited benefits and can even result in further damage due to

the additional disturbance to the habitat. All that may be required are remediation measures to remove any antifouling paint or other pollutants, coupled with simple site 'triage', whereby fractured, dislodged, and overturned coral colonies and other reef organisms are stabilised.

Where the severity of damage is such that a grounding site is unlikely to recover through natural processes, then greater intervention may be required, such as the transplantation of live coral colonies from nurseries or healthy sections of reef. However, conditions within the impacted site, and any potential donor site, must be suitable. The donor site must be robust enough to survive removal of donor nubbins (coral fragments) or colonies; the receiving site must be structurally suitable and protected for new corals to survive; and both sites must be geographically and physically similar so that introduced corals would not be 'invasive species' and are demonstrated to previously thrive there. Furthermore, any replanting strategy must conform to the pre-damage circumstances rather than introducing factors that could cause wider negative consequences, e.g. invasive species, altered topography etc.

The degree and nature of reef rehabilitation activities should be based upon scientific evaluation of the site and consensus should be reached between the joint team of experts established prior to the damage assessment. Whether or not active restoration is determined to be the best course of action, a monitoring plan (lasting months or years) will be required to assess the effectiveness of the chosen strategy.

Further information is provided in TIP 18: Ship groundings on coral reefs, produced in collaboration with Seaground, due for publication in 2021.



Coral reef survey. Credit: Achmad Husein Nyompa / Shutterstock.com

Low sulphur fuel oil

of suppliers is needed to give a clearer understanding of the characteristics and behaviours of individual products.

Real life conditions

Sintef's study will undoubtedly help towards the development of an industry-wide response strategy for this new generation of LSFOS. Valuable feedback on the accuracy and applicability of tests done in the laboratory can be provided by real life incidents. These will also contribute significantly to our understanding of the fate and behaviour of LSFOS once spilled into the marine environment.

ITOPF has already attended several spills involving LSFOS, including incidents in Thailand, Sri Lanka and Mauritius. Sintef's study focused primarily on climatic conditions found in the northern hemisphere, whereas our experience primarily involves spills in warmer climates. We have observed first-hand how warm weather can impact the behaviour of LSFOS when spilled, and consequently the effectiveness of the methods employed during the clean-up response.

The largest LSFOS spill that ITOPF has attended to date occurred in Mauritius in August 2020 (as described on page 8). Mauritius is a tropical island located east of Madagascar, in the Indian Ocean, with sea temperatures averaging 25 °C. The spill stranded along over 30 km of shoreline largely consisting of sandy beaches, rocky shoreline and mangroves. During the clean-up operations, ITOPF observed that the spilled oil was more liquid, and less viscous,



Oil penetrated into the substrate, Mauritius

In January 2020, new global standards were introduced by IMO to reduce the sulphur content in the fuel oil (bunkers) used by ships. This was in response to growing concern about the harmful impact of shipping emissions on the environment and human health. To comply with the new requirements, many ships have been switching from 'traditional' bunker fuels to a new generation of low sulphur fuel oils (LSFO).

Laboratory study

To find out more about this new type of oil, ITOPF granted its 2019 R&D Award to Sintef for work to document the weathering properties and behaviour of LSFOS when spilled at sea. The research would include particular focus on the feasibility and effectiveness of different response options. This project was also funded by the Canadian government 'Multi-partner Oil Spill Research Initiative program' (MPRI) and the Norwegian Coastal Administration (NCA).

Three LSFOS (indicative of the different refinery mixes available) were subjected to a series of tests, including analysis of their chemical composition, physical properties, emulsifying properties and toxicity. Dispersibility and ignitability testing on different weathered samples was also carried out. The testing was performed at two temperatures, representing cold climate/Arctic conditions (2 °C), and



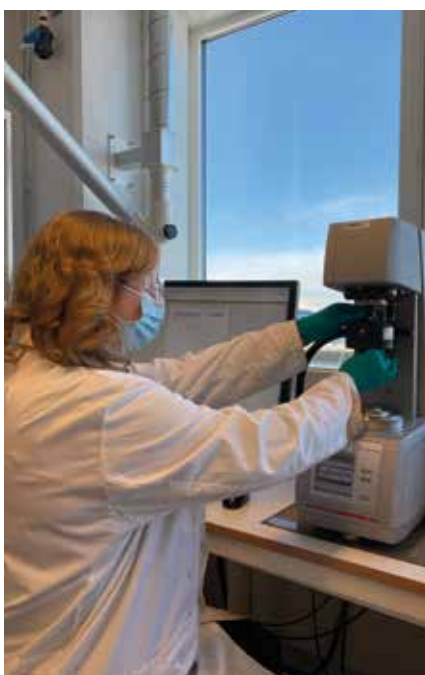
typical summer conditions in the North Sea (13 °C).

The results of the project were published in 2020 and are available on ITOPF's website.

The LSFOS tested indicated a high degree of persistence on the sea surface. This will have a direct influence on the choice of most appropriate response options should a spill occur. Overall, the findings suggest that the response to a spill of LSFOS may be even more challenging than one involving 'traditional' high sulphur fuels oils, especially in cold water. It was found in particular that:

- The effectiveness of using dispersants may be limited due to either high viscosities of the emulsions and/or high pour point of the oils.
- The potential to use in-situ burning as a response option could be limited due to the relatively low proportion of volatile components and the length of time required to ignite the oil. Emulsification (where water becomes incorporated into the oil) may also restrict ignition of the oil without it being 'primed' with a more volatile solvent, such as diesel oil.
- Mechanical recovery of these oils is likely to be more effective using an 'active' high viscosity or belt skimmer designated for high viscosity oils or oils that have solidified at sea.

Many of the LSFOS being developed share similar compositions, so it is important to note that the findings of this report are not unique to the fuel samples analysed. However, further laboratory analysis of low sulphur oils from a variety



SINTEF Ocean oil spill laboratory (Photo by Oddveig M. Bakken, Sintef Ocean)

than a characteristic heavy fuel oil (HFO) when spilt. This resulted in the LSFO penetrating further into the sediment than would be expected from a heavier and more viscous oil. However, this same characteristic also enabled the oil to be more easily mobilised from the sediment using gentle flushing techniques, which assisted the clean-up operation. The warm temperatures also promoted natural weathering of the spilt oil, across all impacted shorelines, through processes such as photo-oxidation, evaporation and dissolution. Another consequence of the relatively mobile nature of the spilt LSFO was the ability of successive tides, and wave action, to remobilise trapped oil. This aided the removal of oil from sensitive habitats, such as mangroves, but it also meant that the remobilised oil had the potential to spread, which needed to be taken into account during the clean-up operation.

The clean-up operation in Mauritius is on-going as at the time of writing. ITOPF expects that as the country moves into its summer season, higher temperatures may promote an increase in natural weathering, causing the LSFO to become even more liquid and less viscous as a



Flushing oil from mangroves

result. This incident has provided many useful learning points for future LSFO spills, particularly in warmer climates,

and has allowed ITOPF to build on the outcomes of the Sintef study and our knowledge of this topic.

10 years of ITOPF's R&D Award

ITOPF established its annual R&D Award in 2011 as a way to support projects that have the potential to lead to improvements in spill preparedness and response, and the development of new techniques for monitoring and restoring environmental resources. To date, £450,000 has been awarded to nine separate R&D projects from institutions worldwide. This has increased our knowledge on a diverse range of topics, including the impact of chemically dispersed oil on fish health, remote sensing in icy waters, the efficacy of different dispersion mechanisms, the fate and behaviour of spilled chemicals, and virtual reality for training applications. The results from the 2019 award winning project on low sulphur fuel oils are presented opposite.

2020 winner

Last year's award went to BAUPRE (Biological Assessment Under Hydrostatic Pressure), a one-year project led by ORPHY (a research unit in physiology from the University of Western Brittany, France), in partnership with Cedre and TOTAL SA. This project commenced in September 2020 and is designed

to improve the methodology used by laboratories to simulate the effect of hydrostatic pressure. Specifically, the project will investigate how pressure influences microbial activity and toxicity of oil and chemicals on deep-sea ecosystems.

The researchers will use the scenario of a deep-sea leakage of fuel oil to measure the rate of biodegradation of the fuel oil at different pressures by simulating depths of up to 1500m. They will also measure the toxic effect of pressure on bacterial strains using reference toxins.

The outcome of this research should provide experimental tools to assess toxicity and behaviour of pollutants under high hydrostatic pressure, and data on biodegradation and biological impacts of pollutants at depth, for example from sunken vessels or blow-outs. Once the project is complete, the findings will be published on our website.

Increase in funding

To mark the 10th anniversary of the ITOPF R&D Award, from 2021 the amount of the award will be increased from £50,000 to £75,000 per annum.

This will support a combination of PhD and short-term projects.

The Award is open to any reputable R&D establishment or other organisation worldwide intending to fund a candidate or project team to undertake research related to accidental marine pollution. Funding is capped at £40,000 for PhDs, provided in instalments for the duration of the PhD project. In addition, a competitive annual stipend and contribution towards tuition fees are payable to a successful PhD candidate. For short-term projects, funding is capped at £60,000 which can be spread over 1-2 years. Proposals are evaluated by the ITOPF R&D Award Committee, comprised of external and internal evaluators with a wealth of experience in maritime and environmental issues and a keen focus on developing young talent in these areas.

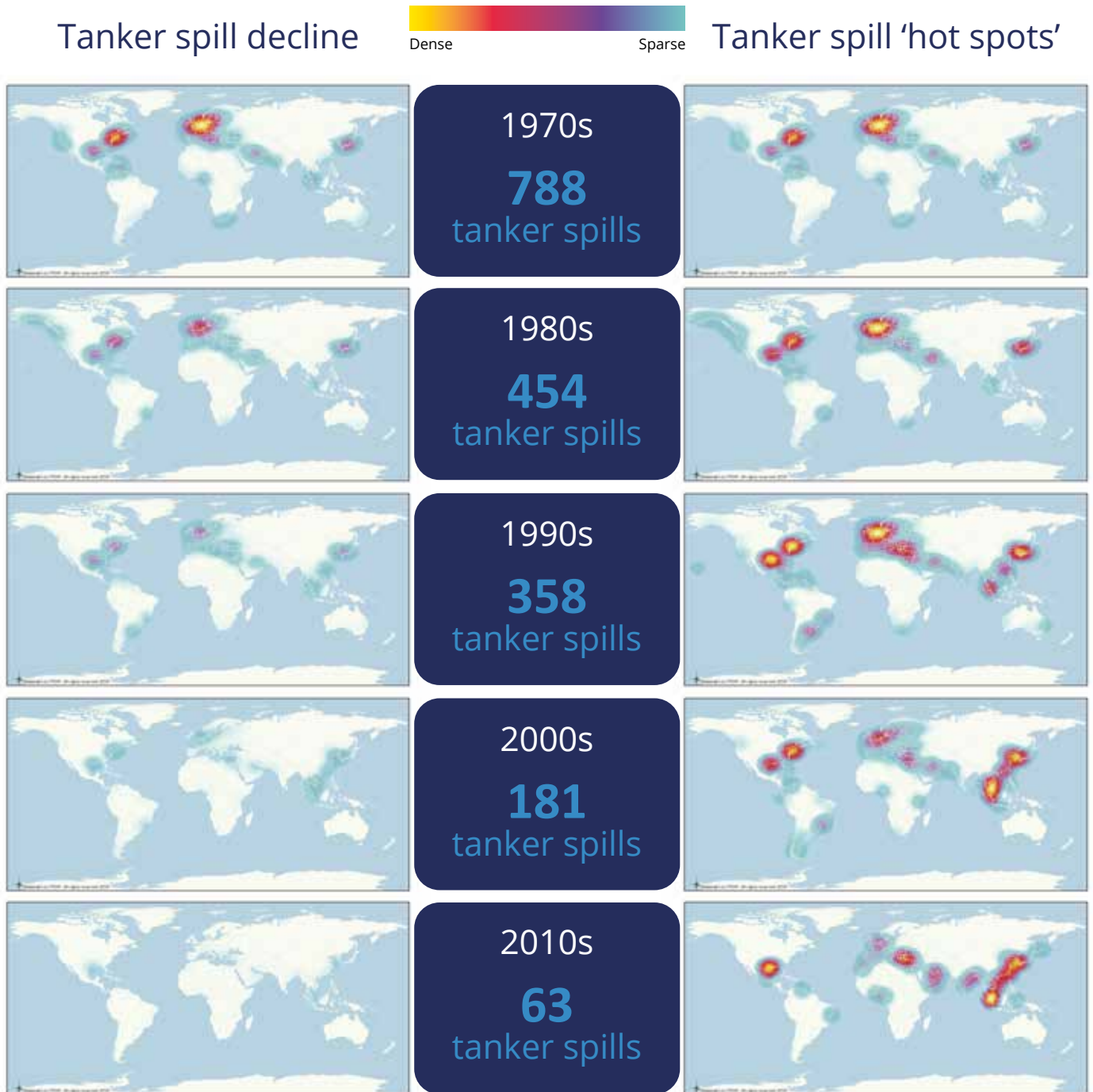
The application process is now closed for the 2021 Award. Applications will reopen in September 2021 for the 2022 Award. If you would like to be added to our mailing list for updates or have any questions about the Award, please email rdaward@itopf.org or keep an eye on our website (<http://www.itopf.org/in-action/r-d-award/>).

Global distribution of tanker spills over the last 50 years

ITOPF regularly reports on the reduction of oil spills from tankers over time, but we can also explore global distribution patterns of incidents with the use of GIS.

The time-series heat maps below are derived from ITOPF's tanker spills database and include spills of 7 tonnes and over.

The maps on the left show the decrease in tanker spills across all regions over the decades; the maps on the right show the regions with the highest relative spill densities per decade, highlighting a gradual shift eastward.



The left-hand maps use constant rendering so different decades can be compared equally; the right-hand set use dynamic rendering which recalculates density based on the data available per decade. To note: Inland spills and a small percentage of cases for which no location data is available are excluded from the maps.

Do you have a tanker spill statistics query?

Please contact: Naa Sackeyfio, our Information Data Analyst, at naasackeyfio@itopf.org (please note: it is not possible to provide direct access to our database or to release the names of individual tanker incidents except for major spills).

Update on West MOPoCo Project



Contingency planning workshop, Algeria, March 2020 (Credit: CNL)

In 2018, ITOPF was part of a successful bid by the Regional Marine Pollution Emergency Response Centre for the Mediterranean Sea (REMPEC) for a project to assist with strengthening collaboration in combating oil and chemical pollution in the western Mediterranean.

This two-year project (2019-2020), known as the Western Mediterranean Region Marine Oil & HNS Pollution Cooperation Project (West MOPoCo), was coordinated by the French General Secretariat for the Sea and involved seven countries: Algeria, France, Italy, Malta, Morocco, Spain and Tunisia. It was supported by three Secretariats (REMPEC, the OSPAR/Bonn Agreement and HELCOM) and three other organisations (Cedre, ISPRA and ITOPF).

ITOPF's involvement comprised:

(i) The facilitation of national oil spill contingency planning self-assessment workshops for Morocco,



Malta, Tunisia and Algeria.

(ii) Assistance with establishing national mechanisms for the mobilisation of response equipment and experts in the event of an emergency.

(iii) Assistance with updating and upgrading the Maritime Integrated Decision Support Information System (MIDSIS TROCS).

(iv) Co-authoring the inter-regional 'Marine HNS Response Manual' in collaboration with Cedre and ISPRA. The final document will be available electronically from early 2021.

Further details are available on West MOPoCo's website <https://www.westmopoco.rempec.org/en>.



ITOPF and MPA renew MoU

ITOPF and the Maritime and Port Authority of Singapore (MPA) have renewed a Memorandum of Understanding (MoU) on oil spill response equipment and vessel rates in Singapore.

The new document, which came into effect on 24th October 2020, was signed remotely by ITOPF's Technical Director, Richard Johnson, and MPA's Port Master, Captain Kevin Wong and presented at the Singapore International Bunkering Conference and Exhibition (SIBCON) 2020 on 7th October.

The MoU was first signed in 2007 to expedite claims for compensation. It comprises pre-agreed rates for the use of resources during a spill response for vessels entered in the International Group of Protection & Indemnity Clubs (IGP&I) or incidents involving the International Oil Pollution Compensation (IOPC) Funds. This is the fourth edition of the MoU and signals the enduring success of this initiative in facilitating compensation payments for the benefit of all parties involved.



ITOPF is a bronze sponsor of London International Shipping Week – the biennial maritime event for the global shipping industry. Further details on our activities during the week will be outlined on our website later this year.

Meet the team

Here we ask some of our newer Technical Advisers about what attracted them to a position at ITOPF, how they're finding their early experiences in the role, and what they're most looking forward to.



Lauren Fear

Qualifications & previous experience

I completed a BSc (Hons) in Biology and Animal Behaviour at the University of Exeter in 2012 and then did an MSc (by research) in Biology in 2014, looking into the impacts of anthropogenic noise on coral reef fish communities. I worked as an Ecological Consultant for approximately five years before joining ITOPF as a Technical Adviser in 2019.

Why did you apply for the job?

The job description combined many of my ideals for a career, including working in science and with people, travel, and being challenging.

What sort of things have you been doing since joining ITOPF?

I have been lucky enough to be mobilised for a few spills since joining. This has involved remote island spills as well as spills in ports, across the northern and southern hemisphere. Outside of spill response, I have taken part in training exercises and awareness-raising events for ITOPF.

Any surprises?

I think the job description closely matched the job I have been working in for the last 18+ months.

What has been the highlight so far?

Being given the opportunity to work on a remote island in Indonesia, where only a handful of westerners have been recently (it took five days of travelling to reach the island). That was an amazing experience, and working for ITOPF provided this chance.

What are you looking forward to in the job?

I look forward to continuing to provide technical advice in the event of a ship-source marine spill, and I particularly look forward to working with different governments, agencies and organisations to aid an effective response. I enjoy the opportunity to travel and work in different countries, learning and experiencing the nuances of working with different cultures.



Conor Bolas

Qualifications & previous experience

My background before joining ITOPF was mainly focused on the environment and chemistry. In general, it was very varied from doing fieldwork on remote Scottish islands for genetics research on wild sheep to synthesizing pharmaceutical chemicals in industrial laboratories in Switzerland. Immediately prior I was finishing up my atmospheric chemistry PhD at the University of Cambridge, honing my technical and analytical skills.

Why did you apply for the job?

The Technical Adviser role appealed massively to me as it encompassed all the aspects of previous roles that I had enjoyed most. Here was a job where I could tackle real world problems with scientific rigour to effect real change, which for me carried some moral satisfaction. I have always enjoyed the social aspects of my jobs and at ITOPF, the teamworking really appealed as well as the social and diplomatic challenges of dealing with a vast array of cultures and stakeholders under emergency circumstances. The opportunity to travel and experience the world in such a unique way also drew me to the job.

What sort of things have you been doing since joining ITOPF?

Well, as I had hoped, no two days are the same and I never know what new challenges will come my way. I have attended incidents in Brazil, Scotland and, most recently,

Mauritius which have all been extremely effective introductions to spill response! Internally, I developed training for the team on chemical fingerprinting of oil and have been involved in the internal HNS working group.

Any surprises?

The biggest surprise for me really was the level of importance that you are propelled to when attending a spill. One day you are in the office preparing training presentations, the next day you could be in a high-energy meeting with some of the top government officials of a new country to discuss emergency measures to protect the environment.

What has been the highlight so far?

The biggest highlight for me so far has been the satisfaction of seeing my advice being followed in key moments of decision making in spill response and seeing the immediate result. An example of this was advising response personnel during an overflight along the Brazilian coast that clean-up of oil near a river inlet should be prioritised to prevent it from washing into a mangrove area and seeing clean-up teams there the next day.

What are you looking forward to in the job?

The unpredictability of this job means you never know where you may find yourself next. I am looking forward to the next call!



Andrew Le Masurier

Qualifications & previous experience

I completed a BSc (Hons) in Environmental Science at the University of Southampton in 2014 and subsequently completed an MSc in Environmental Monitoring and Assessment in 2015, with a focus on heavy metal pollution in the UK. Following graduation, I worked as a contaminated land consultant for an engineering consultancy in London for approximately four years before joining ITOPF as a Technical Adviser in September 2019.

Why did you apply for the job?

The job description was fascinating with a combination of environmental science, marine biology alongside travelling internationally in order to provide technical assistance in the event of a ship-source spill. My degrees in environmental sciences and my former employment as an environmental consultant shows that this job is perfectly aligned with my career goals.

What sort of things have you been doing since joining ITOPF?

I have been able to travel internationally twice with one being a mobilisation to Brazil and the other being a presenter at a seminar in Germany. I was also supposed to provide lectures to students at the World Maritime University in Sweden but this was cancelled due to Covid-19. However, ITOPF was able to provide the lectures online remotely. I have also provided technical assistance in remote cases in the Philippines, Taiwan and Iraq, and worked on several contingency planning documents.

Any surprises?

When I joined ITOPF back in September 2019, I could not have expected the global Covid-19 pandemic that would cause widespread international travel restrictions and lead to me primarily working from home. However, in this time ITOPF has still been able to mobilise to site (even though some local quarantine measures are mandatory upon arrival).

What has been the highlight so far?

Being given the opportunity to work in Brazil on a spill mobilisation. I had never been to South America before so it was interesting to see the differences in communication and how the people work. Over time as I attend more mobilisations in different countries I will hope to learn some of the different attitudes to business and their overall cultures.

What are you looking forward to in the job?

I look forward to being able to provide technical advice throughout the world, working alongside governments, authorities, contractors and other organisations in order to provide an effective response to a spill. I am also looking forward to researching into alternative fuels that ITOPF may be asked to assist with in the future in the event of a ship-source spill.



Thomas Sturgeon

Qualifications & previous experience

I completed a BSc in Environmental Science at the University of Plymouth and an MSc in Oceanography at the University of Southampton. Between my studies I worked as a field scientist and diver to maintain a range of remote scientific monitoring stations, and after my MSc I trained and worked at sea as an installation engineer and manager in the offshore energy and renewables industry.

Why did you apply for the job?

I felt the Technical Adviser role incorporates the key aspects that I hold in high regard for a career, ie the ability to have a positive impact on society and the environment; promotion of cross border communication and cooperation; and an opportunity for continuous personal development through interaction with experts in a range of disciplines. As well as meeting these criteria, I felt that the management team at ITOPF shared similar values to myself and the role would allow me to maintain a good work-life balance.

What sort of things have you been doing since joining ITOPF?

Having only joined ITOPF in early 2020, I have spent a large amount of my time working on the WAKASHIO case, both in the field and remotely from home. I have also provided remote advice to the Norwegian Coastal Administration and Gard on

shoreline response techniques following a spill of plastic pellets (nurdles) offshore Denmark; and have assisted IMO in the review of Kenya's new National Oil Spill Contingency Plan.

What has been the highlight so far?

Having the opportunity to work with such a diverse range of people with differing skills and experiences has probably been the main highlight for me, particularly on the WAKASHIO case. These experiences have certainly been humbling and have provided great learning opportunities.

What are you looking forward to in the job?

Considering the varied nature of the role I am looking forward to my next assignment. In particular, the challenge of applying knowledge in different scenarios and the collaboration, teamwork and stakeholder engagement that is often required to find solutions.

Staff news



David Cooper

We have welcomed four new members of staff to the team in the last year.

David Cooper joined as Company Secretary in September 2020. In this new role, David is responsible for the provision of governance support to ITOPF's directors and management team, and the smooth operation of the administrative support services functions. David is a Chartered Certified Accountant and a Chartered Secretary. He previously worked in financial services and spent several years as Company Secretary and Finance Director of a builder's merchant.



Daniela Haenle

Daniela Haenle joined as HR Adviser in September 2020. Daniela has an MA in History and English, a postgraduate diploma in HR Management and is an Associate Member of the CIPD. She is a qualified teacher and previously worked in administrative and HR roles in SMEs. At ITOPF, Daniela supports the HR Manager in providing a responsive HR service and assists with payroll, the pension scheme and benefits administration.



Sarah Grant

Sarah Grant joined ITOPF as Team Administrator – Travel and Project Support in September 2020. Sarah has a Bachelor of Arts (Media) and has spent the majority of her career in Australia working in administration and project management roles. At ITOPF, Sarah assists the team with organising national and international travel and risk assessments. She also assists with other administrative tasks, including coordinating the central diary for the office, minute taking, and tracking commitments.



Thomas Sturgeon

On the technical side, Thomas Sturgeon joined as Technical Adviser in February 2020. For more information on Thomas, see his interview on page 19.



ITOPF'S new Chairman

ITOPF's board voted unanimously to appoint Erik Hånell, President & CEO of Stena Bulk, as its new Chairman in November 2019. Erik has served on the ITOPF board since 2012 and is also on the board of Skuld P&I Club. Erik brings a wealth of experience to this role and his input into the strategic direction of ITOPF is hugely welcomed. Erik replaced Paddy Rodgers, who served as ITOPF's Chairman for five years and made an energetic and invaluable contribution to the work of the organisation.

Congratulations

Congratulations go to Amanda Howarth (Finance & Pensions Manager) who has become a Fellow of the Chartered Institute of Management Accountants; Naa Sackeyfio (Information Data Analyst) who has become a Chartered Geographer; and Alex Hunt (Technical Team Manager) who has become a Chartered Biologist, a Fellow of the Royal Society of Biology and a Member of the Marine Biological Society.



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