ITOPF

PROMOTING EFFECTIVE SPILL RESPONSE

# Handbook


2023/24

# Emergency contact

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:

**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.

It will be helpful to have as much of the following information as possible. However, please don't wait to get this before calling as early notification is important.

## ESSENTIAL 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 spilt 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 proximity to damage

HNS Chemicals

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

Oil

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

# Contents

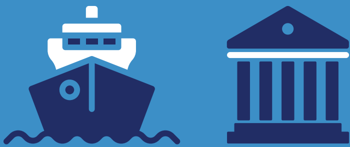


Cover photo: Vessel cleaning, Italy

ITOPF

established 1968

Spill advisers for industry & government



Operates internationally from London & Singapore

Highly skilled international team ready to assist around the clock

Marine biologists, chemists, environmental scientists, engineers, geologists

Attended
840
spills in
100
countries

Observer status at IMO and IOPC Funds


8,500 Members owning or operating 14,000 tankers totalling 465 million GT

Associates, the owners of all other types of ships, totalling 928 million GT

# ITOPF in brief

**ITOPF is maintained by the world's shipowners and their insurers on a not-for-profit basis to promote effective response to spills of oil, chemicals and other cargoes in the marine environment.**

Our technical staff have attended on-site at almost 840 shipping incidents in 100 countries to provide objective scientific advice on clean-up measures, the effects of pollutants on the environment and economic activities, and on compensation. These incidents can involve oil, chemicals and other bulk or packaged cargoes, as well as bunker fuel from all types of ship. We also provide advice in relation to oil spills from other potential sources of marine pollution, including pipelines and offshore installations; physical damage to coral reefs resulting from ship groundings; and environmental impacts associated with shipwrecks.

Our first-hand experience of pollution incidents is utilised during contingency planning and other advisory assignments for government and industry. We are an authoritative source of information on marine spills and share our knowledge at training courses and seminars throughout the world, encouraging best practice through outreach and education.

ITOPF is based in London and Singapore. The majority of our income comes from dues from shipowners, paid on their behalf by Protection and Indemnity (P&I) insurers. Shipowners are enrolled in ITOPF either as Members (for tankers, barges, LPG/LNG carriers, FPSOs/FSUs or combination carriers) or Associates (for other types of ship). Our services are provided to Members, Associates and their P&I insurers, usually at no cost, apart from expenses. We are also available to assist at the request of governments and intergovernmental organisations such as the International Maritime Organization (IMO) and the International Oil Pollution Compensation Funds (IOPC Funds).

We are overseen by an international Board of Directors representing shipowners, the energy sector and P&I insurers.

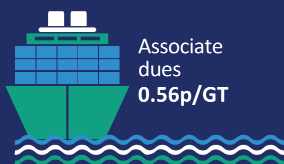
## Benefits included with ITOPF Membership & Associate Status

- emergency 24/7 technical advice and, where necessary, attendance on-site at incidents involving a spill (or potential spill) of oil, chemicals or other cargoes
- highly qualified and experienced technical staff to answer queries related to the fate and effects of these pollutants in the marine environment
- objective technical advice on the most appropriate response techniques to minimise pollution damage
- objective technical assessment of claims for compensation in conjunction with those paying compensation and claimants
- advice on realistic scenarios for testing during exercises and drills and participation in these, either remotely or in person
- advice on the preparation or updating of contingency plans
- advice concerning national, regional and international approaches to preparedness and response to spills of oil, chemicals and other cargoes
- educational seminars and workshops
- historic information and statistics relating to oil and chemical spills
- technical publications and films
- access to ITOPF's London based library
- 24/7 access to the online Membership Database to retrieve copies of Membership Record Forms (applicable to Members only)

Access to ITOPF's services is freely available and part of P&I cover.

We encourage our shipowners to make full use of the services available to them and to contact us directly if they would like further information.

Member dues **0.67p/GT** plus **£20** Administration Fee per tanker



Associate dues **0.56p/GT**

# ITOPF Directors

### Chairman

| | |
|---|---|
| Erik Hånell | Stena Bulk AB, Sweden |

### Managing Director

| | |
|---|---|
| Oli Beavon | ITOPF Limited, UK |

### Directors

| | |
|---|---|
| Alex Staring | Euronav NV, Belgium |
| Andre Kostelnik | ExxonMobil, SeaRiver Maritime, Inc., USA |
| Barbara Pickering | Chevron, USA |
| Billy Chiu | BW Maritime Pte Ltd, Singapore |
| Brian Horsburgh | Shell International Trading & Shipping Co Ltd, UK |
| Christen Guddal | Gard AS, Norway |
| Claus Grønborg | Maersk Tankers A/S, Denmark |
| Donald Kurz | Keystone Shipping Co, USA |
| Hannes Thiede | F. Laeisz Schiffahrtsgesellschaft, Germany |
| Jones Alexandre Barros Soares | Petrobras Transporte SA – Transpetro, Brazil |
| Keisuke Kobayashi | The Japan Ship Owners' Mutual P&I Association, Japan |
| Kevin Mackay | Teekay Shipping, Singapore |
| Khalid Alhammad | Bahri Ship Management, Saudi Arabia |
| Lambros Klaoudatos | BP Shipping Limited, UK |
| Lois Zabrocky | International Seaways Inc, USA |
| Maren Schroeder | Stolt Tankers, Netherlands |
| Nikolas Tsakos | Tsakos Energy Navigation, Greece |
| Ryuichi Takebayashi | Eneos Ocean Ltd, Japan |
| Sue Watkins | Steamship Insurance Management Services, UK |
| Thomas Pinto | Seven Islands Shipping, India |
| Tony Paulson | West of England P&I Club, UK |
| Zhu Mai Jin | COSCO Shipping Tanker Company Ltd, China |

As at April 2023

# Staffing

## LONDON

### Executive Office

#### Managing Director

Oli Beavon is a seasoned leader with a diverse experience base gained over three decades. He has worked and led in operational, technical, project and corporate roles across industry sectors including petrochemicals, gas, oil and shipping. Before joining ITOPF in 2021, Oli was supporting FTSE100 companies on their journey to implement agile and hybrid working with a focus on workplace, human performance, and culture. He has an MBA and is a Fellow of the Institution of Mechanical Engineers.

#### Technical Director

Richard Johnson is a marine biologist and holds a master's degree in radiation and environmental protection. Before joining ITOPF in 1994, he worked on investigating the fallout from the Chernobyl accident. Richard has attended numerous spills worldwide, including ERIKA, SEA EMPRESS and PRESTIGE, and became Technical Director in 2009 with responsibility for the strategic oversight and delivery of ITOPF's technical services.

#### Company Secretary

David Cooper joined ITOPF in 2020. He is a Chartered Certified Accountant and a Chartered Secretary. He has previously worked in financial services and as Company Secretary and Finance Director of a builder's merchant. David's main responsibilities at ITOPF are ensuring it follows good governance standards and the smooth operation of its administrative functions.

#### Executive Assistant

Jo Woodward joined ITOPF in 2016 and provides support to the Executive Office along with company secretarial responsibilities. She has worked extensively as a Board / C-suite EA and much of her career has been spent working for large retail and hotel organisations.

#### Company Secretarial Assistant

Bridget Bulana has a law degree and previously worked as a paralegal in financial services. She joined ITOPF in 2023 and provides company secretarial support and assistance with membership processes.

# Technical

## Technical Team Managers

Dr Franck Laruelle is a marine biologist and previously worked with the French research organisation Cedre, acting as a technical adviser on behalf of the French government at a number of spills, including ERIKA and PRESTIGE. Franck joined ITOPF in 2006 and currently leads ITOPF's Africa and Middle East Team.

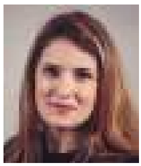
Alex Hunt is a Chartered Biologist, Fellow of the Royal Society of Biology and a Member of the Marine Biological Society. He has a master's degree in tropical coastal management and a background in coral reef damage assessment work. Since joining ITOPF in 2004 he has attended numerous shipping incidents throughout the world. Alex is Technical Manager for the Asia-Pacific Team at ITOPF and has a focus on spill preparedness projects in this region.

Dr Mark Whittington is a marine biologist with a background in fisheries, aquaculture and environmental monitoring. Prior to joining ITOPF in 2007, he worked in marine consultancy in the UK, Middle East and East Africa. Mark has attended pollution incidents worldwide, delivered national and regional training courses and supported national contingency planning projects. He currently leads ITOPF's Americas Team.

## Technical Support Manager

Tim Wadsworth has degrees in engineering and law and joined ITOPF in 1991. He became Technical Support Manager in 2006 and is responsible for ITOPF's technical support functions, including the assessment of claims.

## Senior Technical Advisers



Dr Annabelle Nicolas-Kopec is a Chartered Chemist. Since joining ITOPF in 2011, she has contributed to numerous incident responses worldwide and leads ITOPF's HNS Working Group. Annabelle is lead of the Contingency Planning and Advisory Work Functional Group within ITOPF. She has an MSc and a PhD in organic chemistry, an MSc in chemical engineering, and postgraduate research experience in analytical and synthetic chemistry.

Miguel Patel has a degree in zoology, a master's degree in environmental management, and research experience in ecotoxicology, population dynamics and habitat restoration. Since joining ITOPF in 2011, he has attended numerous incidents worldwide. Miguel leads ITOPF's Training and Education Functional Group and heads up the Environmental Damage Working Group.

**Dr Duarte Soares** is a geologist with an MSc in petroleum geoscience and a PhD in seismic stratigraphy. He has attended spills in Asia, South America, Oceania and Europe, coordinates the ITOPF R&D Award, and leads ITOPF's Monitoring Modelling & Mapping Working Group. Before joining ITOPF in 2017, he worked for the hydrocarbon industry (UK), in mining (Angola) and on geoarchaeology and environmental impact studies (Portugal).

## Technical Advisers

**Samuel Durrance** is a marine biologist with an MSc in international marine environmental consultancy and a BSc in marine biology. Before joining ITOPF in 2018, he worked as a fisheries management consultant at an international marine resource management consultancy. Sam is a member of ITOPF's Fisheries Working Group.

**Lauren Fearenga** is a biologist with an MSc by research in biology. Before joining ITOPF in 2019, she was a consultant ecologist. Lauren is a Member of the Chartered Institute of Ecology and Environmental Management (CIEEM) and a Member of the Royal Society of Biology (RSB). She leads the internal Environmental Damage Working Group, and is a member of the Waste Working Group and the Plastics New Development Working Group.

**Dr Angela Pinzón** has a BSc in microbiology, an MSc in chemistry, an MSc in analytical chemistry, and a PhD in environmental chemistry and toxicology. She helps coordinate the ITOPF R&D Award and is a member of ITOPF's HNS Working Group. Angela has previously worked on the clean-up of toxic oil refining waste, the characterisation of chemical diversity in marine organisms, and the recovery of coral populations in the Caribbean. She joined ITOPF in 2019.

**Dr Conor Bolas** has a master's degree in chemistry and holds a PhD in atmospheric and analytical chemistry. He has experience of environmental monitoring of tropical field sites in Southeast Asia and temperate ecosystems in the UK, as well as research in materials and organic chemistry in industrial laboratories. He joined ITOPF in 2019 and is a member of ITOPF's HNS Working Group.

**Susannah Domaille** joined ITOPF as a Technical Support Coordinator in 2016 after completing a BSc degree in mathematics and an MSc degree in atmosphere, ocean and climate science. In 2019, Susannah changed roles to become a Technical Adviser. Throughout her career at ITOPF, she has had a focus on oil trajectory modelling, remote sensing and aerial surveillance techniques.

**Andrew Le Masurier** is an environmental scientist with a master's degree in environmental monitoring and assessment. He previously worked for four years in the contaminated land sector, dealing with the assessment and remediation of impacted soils and groundwater across the UK. Andrew joined ITOPF in 2019.

**Thomas Sturgeon** holds a Bsc in environmental science and an MSc in oceanography. Before joining ITOPF in 2020, he spent two years working as an offshore installation engineer in the offshore energy and renewables industry, installing subsea fibre and power cables.

**Natálie Kirk** has a BSc in earth sciences and a GradDip in economics. Before joining ITOPF in 2021, she worked as an oil spill responder, and previously as a consultant for a natural resource governance institute in Myanmar and a financial analyst for an oil major.

**Dr Amy Jewell** joined ITOPF in 2022 from the University of Southampton, where she completed an MSci in oceanography with French and a PhD in palaeoclimate & geochemistry. As part of her studies, she carried out piston-coring and seismic survey operations in the Southern Ocean. At ITOPF, Amy is a member of the HNS and ESG Working Groups.

**Dr Sue Ware** is a marine ecologist with a BSc in zoology, an MSc in marine and fisheries science and a PhD in essential fish habitat. Before joining ITOPF in 2022, she worked at Cefas, where she provided advice on post spill monitoring and assessment in the UK and overseas.

**Ayumi Therrien** has a BSc in physical geography and an MSc in environmental sciences and management. She joined ITOPF in 2022, having previously worked as a spill preparedness and response specialist for the Canadian government and then for a consulting firm.

## Senior Technical Support Co-ordinator

**Phil Ruck** has a degree in physical geography, an MSc in environmental technology and previously worked at Ipieca. He joined ITOPF as Technical Adviser in 2016 and transferred to the Technical Support team in 2022, where his responsibilities include claims co-ordination and stakeholder engagement. He leads ITOPF's Claims & Compensation Functional Group and is part of the Fisheries Working Group.

## Technical Support Co-ordinators

**Jamie Stovin-Bradford** joined ITOPF in 2021 with an MSc in geophysical hazards and a BSc in geography. His role at ITOPF involves providing support to the team on modelling and monitoring, as well as assisting with the assessment of claims.

**Shania Hughes** has a BSc degree in geography and an MSc degree in environmental hazards. Before joining ITOPF in 2022, she worked for Natural Resources Wales, providing business and technical support to the Marine Service teams. Her role at ITOPF includes claims work, data management and providing advice on response resources.

## Information & Communications

### Information and Communications Manager

**Lisa Woolgar** has a degree in physics with satellite technology and a PgCert in business administration. Before joining ITOPF in 2006, she worked in the space division of a defence technology company. Lisa leads a diverse team managing the strategy, development and implementation of ITOPF's information, communications, geospatial and digital technologies.

### IT Systems Manager

**Alan Smith** has worked in IT for over 20 years in a variety of companies from SME to enterprise. He joined ITOPF in 2019 and is responsible for developing and supporting its information systems.

### Senior Information Officer

**Deborah McKendrick** has an MA in librarianship and joined ITOPF in 1996 from the Institute of Petroleum Library. She is responsible for ITOPF's publications, extensive library and website.

### Senior Data & GIS Specialist

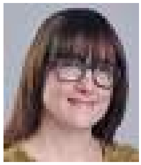
**Naa Sackeyfio** is a Chartered Geographer. She has a degree in natural resources management, a master's in GIS and previously worked for an environmental consultancy. She joined ITOPF in 2016 and her responsibilities include management of geodatabases and web applications, maintenance of the incidents and claims database, data analysis and GIS mapping.

### Communications Officer

**Joe Lane** joined ITOPF in 2022, having previously worked as a communications officer in the water industry. He has a Certificate of Higher Education in English literature and his role at ITOPF covers digital communications management, stakeholder engagement, creative content development and press duties.

# Membership

## Senior Membership Secretary



Karen Young joined ITOPF in 2008, having previously worked at the Institute of Marine Engineering, Science and Technology (IMarEST). She is responsible for managing and developing the Membership process and enrolling fixed premium Associates, including completing due diligence checks for any sanction breaches. She liaises with P&I insurers, brokers and ship managers, and issues the Membership Record Form.

# Finance

## Finance and Pensions Manager

Amanda Howarth joined ITOPF in 2000. She has an MBA and is a Fellow Chartered Management Accountant (FCMA and GMA). She has 25 years' experience of the tanker industry and has worked as Financial Controller for small entities for 30 years. Her responsibilities at ITOPF include the management of its financial and tax affairs and overseeing its pension scheme.

## Finance Officer

Jenny Maher has over 25 years' experience in preparing, managing and reporting financial information as well as implementing new accounting procedures, job costing systems and customised reports. She is responsible for ITOPF's financial management information systems and accounting transactions, which includes the collection of Membership and Associate dues.

## Finance Assistant

Chee-Ming Chung has a higher national diploma in business and finance and over 15 years' accounts experience across a variety of sectors. He joined ITOPF in 2012 and provides administrative support for ITOPF's financial activities.

# People & Culture

## People & Culture Manager

Vanessa Holliday has a business studies degree, a post graduate diploma in people management and is a Chartered Member of the CIPD, the professional body for HR and people development. She joined ITOPF in 2017, bringing experience from a varied background in HR management, most recently in the not-for-profit and public sectors.

### People & Culture Adviser

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

## Office & Administration

### Office Manager

Jayne Foster first joined ITOPF in 1998 as Team Secretary and, following a career break, re-joined in 2012 as Secretary to the Technical Director. She now manages the Office & Administration Team and has overall responsibility for administrative activities to facilitate the smooth and efficient running of the office.

### Office Administrator – Travel & Project Support

Rosalynd Wilson has a BA in photography and journalism and joined ITOPF in 2021, following six years in the pharmaceutical events industry. At ITOPF, she is responsible for organising travel, risk assessments and social events, as well as assisting the team with other administrative activities.

### Office Assistant

Teresa Rideout joined ITOPF in 2022 with support staff experience gained from working within the financial services industry. She manages reception and visitor hospitality, provides administrative support to the wider team, assists with facilities related duties, and organises team social events.

## SINGAPORE

### Head of Office / Senior Technical Adviser

David Campion is a marine biologist with a master's degree in tropical coastal management. Before joining ITOPF in 2014, he worked as Group Director of Corporate Social Responsibility for an Asian based resort company. He is the lead for ITOPF's New Developments Functional Group and a member of the Environmental Damage and Fisheries Working Groups. In 2023, he was seconded to head ITOPF's Singapore office.

### Office Manager

Marie Lee joined ITOPF in 2023, having previously worked in the tourism, education and real estate sector as well as with a UK chartered professional body. She is responsible for the day-to-day operations of the Singapore office and providing support to the Singapore team.

# Key services

ITOPF promotes effective response to marine spills of oil, chemicals and other cargoes by providing five core services. These are usually provided at no cost to our Members, Associates and their P&I insurers, apart from expenses. Our technical services are also available to other groups around the world involved with marine spills.

## RESPONSE

**Spill Response**

We are available 24 hours a day, 365 days of the year to attend spills of oil, chemicals and other cargoes in the marine environment worldwide.

**Claims Analysis & Damage Assessment**

We give advice on pollution damage caused by spills and assess the technical merits of claims for compensation.

## PREPAREDNESS

**Contingency Planning & Advisory Work**

We regularly advise governments and industry on the preparation of contingency plans and other matters related to accidental pollution from ships.

**Training & Education**

We run training courses and seminars worldwide where we share our technical knowledge and first-hand experiences.

**Information Services**

We are a primary and trusted source of information on accidental ship-source pollution.


Responding to marine spills of oil, chemicals and other cargoes is our priority service.

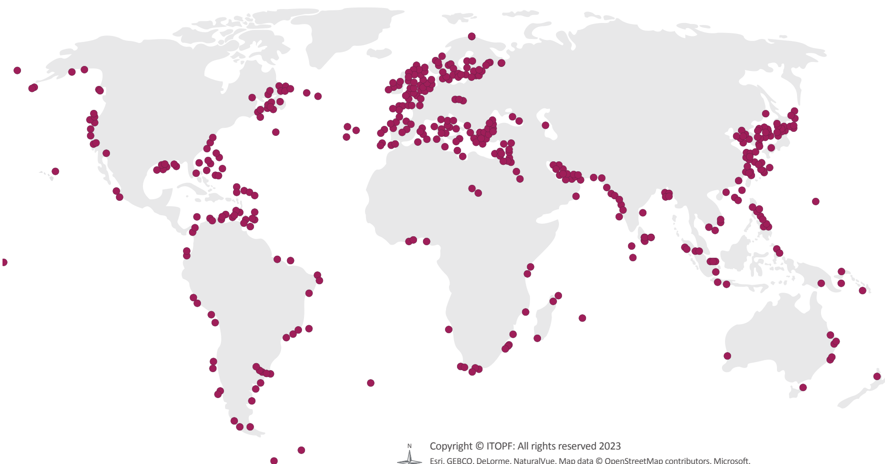
## Notification

We can be notified of an incident in a number of ways. Most often we will be contacted by the vessel's P&I insurer via our emergency contact numbers (see inside front cover). We can also be notified by our extensive network of contacts, which include correspondents, surveyors, spill response organisations, government agencies and port authorities.

## 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 cargoes
- sourcing and interpreting satellite imagery to assist with understanding oil movements and assess the on-going spill situation
- checking in-house and online resources for information on local preparedness, such as availability of contingency plans and local stockpiles
- identifying sensitive resources at risk and mapping them using our in-house GIS capabilities



Spills attended by ITOPF since 1970

Technical staff receiving helicopter underwater escape training

On-site in South Korea

- reviewing our previous in-country experience and identifying useful contacts

## Mobilisation

If the incident requires our immediate attendance, we determine the quickest and most effective way of getting on site.

Meeting with a fishermen's association, Peru

Our risk assessment process is activated to identify any travel, security or health risk concerns for the Technical Adviser mobilising.

As we provide assistance throughout the world from our offices in London and Singapore, we pride ourselves on our ability to mobilise rapidly when needed.

## On-site

Upon arrival, we are usually met by the P&I insurer's local correspondent or appointed surveyor, who will brief us on any recent developments and act as an initial guide to the area.

Our role on site will vary according to the circumstances of the incident, but it is always advisory. Decisions on the response are made by the relevant authorities. The advice we provide is based on scientific principles and our past experiences attending spills in a large range of habitats and economies.

Our role normally includes one or more of the following activities:

- advising all parties on the behaviour, fate and effects of the pollutant
- undertaking surveys to assess the extent of contamination and monitor the clean-up operation
- advising all parties on the most appropriate clean-up techniques and highlighting priority areas for clean-up
- helping 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
- 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
- attending meetings with government agencies and other parties to review progress, response decisions and logistical requirements, including waste management

Staff in the Singapore office

Liaising with colleagues from the London office

Command and control is vital in spill response, and early decisions may have a lasting benefit. For this reason, we usually try to integrate ourselves into the command centre as quickly as possible.

In all cases, our aim is to cooperate and work closely with the government agencies, contractors and other parties involved in an incident, and to reach agreement on measures that are technically justified in the particular circumstances. This not only helps to ensure that the clean-up is as efficient and effective as possible and that damage is minimised, but that subsequent claims for compensation can be dealt with promptly and amicably.

## Remote advice

We are also available to provide advice remotely from the office for cases that may not require full mobilisation. Common requests include advice on the fate and effects of a pollutant, the resources at risk or the location of response equipment.

Claims Analysis & Damage Assessment

We provide advice on the technical merit of claims for compensation arising from spills. In many cases this is a natural extension of our attendance on-site at the time of an incident. Claims assessment usually involves evaluating the reasonableness of clean-up costs and the merit of claims for damage to economic resources, such as property or businesses, according to internationally established criteria. The assessment of damage to fisheries, especially mariculture facilities, is a specialist area, which often requires detailed analysis of complex claims. We may work in conjunction with experts who have in-depth knowledge of the affected area and the economics of its particular fisheries.

Our advice is also regularly sought in relation to environmental damage caused by spills, and on the feasibility and technical justification of the restoration measures proposed.

Our role is to encourage a cooperative approach to the assessment of pollution damage with a view to facilitating the prompt and amicable settlement of claims. In this regard, we provide support both to claimants and to those who actually pay the compensation, usually the P&I insurer and/or the IOPC Funds.

These bodies – not ITOPF – ultimately decide whether or not a particular claim should be paid as factors, other than purely technical considerations, may influence the final decision.

Inspecting a fish farm, South Korea

# Contingency Planning & Advisory Work

National contingency planning workshop, São Tomé and Príncipe

We use our extensive practical experience to advise governments, industry, international agencies and other organisations on contingency planning and other matters related to preparedness for marine pollution incidents.

These activities give us the opportunity to communicate best practice outside the pressurised environment of a spill. This also enables us to build and maintain contacts within governments and organisations with whom we might work in the future.

We also regularly assist with spill drills and exercises conducted by shipowners, oil companies, governments and other groups.

National salvage and oil spill response exercise, Spain

## Training & Education

We organise and participate in training courses and seminars for government and industry around the world. These are often undertaken with key inter-governmental partners, such as IMO and the IOPC Funds, or industry bodies like IPIECA.

Training courses provide an excellent opportunity for us to share our technical knowledge and first-hand experience with those likely to be involved with an incident.

In recent years, we have incorporated a number of interactive training methods and tools to suit a wider variety of learning styles. This includes interactive table-top exercises, gamified learning and virtual reality.

Using ITOPF's aerial surveillance VR app, Spillcast event, London

Training students at the World Maritime University, Sweden

Information Services

We are a primary and trusted source of information on ship-source pollution. Unless otherwise stated, the following resources are available free of charge via our website:

**Technical Information Papers (TIPs)**, providing practical guidance on oil and chemical spill response and effects in the marine environment, available in multiple languages.

1 Aerial observation of marine oil spills
2 Fate of marine oil spills
3 Use of booms in oil pollution response
4 Use of dispersants to treat oil spills
5 Use of skimmers in oil pollution response
6 Recognition of oil on shorelines
7 Clean-up of oil from shorelines
8 Use of sorbent materials in oil spill response
9 Disposal of oil and debris
10 Leadership, command & management of oil spills
11 Effects of oil pollution on fisheries and mariculture
12 Effects of oil pollution on social and economic activities
13 Effects of oil pollution on the marine environment
14 Sampling and monitoring of marine oil spills
15 Preparation and submission of claims from oil pollution
16 Contingency planning for marine oil spills
17 Response to marine chemical incidents
18 Ship groundings on coral reefs


Spillcast event – trends, technology and the environment, London


**Response to Marine Oil Spills films**, an award winning series of eight films tackling key issues related to oil spills and how to deliver a well-planned and executed response, subtitled in multiple languages. The first seven films are available as a DVD.

1 Introduction to oil spills
2 Aerial surveillance
3 At-sea response
4 Shoreline clean-up
5 Waste management
6 Environmental impacts
7 Oil spill compensation
8 Oil spills in cold climates

**Response to Marine Oil Spills book** (2012), a comprehensive review of the problems posed by marine oil spills and appropriate response measures, available for sale priced £95 from Witherbys (https://shop.witherbys.com/).

**Oil Tanker Spill Statistics**, an annual publication providing data on accidental oil spills from tankers, combined carriers and barges since the 1970s, derived from ITOPF's database.

**Country & Territory Profiles**, short reports summarising the spill response arrangements and clean-up resources within individual maritime states.

**Ocean Orbit**, ITOPF's annual newsletter with reports on our activities and news on spill-related issues and developments.

**Annual Review**, an overview of ITOPF's activities during the last year, including the Directors' Report and Accounts.

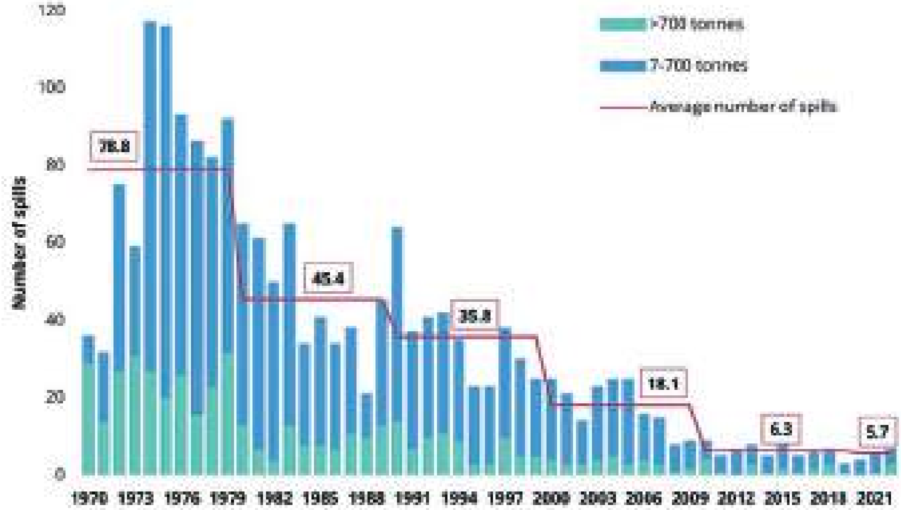
We also have a comprehensive library in London containing a unique collection of publications on marine spills, clean-up techniques, environmental effects and other related issues. This is open to students and other visitors for reference purposes by appointment.

# Oil tanker spill statistics

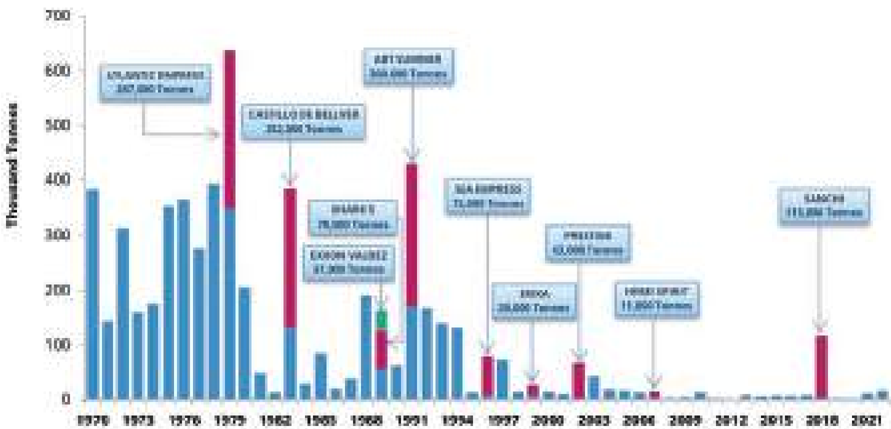
ITOPF's database contains information on approximately 10,000 oil spills from tank vessels, including combined carriers, FPSOs and barges, over 80% of which are less than seven tonnes.

## Numbers and amounts

Over the last half century, the frequency of oil spills from tankers has shown a progressive downward trend.




Numbers of large (over 700 tonnes) and medium (7–700 tonnes) tanker spills, 1970–2022



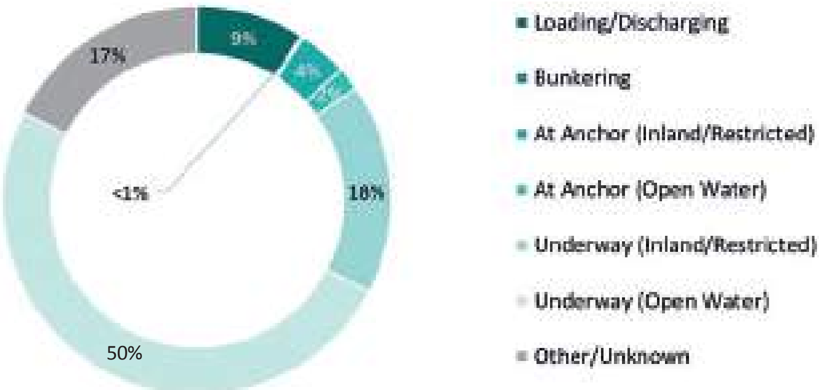

Quantities of oil spilt 7 tonnes and over (rounded to nearest thousand) from tanker incidents, 1970–2022

The average number of spills of 7 tonnes or more in the 2010s was about six per year, from a high of 79 in the 1970s and is now largely stabilising at a low level. This reduction has been due to the combined efforts of the oil/shipping industry and governments (largely through IMO) to improve safety and pollution prevention.

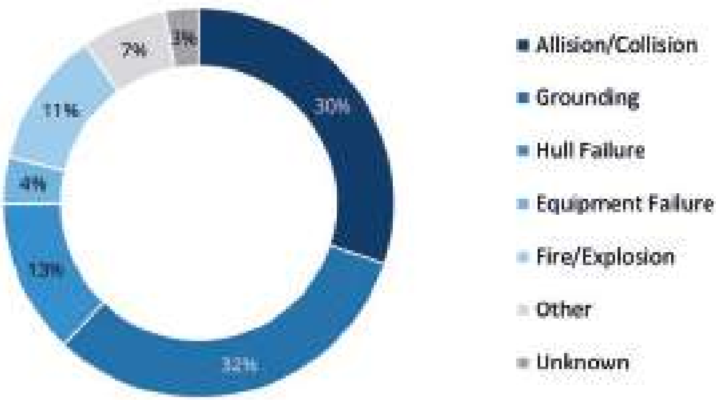
Statistics for the quantity of oil spilled through the decades show a similar trend.  However, this trend can be distorted by a single large spill.

## Causes of spills

Spills of different sizes have been evaluated in terms of the operation taking place at the time and the primary event leading to the spill. During the period 1970-2022, 50% of large spills (>700 tonnes) occurred while the vessels were underway in open water and 18% while underway in inland or restricted waters. The main causes of large spills were allisions/collisions (30%) and groundings (32%).




Operation at time of incident for large tanker spills (>700 tonnes), 1970–2022




Causes of large tanker spills (>700 tonnes), 1970–2022

# ITOPF R&D Award

The ITOPF R&D Award provides financial support to projects that have the potential to lead to improvements in our knowledge and understanding of issues related to accidental marine pollution from ships, such as spill preparedness and response, and techniques for monitoring and restoring environmental resources.

The Award was established in 2011 and **provides up to £75,000** each year to support a combination of PhD and short-term projects.

For individual projects, funding is capped at the following levels:

**Short-term projects - up to £60K**
This can be spread over 1-2 years and can include research costs, staff costs and overheads, and travel expenses.

**PhD research projects - up to £40K plus a student stipend and university fees**
This sum (grant) is provided for research costs in instalments for the duration of the PhD. Additionally, a competitive annual stipend and contribution towards tuition fees are payable to the successful candidate each year for the duration of their research (up to 4 years).

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. Applications are invited from all academic disciplines, although preference is given to those with an applied scientific focus.

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.

Over half a million pounds has already been awarded to projects worldwide through this scheme. This has increased our knowledge on a range of topics, including the impact of chemically dispersed oil on fish health, remote sensing in icy waters, the characteristics of low sulphur fuel oils, the efficacy of different dispersion mechanisms, the fate and behaviour of spilled chemicals, and the rehabilitation of oiled birds.

To apply for the ITOPF R&D Award, please visit our website at **www.itopf.org/in-action/r-d-award/**

For further information contact us at **rdaward@itopf.org**

**Important dates**
1st September – Applications open
1st December – Applications closing date
March 2024 – Award granted

# Different types of marine spills

Spills of hydrocarbon-based oils from ships have been the focus of ITOPF's work from the outset, initially from tankers and later from a wide range of ships. Over time, our activities have expanded to include other types of pollution at sea – including spills of vegetable oils, a wide range of hazardous chemicals, dry bulk cargoes, including coal and wood, as well as the vast array of raw and manufactured goods and products carried on board containerships. Here we provide an overview of some of the pollutants that ITOPF is called to deal with.

## Hydrocarbon oils

Spills of hydrocarbon oils carried as cargo or bunker fuel remain our core activity. Further information on their fate and effects and appropriate clean-up activities are provided on pages 31-45.

## Vegetable oils

The carriage of vegetable oils, such as palm, canola and soybean oil, has increased in recent years. Although less toxic than hydrocarbon oils, spills of vegetable oils in the marine environment can prove problematic, nonetheless.

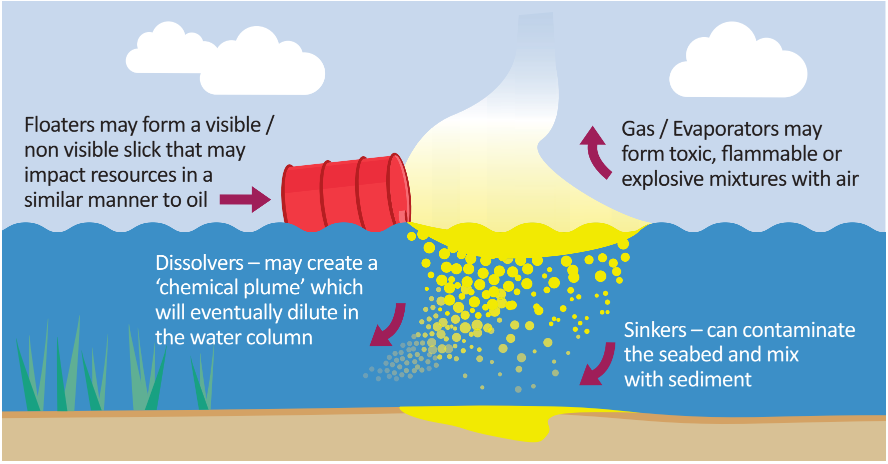
In general, vegetable oils will behave similarly to hydrocarbon oils in the initial stage of a spill, in that they tend to float and spread on the surface of the water. However, vegetable oils are not very soluble in water; they do not undergo dispersion in the water column nor will they evaporate to any extent. Depending on their particular characteristics, they may form solid lumps or polymerise into floating rubbery strings.

Vegetable oils are comprised primarily of triacylglycerols or fatty acids and in their fresh state may be broken down by marine micro-organisms. This decomposition contributes to the rancid odours typical of these spills.

The primary environmental consequences of spills of vegetable oils are seen in relation to surface dwelling organisms where oil can lead to smothering, suffocation and starvation. Examples include oiling of bird plumage and animal fur, or oxygen depletion and asphyxiation.

The most appropriate response technique for vegetable oil spills is containment and recovery, such as using conventional booms combined with scoops, nets or grabs. Ideally, the floating lumps should be removed

Lumps of palm stearin washed ashore, Hong Kong




Behaviour of spilled chemicals

before they have chance to fragment, incorporate sediment and sink to the seabed or reach the shoreline. Dispersants formulated for use on hydrocarbon oils have been shown to have little or no effect on vegetable oils.

## Chemicals

Spills of chemicals are less frequent than spills of oil. However, due to the wide variety of chemicals transported, their differing properties and fate in the marine environment, as well as potential effects on human health and safety, they can often prove to be a more complex challenge.

Chemicals can be categorised in a number of ways, for example whether they are a solid, liquid or gas when transported or spilled; whether they exhibit one or more of five hazards: flammable, explosive, toxic, corrosive or reactive; and whether they sink, dissolve, float or evaporate in water (or a combination of these processes), as illustrated above.

The effects of a spilled chemical will depend on a number of factors such as its toxicity, the quantities involved and the resulting concentrations in the environment. Even sub-lethal concentrations of hazardous chemicals can lead to long term impacts within the marine environment. For example, chemically-induced stress can reduce the overall ability of an organism to reproduce, grow, feed or otherwise function normally.

Some substances can persist for long periods in the marine environment once lost to sea, including heavy metals and some organic compounds. This can result in bio-accumulation, whereby the chemical builds up in tissue at a faster rate than it can be broken down. Sessile marine species that filter seawater for food, such as bivalve molluscs, are particularly vulnerable to this effect. Subsequent bio-magnification may also occur if the chemicals travel up the food chain and ultimately to humans.

The potential consequences of spills

of hazardous chemicals mean that effective response planning is crucial. A response should be mounted only once a thorough safety assessment of the situation has been completed. A number of different models are available to predict how a substance will behave and its likely trajectory, as well as assessing fire, explosion and toxicity risks.

Response options for many chemicals are limited and monitoring, without necessarily undertaking an active response, must always be considered. If a response is required, responders should wear appropriate personal protective equipment (PPE). For gases and evaporators, techniques available include "knocking down" the vapour cloud or trying to stop or deflect it using water sprays. For dissolvers, acceleration of the natural processes of dispersion and dilution may be possible. Containment and recovery may be an option for some floating chemicals, depending on their flammability, whilst mechanical dredgers and pump/vacuum systems might be used to recover chemicals that have sunk to the seabed.

For all types of chemical spill, maintaining adequate health and safety for vessel crew, responders and the public is key. In a major casualty, the presence of spilled hazardous chemicals can affect the clean-up of spilled oil, requiring detailed risk assessments for all involved.

## Coal

Although fairly infrequent, coal spills recently attended by ITOPF have typically occurred in sensitive tropical regions where reefs and fisheries are present.

Common problems with large spills of coal include smothering and abrasion. The coal may sink, blocking light to sea bed flora and fauna and restricting water circulation. Any fixed or slow

Coal spill, Indonesia

Containership casualty, Sri Lanka

moving benthic organisms, including corals, may be crushed or trapped and have limited access to food sources, potentially causing mortality. Negative impacts are exacerbated by high wave energy which can throw coal repeatedly against shoreline substrates causing physical damage through abrasion.

Small particles of coal (or fines) may remain suspended in the water column for some time and in calm waters coal 'clouds' can block light and reduce the photosynthetic ability of organisms. Mobile organisms will move to better light sources, but fixed organisms are vulnerable to starvation, with corals particularly at risk. Fines released close to mariculture facilities or water intakes can clog pumping equipment or affect stock.

The removal of large amounts of stranded coal can present logistical challenges in remote environments; manual recovery is usually required rather than reliance on mechanical resources due to access or availability issues. Furthermore, coal may become buried by subsequent tides and become difficult to remove, particularly in dynamic environments.

Storage of recovered coal should be managed with care. An awareness of the potential for self-combustion of stored coal is important. In areas of high rainfall, leachate should be managed to prevent contamination through runoff.

The above issues, particularly smothering, can apply equally to spills of other types of dry bulk cargoes, for example, iron and nickel ores, fertilisers, sulphur and cement.

## Other cargoes

The loss of cargoes, such as wood, foodstuffs and livestock, bring their own set of variables and challenges. Rotting or decomposing organic materials, for example, grain, thawing fish or rotting carcasses, can result in the generation of hydrogen sulphide gas which is particularly hazardous when allowed to accumulate in confined spaces as it is highly toxic and flammable.

## Container ship losses, including plastics

Container ship incidents are an area of increasing concern, not least the consequential loss of plastics into the marine environment. The recovery of containers is challenging in itself, but for breached containers, the sheer amount and variety of materials to recover - from packaged chemicals and foodstuffs to home electronics and textiles – often requires a lengthy response.

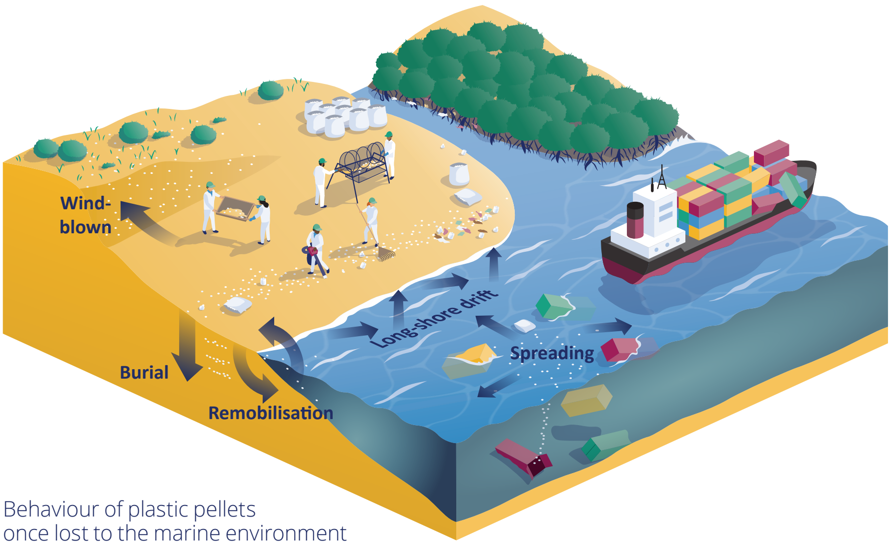
An understanding of the integrity of the container and the packaged contents inside may provide an indication of whether the containers are likely to remain intact, float or sink if lost overboard. The response actions, as with oil, will depend on the specific properties and characteristics of the materials in question. Larger floating solids can be corralled from boats using nets and then recovered using grabs.  Sunken materials may require dive surveys, dredges or crane grabs.

Incidents can become particularly complex when non-oil cargoes mix with spilled oil. This can make the identification of hazardous materials amongst other cargoes more difficult and present challenges for the segregation of waste for disposal.

Containerised goods are highly diverse, but most contain some form of plastic – either as parts of the cargo itself or as a means of packaging. Following a recent spate of cases, specific attention is currently focused on the issue of plastic pellet pollution.

Plastic pellets, also referred to as nurdles, are typically the size of a

Plastic pellets washed ashore, Sri Lanka




Behaviour of plastic pellets
once lost to the marine environment

lentil and the building blocks for the manufacture of plastic goods. They are highly persistent and are found ubiquitously in the marine environment. Plastic pellets have a propensity to harbour persistent organic pollutants and can therefore be potentially harmful to wildlife if ingested.

Plastic pellets can spread over vast distances if released to sea and, due to their size, are extremely challenging to locate and remove. In most cases, at-sea response is not considered a viable option for individual pellets. For shoreline clean-up, a rapid response is essential (to minimise the opportunity for pellets to remobilise or become buried by tidally transported sediments), alongside continuous surveys and dynamic prioritisation. Early notification to authorities and response organisations is essential for source control and mitigation.

Means of mechanical recovery of plastic pellets are currently limited, but in development. Manual recovery, though labour-intensive and time-consuming, is often the most effective clean-up option, as it is selective and reduces the amount of unpolluted material recovered. This mainly involves the use of sieves and water separation techniques.

Endpoints can be difficult to establish in plastic pellet cases, particularly in polluted areas where container contents may be difficult to distinguish from background levels of contamination.

# Fate of oil spills

The fate of oil spilled in the marine environment is dependent upon factors such as the initial physical and chemical properties of the oil, the quantity spilled, the prevailing climatic and sea conditions and whether the oil remains at sea or is washed ashore.

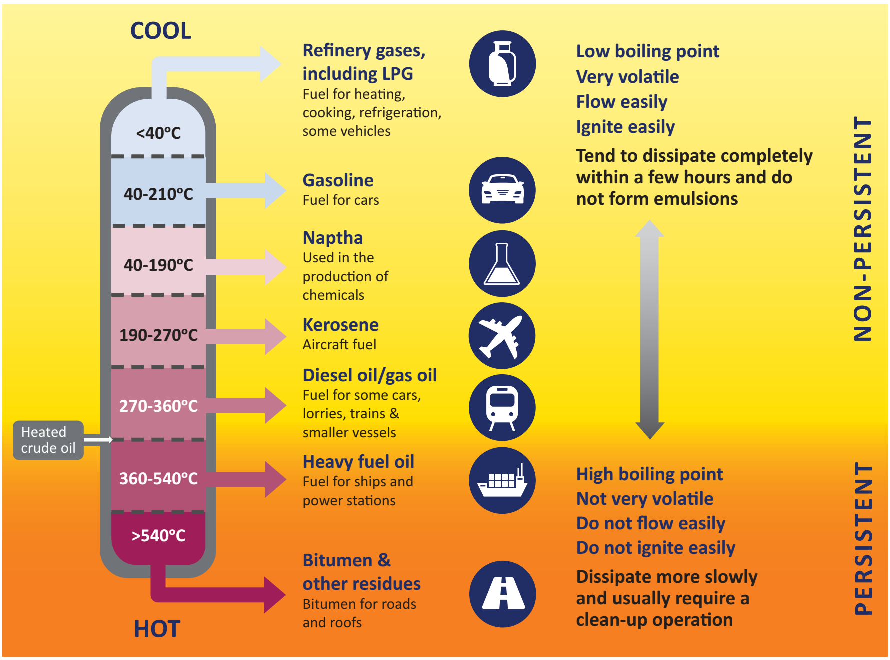
## Oil properties

Crude oil is made up of a complex mixture of compounds. These range from very volatile, light materials such as propane and benzene, through medium-weight liquids, which include kerosene and diesel, to more complex heavy compounds such as bitumens, asphaltenes, resins and waxes.

Different fractions have different boiling points and can be separated during the refining process by distillation. The schematic below summarises the main fractions obtained from crude oil, as well as their uses, properties and fate when spilled.

The main properties of oil which affect its behaviour when spilled oil at sea are:

- specific gravity (its density relative to pure water - often expressed as °API or API gravity)
- distillation characteristics (its volatility)
- viscosity (its resistance to flow)
- pour point (the temperature below which it will not flow)




Crude oil and its distillation fractions

# Classification of oils according to their specific gravity

## Group 1 oils

**A**: °API > 45 (Specific gravity < 0.8)
**B**: Pour point °C
**C**: Viscosity @ 10–20°C: less than 3 CSt
**D**: % boiling below 200°C: greater than 50%
**E**: % boiling above 370°C: between 20 and 0%

| | A | B | C | D | E |
|---|---|---|---|---|---|
| Aasgard | 49 | -28 | 2 @ 10°C | 58 | 14 |
| Cossack | 48 | -18 | 2 @ 20°C | 51 | 18 |
| Curlew | 47 | -13 | 2 @ 20°C | 57 | 17 |
| F3 Condensate | 54 | <-63 | 1 @ 10°C | 81 | 0 |
| Gippsland | 52 | -13 | 1.5 @ 20°C | 63 | 8 |
| Hidra | 52 | -62 | 2.5 @ 10°C | 60 | 11 |
| Terengganu condensate | 73 | -36 | 0.5 @ 20°C | >95 | 0 |
| Wollybutt | 49 | -53 | 2@ 20°C | 55 | 4 |
| Gasoline | 58 | | 0.5 @ 15°C | 100 | 0 |
| Kerosene | 45 | -55 | 2 @ 15°C | 50 | 0 |
| Naptha | 55 | | 0.5 @ 15°C | 100 | 0 |

## Group 2 oils

**A**: °API 35–45 (Specific gravity 0.8–0.85)
**B**: Pour point °C
**C**: Viscosity @ 10–20°C: between 4 Cst and semi-solid
**D**: % boiling below 200°C: between 20 and 50%
**E**: % boiling above 370°C: between 15 and 50%

**Low pour point <6°C**

| | A | B | C | D | E |
|---|---|---|---|---|---|
| Arabian Extra Light | 38 | -30 | 3 @ 15°C | 26 | 39 |
| Azeri | 37 | -3 | 8 @ 20°C | 29 | 46 |
| Brent | 38 | -3 | 7 @ 10°C | 37 | 33 |
| Draugen | 40 | -15 | 4 @ 20°C | 37 | 32 |
| Dukhan | 41 | -49 | 9 @ 15°C | 36 | 33 |
| Liverpool Bay | 45 | -21 | 4 @ 20°C | 42 | 28 |
| Sokol (Sakhalin) | 37 | -27 | 4 @ 20°C | 45 | 21 |
| Rio Negro | 35 | -5 | 23 @ 10°C | 29 | 41 |
| Umm Shaif | 37 | -24 | 10 @ 10°C | 34 | 31 |
| Zakum | 40 | -24 | 6@ 10°C | 36 | 33 |
| Marine Gas oil (MGO) | 37 | -3 | 5 @ 15°C | | |

**High pour point >5°C**

| | A | B | C | D | E |
|---|---|---|---|---|---|
| Amna | 36 | 19 | Semi-solid | 25 | 30 |
| Beatrice | 38 | 18 | 32 @ 15°C | 25 | 35 |
| Bintulu | 37 | 19 | Semi-solid | 24 | 34 |
| Escravos | 34 | 10 | 9 @ 15°C | 35 | 15 |
| Sarir | 38 | 24 | Semi-solid | 24 | 39 |
| Statfjord | 40 | 6 | 7 @ 10°C | 38 | 32 |

Note: High pour point oils only behave as Group 2 at ambient temperatures above their pour point. Below this treat as Group 4 oils.

## Group 3 oils

**A**: °API 17.5–35 (Specific gravity 0.85–0.95)
**B**: Pour point °C
**C**: Viscosity @ 10–20°C: between 8 CSt and semi solid
**D**: % boiling below 200°C: between 10 and 35%
**E**: % boiling above 370°C: between 30 and 65%

**Low pour point <6°C**

| | A | B | C | D | E |
|---|---|---|---|---|---|
| Alaska North Slope | 28 | -18 | 32 @ 15°C | 32 | 41 |
| Arabian Heavy | 28 | -40 | 55 @ 15°C | 21 | 56 |
| Arabian Medium | 30 | -21 | 25 @ 15°C | 22 | 51 |
| Arabian Light | 33 | -40 | 14 @ 15°C | 25 | 45 |
| Bonny Light | 35 | -11 | 25 @ 15°C | 26 | 30 |
| Iranian Heavy | 31 | -36 | 25 @ 15°C | 24 | 48 |
| Iranian Light | 34 | -32 | 15 @ 15°C | 26 | 43 |
| Khafji | 28 | -57 | 80 @ 15°C | 21 | 55 |
| Sirri | 33 | -12 | 18 @ 10°C | 32 | 38 |
| Thunder Horse | 35 | -27 | 10 @ 10°C | 32 | 39 |
| Tia Juana Light | 32 | -42 | 500 @ 15°C | 24 | 45 |
| Troll | 33 | -9 | 14 @ 10°C | 24 | 35 |
| IFO 180 | 18–20 | 10–30 | 1,500–3,000 @ 15°C | | – |

**High pour point >5°C**

| | A | B | C | D | E |
|---|---|---|---|---|---|
| Cabinda | 33 | 12 | Semi-solid | 18 | 56 |
| Coco | 32 | 21 | Semi-solid | 21 | 46 |
| Gamba | 31 | 23 | Semi-solid | 11 | 54 |
| Mandji | 30 | 9 | 70 @ 15°C | 21 | 53 |
| Minas | 35 | 18 | Semi-solid | 15 | 58 |

Note: High pour point oils only behave as Group 3 at ambient temperatures above their pour point. Below this treat as Group 4 oils.

## Group 4 oils

**A**: °API <17.5 (Specific gravity >0.95) or
**B**: Pour point >30°C
**C**: Viscosity @ 10–20°C: between 1500 CSt and semi-solid
**D**: % boiling below 200°C: less than 25%
**E**: % boiling above 370°C: greater than 30%

| | A | B | C | D | E |
|---|---|---|---|---|---|
| Bachaquero 17 | 16 | -29 | 5,000 @ 15°C | 10 | 60 |
| Boscan | 10 | 15 | Semi -solid | 4 | 80 |
| Cinta | 33 | 43 | Semi -solid | 10 | 54 |
| Handil | 33 | 35 | Semi -solid | 23 | 33 |
| Merey | 17 | -21 | 7,000 @ 15°C | 7 | 70 |
| Nile Blend | 34 | 33 | Semi-solid | 13 | 59 |
| Pilon | 14 | -3 | Semi-solid | 2 | 92 |
| Shengli | 24 | 21 | Semi-solid | 9 | 70 |
| Taching | 31 | 35 | Semi-solid | 12 | 49 |
| Tia Juana Pesado | 12 | -1 | Semi-solid | 3 | 78 |
| Widuri | 33 | 46 | Semi-solid | 7 | 70 |
| IFO 380 | 11–15 | 10–30 | 5,000–30,000 @ 15°C | | |

*Example oils classified according to their °API (American Petroleum Institute gravity). Indicative ranges of expected viscosities and distillation characteristics are provided for each group. Generally, when spilt, persistence increases with group number. However, if an oil cools to below its pour point temperature, it will change from a liquid to a semi-solid. This can occur for certain oils irrespective of whether they are classed as Group 2, 3 or 4. The pour points of oils classed as Group 1 are sufficiently low so as not to be a concern in the marine environment.*

In addition, wax and asphaltene content influence the degree to which the oil will mix with water to form a water-in-oil emulsion.

## Weathering

When oil is spilled at sea it normally spreads out and moves on the sea surface with wind and currents while undergoing a number of chemical and physical changes. These processes are collectively termed weathering and include:

**Spreading** – the speed at which this occurs depends greatly upon the viscosity of the oil and the volume spilled.

**Evaporation** – the more volatile components of an oil will evaporate to the atmosphere at a rate dependent upon the ambient temperature and wind speed.

**Sinking** – oils of sufficiently high density may sink; this occurs more readily in brackish or fresh water.

**Dispersion** – the breakup of the slick into fragments and droplets of varying sizes; this proceeds most rapidly with low viscosity oils in the presence of breaking waves.

**Emulsification** – the incorporation of water into oil; this can increase the volume of pollutant up to five times.

**Stranding** – oil may strand on shore due to the action of waves and tides. The type of shoreline substrate can affect the fate of stranded oil.

**Dissolution** – the dissolving of soluble components; this makes only a minor contribution to the removal of oil from the sea surface.

**Oxidation** – the reaction with oxygen, promoted by sunlight, means oil can form persistent tars most commonly seen as tarballs.

**Sedimentation** – dispersed oil can interact with sediment particles and organic matter to sink to the seabed.

**Biodegradation** – the metabolisation of oil by micro-organisms; this is dependent on temperature and upon the availability of oxygen and nutrients.

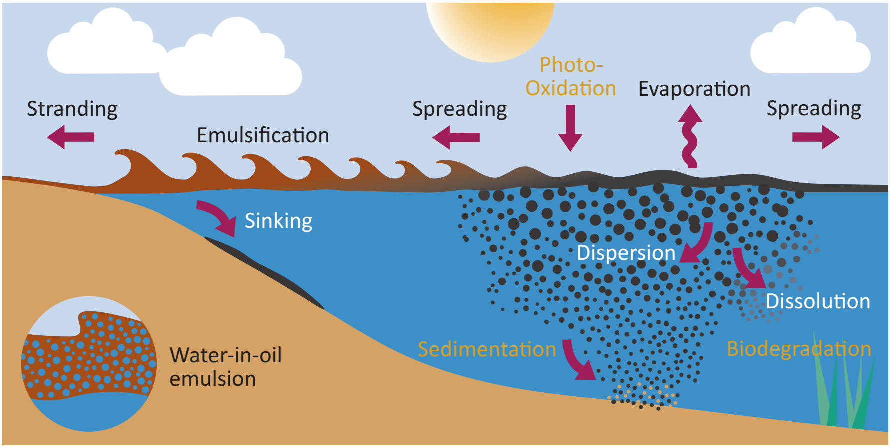
As a general rule, each process can be put into one of two chronological categories in terms of when their effect is most significant:

**Early stage of a spill:** spreading, evaporation, sinking, dispersion, emulsification, dissolution, and stranding.

**Later stage of a spill:** oxidation, sedimentation and biodegradation. These are longer term processes that will determine the ultimate fate of the oil spilled.

Some of these processes, like natural dispersion, lead to the removal of the oil from the sea surface, and facilitate its natural breakdown in the marine environment. Others, particularly the formation of water-in-oil emulsions, cause the oil to become more persistent and remain at sea or on the shoreline for prolonged periods of time.

The speed and relative importance of the processes depend on factors such as the quantity and type of oil spilled, weather and sea conditions. Once washed ashore, the fate of an oil depends on factors such as the type of substrate and wave energy. Ultimately, spilled oil is usually dealt with in the marine environment through the long-term process of biodegradation.



Weathering processes acting on oil at sea

A number of models are available for predicting the trajectory and weathering of oil spills at sea. These can serve as a useful guide to understanding how a particular oil is likely to behave and help when assessing the scale of impact.

## Persistence

When considering the fate of spilled oil at sea, a distinction is frequently made between persistent oils and non-persistent oils.

As a rule, persistent oils break up and dissipate more slowly in the marine environment and usually require an active clean-up response. Persistent oils typically include crude oils, fuel oils, lubricating oils and heavier grades of marine diesel oil. These oils pose a potential threat to natural resources when released, for example, through impacts to wildlife, smothering of habitats or oiling of amenity beaches and mariculture facilities.

In contrast, non-persistent oils will dissipate rapidly, primarily through evaporation. As a result, spills of these lighter oils rarely require an active response beyond monitoring. Non-persistent oils include gasoline, light diesel oil and kerosene. Impacts from non-persistent oils may include effects on paint coatings in marinas and harbours and, at high concentrations, acute toxicity to marine organisms.

Persistence is also important when it comes to the international compensation regimes. The IOPC Funds have developed guidelines which define persistence according to the distillation characteristics of the oil. Under these guidelines an oil is considered non-persistent if at the time of shipment at least 50% of the hydrocarbon fractions, by volume, distil at a temperature of 340°C (645°F) and at least 95% of the hydrocarbon fractions, by volume, distil at a temperature of 370°C (700°F) when tested in accordance with the American Society for Testing and Materials (ASTM) Method D86/78 or any subsequent revision thereof.

# Oil spill response techniques

The selection of the most appropriate response strategy will depend on many factors, including: the resources available; the national and local regulations on oil spill response; the spill scenario; and the physical and ecological characteristics of the area affected by the spill.

Sometimes oil will dissipate and eventually degrade naturally without impacting the coast or wildlife. In these cases, monitoring the movement and fate of the floating slicks may be a sufficient response. For spills in coastal waters, the oil will often drift towards the shore and become stranded due to the action of waves and tides and an active clean-up response will be required.

## At-Sea Response

## Containment & recovery

Containing floating oil within booms for recovery by specialised skimmers is often seen as the ideal solution to a spill at sea as, if successful, this will physically remove the oil from the marine environment. As a result, it is the primary at-sea response strategy adopted by many governments around the world.

For a containment and recovery operation to be successful, there are some key challenges that must be overcome. The floating oil needs to be located and the equipment deployed in an effective arrangement. The sea state and weather conditions should be sufficiently calm for the selected equipment to function as designed and to be operated safely by response personnel. The oil must also be in a state that is amenable for recovering with the skimmers that are available. Importantly, sufficient storage should be available to meet the pumping capability of the skimmers. These interrelated factors commonly combine to limit the proportion of spilled oil that can be recovered at sea. Nonetheless, where environmental conditions and equipment availability

At-sea response, North Sea

Cleaning oiled boom, USA

Skimming operations, Philippines

allow, containment and recovery is an important response strategy.

## In-situ burning

The controlled burning of oil slicks at sea often at, or near, the spill source has the potential to rapidly remove relatively large amounts of oil from the sea surface. However, there are a number of operational constraints that limit the feasibility of this response method, including the difficulty of collecting and maintaining a sufficient thickness of oil to burn. The condition of the oil is also important; as it weathers the oil may lose lighter fractions through evaporation and start to form an emulsion making ignition difficult. Residues from burning may sink, with potential effects on sea bed ecology and fisheries, and there may also be human health concerns from the fire or smoke plume. Given the many factors to consider, the decision-making process for in-situ burning should be addressed during the contingency planning process.

## Dispersants

Dispersants work by enhancing the natural dispersion of the oil into the sea. They do this by facilitating the formation of numerous small droplets which rapidly dilute into the water column and are subsequently degraded by naturally occurring micro-organisms. Significant environmental and economic benefits can be achieved with dispersants, particularly when other at-sea response techniques are limited by weather conditions or the availability of resources.

Dispersants can be applied by a variety of methods. In general, spraying dispersant from vessels and small aircraft or helicopters is more suitable for treating smaller spills and nearshore areas; large multi-engine planes are better for handling large offshore spills. The key to successful chemical dispersion is the ability to target the thickest part of the oil slick in a timely manner, before it becomes viscous through evaporation or has formed an emulsion. Some types of oil, such as heavy fuel oil and viscous crude, are less amenable to dispersion from the outset. Dispersant use can be controversial, at times generating widespread debate in the media and public forums. Whilst its use can be viewed as a way of minimising the potential impacts of oil on sensitive resources, it is also sometimes seen as adding another unwanted pollutant into the environment.

**The decision on whether or not to use dispersants is seldom clear-cut and a balance has to be struck between the advantages and limitations of the different available**

Shoreline clean-up, Peru

**response options, conflicting priorities for protecting sensitive resources from pollution damage and cost-effectiveness.**

As with all clean-up options, detailed contingency planning will aid in the decision process. In particular, dispersant use is usually regulated by government agencies and planning for its use may allow the necessary licenses and permissions to be expedited.

## Shoreline clean-up and response

Once oil has reached the shoreline, the selection of the most appropriate clean-up techniques requires a rapid evaluation of the degree and type of contamination, together with the length, nature and accessibility of the affected coastline. Where possible, it is important to start removing oil from affected shorelines as quickly as possible to minimise its remobilisation and potential to affect other areas. As time passes and the oil weathers, it may adhere to rocks and sea walls or become mixed or buried in sediments.

Shoreline clean-up operations are often considered in three stages; Stage 1 – removal of bulk oil; Stage 2 - removal or treatment in-situ of oiled shoreline substrate, for example oiled sand or gravel (often the most protracted part of shoreline clean-up); and Stage 3 – final clean-up of light contamination and removal of stains, if required. Consideration needs to be given to the environmental sensitivity of the shoreline to ensure that the planned level of cleaning will not cause more harm than allowing the oil to degrade naturally.

During Stage 1 clean-up, the use of vacuum trucks, pumps and skimmers may be useful on pooled liquid bulk oil. For very viscous or emulsified bulk oil or oil-soaked sediment, a variety of non-specialised civil engineering or agricultural machinery may be used to collect and remove stranded oil and contaminated material. In many parts of the world, manual collection is an important strategy and can be particularly useful on sensitive shores and areas inaccessible to vehicles.

Importantly, with Stage 2 clean-up, collection of unoiled material should be kept to a minimum to prevent shoreline erosion and avoid excessive waste. Preferably, oiled material should be treated in-situ, for example by flushing (a technique using high volumes of low-pressure water to wash stranded or buried oil from shorelines) or surf washing (whereby the natural cleaning action of shoreline waves are used to release oil from shore sediment).

During the latter stages of a shoreline clean-up, other techniques may be deployed to complete the work. These include high pressure washing (using either hot or cold water), particularly on man-made structures; drum washing of pebbles and cobbles in concrete mixers or purpose built facilities; and ploughing or harrowing using tractor-towed implements or sand sieving/ beach cleaning machines for high amenity use beaches.

Flushing trapped oil from rocks, Peru

In situations where restricted access to rocky or cobble shorelines prevents the use of pressure washing or other equipment, manual cleaning may be the only option for the active removal of oil.

The use of bioremediation products, which accelerate the natural degradation of oil, is not normally recommended on open shorelines as biodegradation is rarely limited by nutrients and/or biodegrading organisms. Furthermore, the time required for complex oil compounds to degrade is longer than the timescales usually desired to return an area to its normal use.

In time, most shorelines will clean naturally as the oil weathers and degrades. On high-energy sites, natural cleaning can be very effective, and the majority of oil is likely to be removed within a seasonal cycle. However, along sheltered shorelines, particularly with fine sediment, such as saltmarshes, or in cold climates, natural degradation can proceed very slowly and oil may persist for many years.

## Disposal

Cleaning up oil spills can generate significant amounts of waste. This includes not just the recovered oil itself, but oiled cargo, debris, shoreline sediment, fauna and flora, mariculture infrastructure, response equipment and materials, and protective clothing (PPE). The waste generated may amount to over ten times the volume of oil originally spilled, particularly if non-selective shoreline clean-up techniques are employed. As a consequence, waste can cause major logistical problems and delays for the clean-up operation and even bring the response to a standstill, unless adequate arrangements are in place, including temporary storage and transportation, as well as final disposal.

**The best and most obvious option for waste is to minimise the recovery of unoiled material and treat as much oiled substrate in-situ as possible.**

Different types of waste are often disposed of differently, so it helps to separate the waste and keep it segregated from the outset. This is not always easy, but it saves time and money and makes it much easier to direct the waste towards the appropriate treatment or disposal method.

In many countries, the most practical and cost-effective disposal options still take precedence over more sustainable waste management choices. This means that much oily waste goes for incineration or into landfill. However, some waste streams can be treated to facilitate re-use. For example, recovered liquid oil can be blended into feedstock for use in oil refineries or with fuel oils for burning in power stations. This is an option that works best with oil collected from the sea rather than the shoreline, as the former typically contains less debris. Oily sand that does not contain too much debris can also be minimised by stabilising it using quicklime for use in land reclamation and road construction.

Temporary storage of oiled waste, Solomon Islands

# Contingency planning & response management

The effectiveness of the response to an oil spill depends largely on the quality of the contingency plan and the organisation and control of the clean-up operation. Once oil has spilled, events can move rapidly and having the necessary infrastructure, logistical support and leadership in place makes for a more effective response.

## Pre-planning

Careful planning before an incident occurs allows key decisions to be made outside the pressurised environment of a real incident. The process of producing a plan provides the opportunity to define the roles and responsibilities of the different parties likely to be involved in a spill and the organisational structure for effective command and control. It also allows for the assessment of the particular risks of a spill and its expected consequences, and identifies sensitive environmental and economic resources, priorities for protection and clean-up, effective response strategies and operational procedures.

It is crucial that plans are living documents, prepared by those agencies, organisations and stakeholders that might be involved in a response, and incorporate a high degree of local knowledge. Thorough testing of the plan through regular exercises will help ensure that all participants are familiar with their roles.

Contingency planning exercise, Côte d'Ivoire

In line with best practice, contingency planning often follows the concept of 'tiered' response. This is a widely accepted and convenient way to categorise response levels and provides a practical basis for planning. Spills that are small can often be dealt with locally (Tier 1). Should an incident prove beyond the local capability or affect a larger area, an enhanced but compatible response will be required, drawing upon resources based further afield (Tier 2). The foundation of this tiered response is the local plan for a specific facility, such as a port or oil terminal, or for a specific length of coastline at risk from a spill. These local plans may form part of a larger district or national plan (Tier 3). National plans may in turn be integrated into regional response arrangements covering two or more countries. In general, contingency plans should follow a similar format. This will enable the plans to be easily understood, assist compatibility and ensure a smooth transition from one tier level to the next.

## As events unfold

Aerial surveillance is an important element of planning during a response, and can establish the scale and nature of an incident at an early stage, verifying predictions of the movement and fate of oil. Once operations are underway, it provides information that facilitates the appropriate deployment of resources at sea, the timely protection of sites along threatened coastlines and the prioritisation of resources for shoreline clean-up. Advances in remote sensing – using satellites or unmanned aerial vehicles (UAVs) – offer huge potential for monitoring and responding to oil spills safely and efficiently.

The efficient management of resources engaged in shoreline clean-up is vital to the success of the operation. In deciding which clean-up techniques are to be used, the management team have to consider the interests of all concerned with the various local uses of the marine environment, for example, recreation, tourism, fisheries, industry and marine conservation. Proper organisation of the workforce and activities on the shoreline is also crucial so that the clean-up is undertaken in the safest and most effective way possible, and that unnecessary impacts on the environment are avoided.

All clean-up activities should be monitored regularly and re-evaluated constantly using information gained from aerial surveillance and personnel on site. Strategic decisions can be reassessed to determine whether the scale of the response remains appropriate to the size and severity of the spill.

Joint surveys, undertaken by representatives of the various interested parties, are commonly undertaken in order to bring operations to a successful close.

Aerial surveillance, Philippines

Joint survey, Thailand

# Effects of marine oil spills

## Environmental

Oil spills can have serious and wide-ranging impacts on wildlife, fisheries, and coastal and marine habitats, but long-term damage at an ecosystem level is rare.

Oil spills are often portrayed as "environmental disasters" in the media and such perceptions, fuelled by distressing images of oiled birds and contaminated shorelines, are understandable. A science-based appraisal of typical oil spill effects, however, reveals that while damage occurs and may be severe at the level of individual organisms, populations are more resilient. With time, ecosystems can re-establish, even after severe disruptions and/or extensive mortality. Recovery can be assisted by the removal of oil through well-conducted clean-up operations and may sometimes be accelerated with carefully planned restoration measures.

### General effects

The effects of oil on marine organisms is caused either by its physical nature or by its chemical components.

Physical smothering will affect an organism's ability to continue critical functions, such as respiration, feeding and thermoregulation. This is most common with heavier oils and weathered residues.

Chemical toxicity may arise as a result of chemical components being absorbed into organs, tissues and cells. This does not always cause mortality, but may induce temporary effects like narcosis and tainting of tissues, which usually subside over time. This is more common with light oils and refined products.


Oiled shoreline, Peru

Marine life may also be affected by clean-up operations, indirectly through physical damage to the habitats in which they live, or through the loss of key organisms that alter the ecosystem dynamics.

The effects of an oil spill will depend on a variety of factors. These include the quantity and type of oil spilled, and how it interacts with the marine environment; the season and prevailing weather conditions; the biological and ecological attributes of the area and its sensitivity to oil pollution; and the type and effectiveness of the clean-up response.

## Effects on specific marine organisms and habitats

### Plankton

The upper layers of the sea support a myriad of planktonic organisms, including bacteria, eggs and larvae, and a variety of animal and plant species. It is well established that plankton is sensitive to oil exposure and consequently short-term impacts would be expected in the immediate vicinity of the oil. However, plankton is abundant and will naturally suffer very high levels of mortality. As a result, a large proportion of a given species will remain unaffected by the oil and it is rare for plankton mortalities following a spill to have lasting consequences.

### Fish

Although the eggs and larvae of fish may be susceptible to the effects of oil, adult fish tend to be more resilient. Reductions in wild fish stocks in offshore and coastal waters following oil spills have rarely been detected, as fish can detect unfavourable water conditions and actively swim away to avoid them. Where mass mortalities have arisen, it has been because of very high, localised concentrations of dispersed oil in shallow or confined waters. Fish mortalities can occur with caged fish stocks where individuals are unable to actively avoid the oil.

Wildlife rehabilitation, Peru

### Seabirds

In open water, seabirds are some of the most vulnerable of all animals to oil spills, and in some incidents large numbers may perish. Fouling of plumage (which is essential for thermoregulation and buoyancy control) is the most visible effect. Although cleaning and rehabilitation of birds may be attempted, success is often linked to the species of bird, and in many cases only a small fraction of those treated will survive or breed successfully after release. However, it is encouraging that with experience and research, best practices for bird cleaning are emerging and rehabilitation success is improving. Increasingly, oil spill contingency plans define policies on how to deal with oiled seabirds and wildlife.

### Sea mammals and reptiles

Oil can potentially cause harm to the nasal tissues and eyes of marine mammals and reptiles as they come to the surface to breathe. Mammals that rely on fur to regulate body temperature may also be harmed or die from hypothermia or overheating if their fur becomes matted with oil. For species that breed on shorelines, the greatest impact is likely to be on their breeding sites if they become contaminated with oil.

Oiled mangrove, Philippines

### Coastal waters and shorelines

The impacts of a spill in nearshore waters are most often related to exposure to high concentrations of naturally or chemically dispersed oil. Where tidal flushing is insufficient to dilute the dispersed oil below harmful levels, high mortalities of benthic organisms can occur.

Shorelines, more than any other part of the marine environment, are exposed to the effects of oil as this is where it naturally tends to accumulate. Shorelines can be impacted both by the toxic effects of high concentrations of dispersed oil at high tide or suffer the smothering effect of oil stranded at low tide. Many species and individual organisms found here are inherently tough and resilient, however, because they have evolved to survive in a highly dynamic environment with periodic fluctuations in temperature and salinity, storms or other severe stresses. This tolerance also gives many shoreline organisms the ability to withstand and recover from oil spill effects.

Within shallow inshore waters and the shoreline zone, three habitats are particularly sensitive to oil pollution; coral reefs, saltmarshes and mangroves. These ecologically rich and diverse habitats are important for providing coastal protection and as nursery grounds for many invertebrate and fish species. They tend to be found at, or close to, the border between sea and land, and are, therefore, at high risk of contamination during oil spills. Because of the turbulence and wave action associated with reefs, corals may be exposed to naturally dispersed oil droplets. This may cause interference with reproductive processes and lead to abnormal behaviour and reduced, or suspended, growth. The communities that reef habitats support are also sensitive to oil.

Saltmarshes and mangroves are typically found on sheltered shores and natural recovery of these complex ecosystems may take a long time. It is in these marsh and mangrove areas where reinstatement measures, such as planting mangrove seedlings, may have potential to accelerate recovery.

## Recovery

The natural variability of animal and plant populations, which are subject to ever-changing environmental phenomena such as hurricanes, tsunamis and anthropogenic pressures, makes it difficult to determine the point of recovery following an oil spill, and the time that this will take.

**A return to exact pre-spill conditions is unlikely, but it is generally accepted that recovery is reached when a community of plants and animals characteristic of that habitat is established and functioning normally.**

Long-term damage has been recorded in a few instances. However, in most cases, even after the largest oil spills, the affected habitats and associated marine life can be expected to have broadly recovered within a few seasons.

# Economic

Significant economic losses can be experienced by industries and businesses dependent on coastal resources. Usually, the tourist and fisheries sectors are where the greatest impacts are felt.

## Tourism

Contamination of coastal amenity areas is a common feature of many oil spills, but disruption to recreational activities is usually relatively short-lived. Once shorelines are clean, normal activities and tourist-related trade would be expected to resume. However, longer-term economic impacts can occur when public perception of prolonged and widescale pollution remains long after the oil has gone. In some cases, promotional campaigns may help to counteract negative publicity generated by the spill.

## Fisheries and mariculture

Oil spills can cause serious damage to fisheries and mariculture resources. Physical contamination can affect stocks and disrupt business activities by fouling gear or impeding access to fishing sites. In order to preserve market confidence and to protect fishing gear, fishing or harvesting bans may be imposed or voluntarily implemented. In some cases, bans are imposed if contamination in seafood exceeds acceptable limits.

All fishery damage needs to be documented and, where possible, supported by evidence in order to facilitate the compensation process. This often requires rigorous scientific sampling and analysis. It is often difficult to separate the effects of an oil spill from other factors, such as over-fishing and industrial pollution. In order to make the best assessment of spill-related damages, it is necessary to compare post-spill recovery with pre-spill conditions.

## Other industries/businesses

Heavy industry, such as power stations and desalination plants, that rely on seawater for normal operations can be at high risk from oil spills, particularly if water intakes are close to the surface. If such plants are responsible for meeting needs on a national scale, disruptions can be far reaching. Other types of coastal industry, such as shipyards, ports and harbours, can also be disrupted both by oil spills and subsequent clean-up operations.

Cleaning port infrastructure, Thailand

# Pollution liability and compensation

Oil spills may result in expenditure and financial loss for a variety of affected organisations and individuals. Despite the best efforts of those concerned, the response and clean-up can be protracted and costly. Oil may arrive on a shoreline resulting in damage to property and the environment, with economic loss to fishing, tourism and other commercial activity. Those placed at a financial disadvantage as a result of a spill of oil may be eligible for compensation.

Four international conventions, developed through IMO and described below, provide the basis for compensation for oil spill damage and clean-up costs in many countries. To be applicable, governments must sign up to each convention and implement them into their own national law.

The conventions apply in the waters of signatory countries (party states) regardless of the nationality of the shipowner or the registered flag of the vessel.

| Convention | Applicability | Source of compensation | Financial limit[1] | Signatory States[2] |
|---|---|---|---|---|
| 1992 Civil Liability Convention[3] | Tankers carrying persistent oil cargo & bunker fuel oil or residues of persistent oil cargo | Shipowner/ insurer | Dependent on GT up to ~$118 million | 146 |
| 1992 Fund Convention | | 1992 Fund | ~$268 million | 121 |
| 2003 Supplementary Fund Protocol | | Supplementary Fund | ~$990 million | 32 |
| 2001 Bunkers Convention | Bunker fuel oil from all ships | Shipowner/ insurer | Dependent on GT | 105 |
| 2010 Hazardous and Noxious Substances Convention (not yet in force) | Ships carrying cargoes of HNS, including non-persistent oils | Shipowner/ insurer | Dependent on GT, bulk goods up to ~$132 million; packaged goods up to ~$152 million | 6 |
| | | HNS Fund | ~$330 million | |

Summary of international conventions applicable to ship-source marine pollution

[1] Limits converted to US $ from SDR (Special Drawing Rights) as defined by the International Monetary Fund, as at 9 March 2023.
[2] As at March 2023. An up-to-date list of Contracting States is available at www.imo.org/en/About/Conventions/StatusOfConventions/Pages/Default.aspx.
[3] Five additional countries are signatory solely to the 1969 Civil Liability Convention. This earlier iteration of the CLC provides a significantly reduced liability limit and applicability, and has been superseded by the 1992 Protocol.

## Civil Liability and Fund Conventions

The Civil Liability and Fund Conventions provide a mechanism for compensation for a spill, or the threat of a spill, of persistent[4] oil carried in tankers[5].

The CLC provides the first level of compensation, paid by the owner or insurer of the tanker. CLC places strict liability on the tanker owner (subject to a number of specific exceptions). This means that compensation may be available even if the pollution was not due to any fault of the owner and in most instances without the need for a claimant to involve the courts. At the same time, the CLC allows the tanker owner's liability to be limited to an amount of money dependent upon the size (gross tonnage) of the tanker. The limitation amount varies according to the version of the CLC in force in the affected country (ie CLC '69 or '92). Ships carrying more than 2,000 tonnes of persistent oil as cargo must maintain adequate insurance or other financial security to cover this liability. Evidence of insurance is normally provided by a 'Blue Card' issued by the insurer and a Convention certificate issued by a signatory country.

The 1992 Fund Convention provides a second level of compensation for a spill, or the threat of a spill, of persistent oil from a tanker, when claimants do not obtain full compensation under the CLC '92. In 2003, a protocol to the 1992 Fund was adopted. This established the Supplementary Fund, providing a third level of compensation.

To date, no incidents have involved the Supplementary Fund. The Fund Conventions are administered by the International Oil Pollution Compensation Funds (IOPC Funds), an intergovernmental organisation based in London, and financed by a levy on receivers of persistent oil in its Member states.

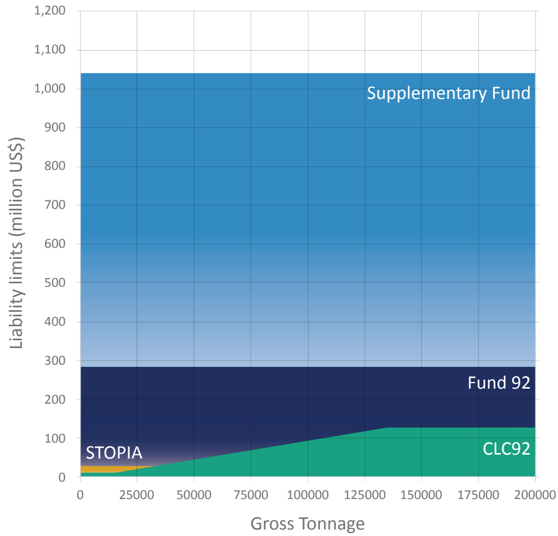
The Civil Liability and Fund Conventions cover claims for pollution response (preventive measures), damage to property and the environment, economic loss, and post-spill studies.

### STOPIA and TOPIA

To ensure the equitable sharing of compensation payments between tanker owners and oil receivers under the Civil Liability and Fund Conventions, two voluntary agreements were introduced in 2006. The Small Tanker Oil Pollution Indemnification Agreement (STOPIA) applies to small tankers, insured by a P&I Club within the International Group of P&I Clubs (IG), that cause pollution damage in a country in which the 1992 Fund Convention is in force. Under STOPIA 2006, the liability under CLC 1992 for owners of tankers up to 29,548 gross tonnes (GT) is increased to about $26 million.

A second agreement, known as the Tanker Oil Pollution Indemnification Agreement (TOPIA), allows the owner of a tanker, insured by an IG P&I Club to reimburse the 2003 Supplementary Fund for 50% of the amounts paid in compensation by that Fund.

[4] A definition of persistence is provided on page 34.
[5] A tanker is defined under the two Conventions as a seagoing vessel or seaborne craft constructed or adapted to carry oil in bulk as cargo.




Compensation limits under the 1992 Civil Liability and Fund Conventions (including 2003 Supplementary Fund Protocol and Small Tanker Oil Pollution Indemnification Agreement–STOPIA)

## Bunkers Convention

The Bunkers Convention provides compensation for pollution damage, including clean-up costs, caused by oil used for the operation or propulsion of a ship, including lubricating oil[6]. It is applicable to any type of sea-going vessel.

The Bunkers Convention is a single-tier compensation regime modelled on the CLC, but has no provision for additional compensation above the shipowner's limit. As with CLC, a key requirement of the Bunkers Convention is the need for the registered owner of a vessel (over 1,000 GT for the Bunkers Convention) to maintain compulsory insurance to cover liability, evidenced by a Blue Card and Convention certificate. The limit of liability of the shipowner is determined by separate applicable national legislation or an international limitation regime, such as the Convention on Limitation of Liability for Maritime Claims (LLMC). The Bunkers Conventions covers the same type of claims as the CLC.

## Hazardous and Noxious Substances (HNS) Convention
(not yet in force)

The 2010 HNS Convention applies to incidents at sea involving hazardous substances carried by any sea-going craft, for example tankers and bulk carriers carrying bulk cargoes, as

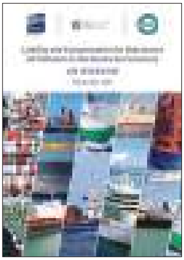
[6] Bunker oil is defined as any hydrocarbon mineral oil, including lubricating oil, used or intended to be used for the operation or propulsion of the ships and any residues of such oil.

well as container ships carrying packaged goods. A large number of substances are included under the HNS Convention, including non-persistent oils such as gasoline and kerosene, vegetable oils and chemicals, as referenced in various IMO conventions and codes. Radioactive materials and some bulk solids, such as coal and iron ore, are excluded.

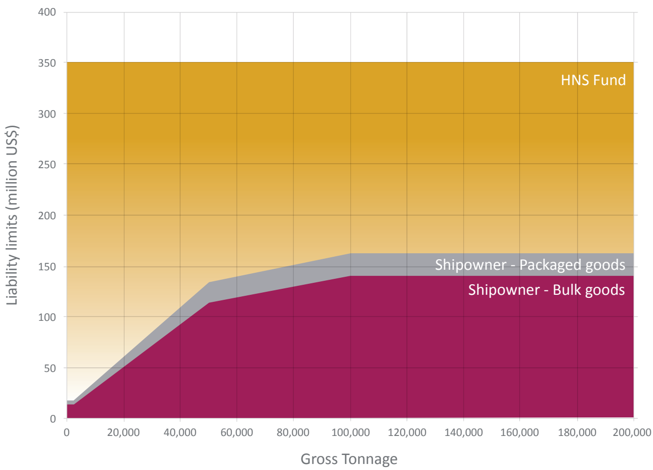
The HNS Convention is modelled largely on the Civil Liability and Fund Conventions, with a two-tier system for compensation, strict liability for the shipowner and a system of compulsory insurance and insurance certificates. However, it goes further in that it covers not only pollution damage (including preventative measures), but also the risks of fire and explosion, including loss of life or personal injury.

As with the CLC/Fund regime, the first level of compensation is paid by the shipowner or insurer of the vessel, up to an amount dependent upon the size of the ship, and whether the HNS is in bulk or packaged form. An HNS Fund, made up of contributions from the receivers of HNS cargo, provides a second level of additional compensation when full compensation is not available from the shipowner.

The 2010 HNS Convention does not apply to oil pollution damage from tankers covered under CLC '92. However, non-pollution damage caused by persistent oil, for example damage caused by fire or explosion, will be covered.

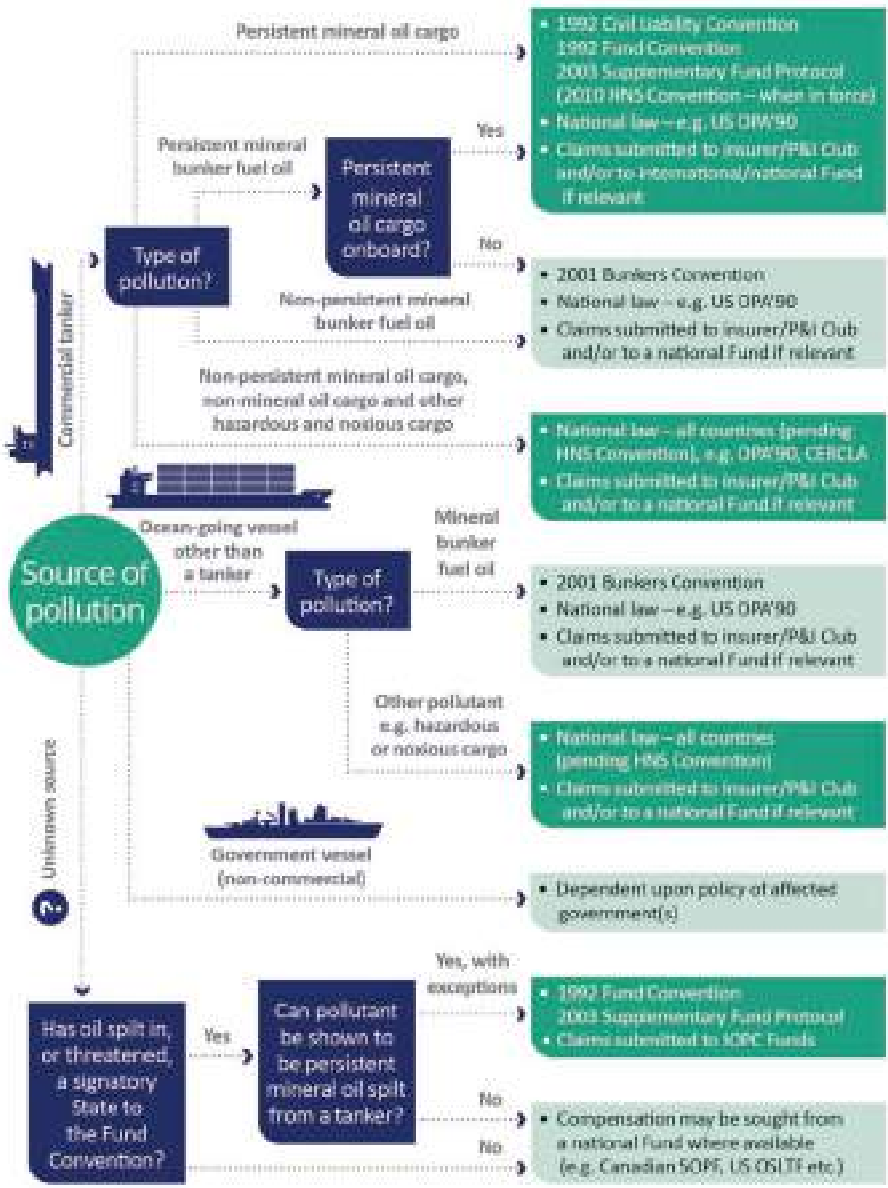


**More detailed information on the international pollution liability and compensation regime is available in the publication left and on the websites of IMO, the IOPC Funds and the International Group of P&I Clubs, as well as ITOPF.**




Compensation limits under the 2010 HNS Convention showing the limits in US$ for vessels of Gross Tonnage up to 200,000GT.

# Pollution Damage Liability and Compensation



## Claims

Claims arising under the four primary conventions are usually handled by the shipowner's insurer in the first instance. Where applicable, the insurer (usually one of the P&I Clubs) and the IOPC Funds cooperate closely in the assessment of claims, often using joint experts such as ITOPF. Guidance is available on the admissibility of claims, the types of evidence required to support a claim, and how a claim should be formulated and submitted[7]. In the event of a major incident, a local clams office is usually established to assist potential claimants and to facilitate the submission of claims.

It is the responsibility of the claimant to provide adequate evidence of a loss, and further information and evidence may be requested during the claim assessment process. The assessment may therefore take the form of iterative exchanges between the claimant and those responsible for settling the claim, until the process has been completed. In most cases, agreement on the amount of compensation to be paid is reached on an amicable basis, without the need for legal action and associated costs.

## National legislation

While the regime of international compensation conventions aims

| Source tank vessel (US$) | Liability limits for five ship sizes (US$ rounded) |
|---|---|
| For an oil cargo tank vessel less than or equal to 3000 GT with a single hull, including a single-hull tank vessel fitted with double sides only or a double bottom only.<br><br>The greater of $4,000 per GT or $8,070,400 | 2,000 GT = $8 million |
| For a tank vessel less than or equal to 3,000 GT, other than a vessel referred to above.<br><br>The greater of $2,500 per GT or $5,380,300 | 2,000 GT = $5 million |
| For an oil cargo tank vessel greater than 3,000 GT with a single-hull, including a single-hull tank vessel fitted with double sides only or a double bottom only.<br><br>The greater of $4,000 per GT or $29,591,300 | 10,000 GT = $40 million<br><br>50,000 GT = $200 million<br><br>100,000 GT = $400 million<br><br>200,000 GT = $800 million |
| For a tank vessel greater than 3,000 GT, other than a vessel referred to above.<br><br>The greater of $2,500 per GT or $21,521,000 | 10,000 GT = $25 million<br><br>50,000 GT = $125 million<br><br>100,000 GT = $250 million<br><br>200,000 GT = $500 million |

Tank vessel liability limits under OPA '90 (as updated 23rd March 2023 )

[7] See ITOPF Technical Information Paper 15: Preparation and submission of claims from oil pollution.

to provide global uniformity for all scenarios of ship-source marine oil pollution, these conventions have not been ratified universally or, as in the case of the HNS Convention, are not yet in force. In incidents where an international convention does not apply, liability and compensation will be dependent upon legislation established nationally. This legislation can be highly specific, such as the Oil Pollution Act of 1990 (OPA '90) in the USA (described below), or be based on broader laws developed originally for other purposes. As a result, liability and the availability of compensation can vary widely from country to country.

### USA—Oil Pollution Act of 1990 and Oil Spill Liability Trust Fund

The Oil Pollution Act of 1990 (OPA '90) is a comprehensive piece of legislation that includes provisions for liability and compensation for spills of persistent and non-persistent oils from onshore and offshore facilities, ships and other watercraft. It also includes sections on planning and prevention activities. OPA '90 does not prevent individual US States from implementing more stringent laws for releases of oil and many have done so.

Under OPA '90, the owner, operator or bareboat charterer for a vessel or facility (the Responsible Party) from which oil is discharged (or which poses a substantial threat of discharge) is strictly liable for removal costs carried out in accordance with the national contingency plan, and certain specified damages resulting from the discharged oil. For ships, liability limits vary according to the type and size of the vessel.

In certain circumstances claims may be submitted to the US Oil Spill Liability Trust Fund (OSLTF), for example when the Responsible Party is unknown or refuses to pay a claim, or when the first level of liability is insufficient to satisfy all admissible claims for compensation. The Fund, funded by a tax on oil, is administered by the US Coast Guard's National Pollution Funds Center and can provide up to $1 billion for any one pollution incident.

## Other relevant conventions

### Oil Pollution Preparedness, Response and Co-operation (OPRC) Convention

The primary objective of OPRC 1990, which entered into force in 1995, is to facilitate international co-operation and mutual assistance between states and regions when preparing for, and responding to, major oil pollution incidents, and to encourage states to develop and maintain an adequate capability to deal with such emergencies. OPRC 1990 covers oil spills from offshore oil exploration and production (E&P) platforms, ports, oil handling facilities and ships.

In 2000, a Protocol was introduced extending the provisions of OPRC 1990 to encompass hazardous and noxious substances (OPRC-HNS Protocol) which entered into force in 2007.

### Wreck Removal Convention

The Nairobi International Convention on the Removal of Wrecks 2007 provides the legal basis for states to remove, or have removed, shipwrecks which pose a hazard to the safety of navigation or to the marine and coastal environments, or both. This convention entered into force in 2015.

# Status of international conventions

This table shows which countries were parties to the 1969 CLC, 1992 CLC, 1992 Fund Convention, 2003 Supplementary Fund, 1990 OPRC, OPRC-HNS, Bunkers and Wreck Removal Conventions as at 23rd March, 2023. x denotes that the convention is in force in that country, whereas + denotes that it has been ratified but is not yet in force. o denotes that the country has denounced that convention but that it has not yet taken effect. For a current list see the IMO or IOPC Funds websites (www.imo.org; www.iopcfunds.org).

| | CLC 69 | CLC 92 | FUND 92 | Supp Fund 03 | OPRC 90 | OPRC-HNS 00 | BUNKERS 01 | WRECK |
|---|---|---|---|---|---|---|---|---|
| Albania | | x | x | | x | x | x | x |
| Algeria | | x | x | | x | | | |
| Angola | | x | x | | x | | | |
| Antigua & Barbuda | | x | x | | x | | x | x |
| Argentina | | x | x | | x | | | |
| Australia | | x | x | x | x | x | x | |
| Austria | | | | | | | x | |
| Azerbaijan | x | x | | | x | | x | |
| Bahamas | | x | x | | x | | x | x |
| Bahrain | | x | x | | x | | x | |
| Bangladesh | | | | | x | | | |
| Barbados | | x | x | x | + | + | x | |
| Belarus | | | | | | | x | x |
| Belgium | | x | x | x | x | x | x | x |
| Belize | | x | x | | | | x | x |
| Benin | x | x | x | | x | | | |
| Bosnia & Herzegovina | | | | | | | | |
| Brazil | x | | | | x | | | |
| Brunei Darussalam | | x | x | | | | | |
| Bulgaria | | x | x | | x | | x | x |
| Cabo Verde | | x | x | | x | | | |
| Cambodia | x | x | x | | | | | |
| Cameroon | | x | x | | x | | | |
| Canada | | x | x | x | x | | x | x |
| Chile | x | x | | | x | x | | |
| China | | x | | | x | x | x | x |
| China (Hong Kong spec.admin.region) | | x | x | | x | x | x | |
| Colombia | | x | x | | x | x | | |
| Comoros | | x | x | | x | | x | x |
| Congo | | x | x | x | x | x | x | x |
| Cook Islands | | x | x | | | | x | x |
| Costa Rica | x | x | x | | | | | |
| Cote d'Ivoire | x | x | x | | x | x | x | + |
| Croatia | | x | x | x | x | | x | x |
| Cuba | | | | | x | | | |
| Cyprus | | x | x | | | | x | x |
| Czechia | | | | | | | x | |
| Dem. Rep. of the Congo | | | | | | | | |
| Denmark | | x | x | x | x | x | x | x |
| Djibouti | | x | x | | x | x | x | |
| Dominica | | x | x | | x | | | |
| Dominican Republic | x | x | x | | | | | |
| Ecuador | x | x | x | | x | x | | |
| Egypt | x | x | | | x | x | x | |
| El Salvador | x | x | | | x | | | |
| Equatorial Guinea | x | | | | | | | |
| Eritrea | | | | | | | | |
| Estonia | | x | x | x | x | x | x | x |
| Ethiopia | | | | | | | x | |
| Fiji | | x | x | | | | x | |
| Finland | | x | x | x | x | x | x | x |
| France | | x | x | x | x | x | x | x |
| Gabon | | x | x | | x | | x | x |
| Gambia | | x | x | | x | | | |
| Georgia | x | x | x | | x | | x | |
| Germany | | x | x | x | x | x | x | x |
| Ghana | x | x | x | | x | | | |
| Greece | | x | x | x | x | x | x | |
| Grenada | | x | x | | | | x | |
| Guatemala | x | x | | | | | | |
| Guinea | | x | x | | x | | | |
| Guinea-Bissau | | + | + | | | | x | x |
| Guyana | x | x | x | | x | x | x | x |
| Haiti | | | | | | | | |
| Honduras | x | x | | | x | | x | x |
| Hungary | | x | x | x | | | x | |
| Iceland | | x | x | | x | | | |
| India | | x | x | | x | | | x |
| Indonesia | x | x | | | x | | x | x |
| Iran | | x | x | | x | x | x | x |
| Iraq | | x | | | x | | | |
| Ireland | | x | x | x | x | | x | |
| Israel | | x | x | | x | | | |
| Italy | | x | x | x | x | | x | |
| Jamaica | | x | x | | x | | x | |
| Japan | | x | x | x | x | x | x | x |
| Jordan | | x | | | x | | x | x |
| Kazakhstan | x | | | | | | | x |
| Kenya | | x | x | | x | | x | x |
| Kiribati | | x | x | | | | x | |
| Kuwait | x | x | | | | | | |
| Latvia | | x | x | x | x | | x | |
| Lebanon | x | x | | | x | | x | |
| Lesotho | | | | | | | | |
| Liberia | | x | x | | x | x | x | x |
| Libya | x | | | | x | | | |
| Lithuania | | x | x | x | x | | x | |
| Luxembourg | | x | x | | | | x | x |
| Madagascar | | x | x | | x | x | x | x |
| Malaysia | | x | x | | x | x | x | x |
| Maldives | x | x | x | | | | | |
| Mali | | | | | | | | |
| Malta | | x | x | | x | x | x | x |
| Marshall Islands | | x | x | | x | | x | x |
| Mauritania | | x | x | | x | | | |
| Mauritius | | x | x | | x | x | x | |
| Mexico | | x | x | | x | | | |
| Micronesia | | | | | | | | |
| Moldova | | x | | | | | | |
| Monaco | | x | x | | x | | | |
| Mongolia | x | x | | | | | x | |
| Montenegro | | x | x | x | x | | x | |
| Morocco | | x | x | x | x | | x | x |
| Mozambique | | x | x | | x | | | |
| Myanmar | | x | | | x | | x | |
| Namibia | | x | x | | x | | x | |
| Nauru | | x | x | | | | x | x |
| Netherlands | | x | x | x | x | x | x | x |
| New Zealand | | x | x | x | x | | x | |
| Nicaragua | | x | x | | | | x | |
| Nigeria | | x | x | | x | | x | x |
| Niue | | x | x | | | | x | x |
| North Korea | | x | | | | | x | x |
| Norway | | x | x | x | x | x | x | |
| Oman | | x | x | | x | | x | x |
| Pakistan | | x | | | x | | | x |
| Palau | | x | x | | x | x | x | x |
| Panama | | x | x | | | | x | x |
| Papua New Guinea | | x | x | | | | | |
| Peru | x | x | | | x | | | |
| Philippines | | x | x | | x | | | |
| Poland | | x | x | x | x | x | x | |
| Portugal | | x | x | x | x | x | x | x |
| Qatar | | x | x | | x | | | |
| Romania | | x | | | x | | x | x |
| Russian Federation | | x | x | | x | | x | x |
| Saint Kitts and Nevis | x | x | x | | x | | x | x |
| Saint Lucia | | x | x | | x | x | x | x |
| St. Vincent & Grenadines | | x | x | | | | x | x |
| Samoa | | x | x | | x | | x | |
| Sao Tome & Principe | x | | | | | | x | x |
| Saudi Arabia | x | x | | | x | | x | x |
| Senegal | x | x | x | | x | | | |
| Serbia | | x | x | | | | x | |
| Seychelles | | x | x | | x | | x | |
| Sierra Leone | | x | x | | x | | x | x |
| Singapore | | x | x | | x | x | x | x |
| Slovakia | | x | x | x | | | x | |
| Slovenia | | x | x | x | x | x | x | |
| Solomon Islands | | x | | | | | x | |
| Somalia | | | | | | | | |
| South Africa | | x | x | | x | | | x |
| South Korea | | x | x | x | x | x | x | |
| Spain | | x | x | x | x | x | x | |
| Sri Lanka | | x | x | | | | | |
| Sudan | | | | | x | | | |
| Suriname | | | | | | | | |
| Sweden | | x | x | x | x | x | x | x |
| Switzerland | | x | x | | x | | x | x |
| Syria | x | x | x | | x | x | x | |
| Tanzania | | x | x | | x | | | |
| Thailand | | x | x | | x | | | |
| Togo | | x | | | x | | x | x |
| Tonga | | x | x | | x | | x | x |
| Trinidad & Tobago | | x | x | | x | | | |
| Tunisia | | x | x | | x | | x | |
| Türkiye | | x | x | x | x | x | x | |
| Turkmenistan | x | x | | | | | | |
| Tuvalu | | x | x | | | | x | x |
| Ukraine | | x | | | | | | |
| United Arab Emirates | x | x | x | | | | x | |
| United Kingdom | | x | x | x | x | | x | x |
| United States | | | | | x | | | |
| Uruguay | | x | x | | x | x | | |
| Uzbekistan | | | | | | | | |
| Vanuatu | | x | x | | x | x | x | |
| Venezuela | | x | x | | x | | | |
| Viet Nam | | x | | | | | x | |
| Yemen | | x | | | x | x | | |

# Terms and Conditions of Membership

## (effective 12th July, 2018)

1. Membership of ITOPF is subject to ITOPF's Memorandum and Articles of Association and to these Terms and Conditions, which apply to all Owners who are Members of ITOPF as at 12th July 2018, and to all Owners who thereafter are accepted for Membership. The Directors of ITOPF have the right from time to time to add to or modify these Terms and Conditions. Any such additions or modifications and their effective date will be notified to Members.

2. Membership of ITOPF is available only to an owner or demise charterer ("Owner") of a tanker, being any ship (whether or not self-propelled) designed, constructed or adapted for the carriage by water in bulk of crude petroleum, hydrocarbon products and any other liquid substance ("Tanker").

3. A Member is required to notify ITOPF (or ensure that ITOPF is notified) in writing from time to time of the name and tonnage of Tankers of which it is or becomes Owner and in respect of which it wishes to be entitled to the services of ITOPF. A Member who is no longer the Owner of any Tanker whose name and tonnage have been so notified shall automatically cease to be a Member of ITOPF.

4. Subject to these Terms and Conditions, a Member has the right to request ITOPF to provide technical and other services, advice and information ("Services") in relation to:

a) a spill (or the threat thereof) of oil, or of HNS, whether as cargo or bunkers, or of any other cargo from a Tanker, including on-site attendance to give technical advice with the aim of effecting an efficient response operation and mitigating any damage;

b) the technical assessment of damage caused by a spill of oil, or of HNS, whether as cargo or bunkers, or of any other cargo from a Tanker;

c) the technical assessment of claims for compensation resulting from a spill (or the threat thereof) of oil, or of HNS, whether as cargo or bunkers, or of any other cargo from a Tanker;

d) contingency planning, response techniques, fate and effects, and compensation resulting from a spill (or threat thereof) of oil, or of HNS, whether as cargo or bunkers, and of any other cargo;

e) training courses, drills, exercises and similar events in respect of oil, or of HNS, whether as cargo or bunkers, or of any other cargo;

f) the provision of such of ITOPF's publications as are for circulation to Members and such other general information and advice as is within the scope of ITOPF's Services.

5. It is a condition of entitlement to Services that the Member's ITOPF subscription has been paid in respect of the current year commencing 20th February and for all prior periods of Membership, either directly or by another body on the Member's behalf, and in respect of all Tankers notified pursuant to paragraph 3 of which the Member is the Owner.

6. Although under no obligation to solicit or obtain such information, ITOPF reserves the right from time to time to request any Member or its insurer to provide information satisfactory to ITOPF concerning the Member's pollution liability insurance cover. It is a condition of entitlement to Services that any Member or its insurer of which such a request is made will duly comply.

7. ITOPF reserves the right to recover costs incurred in respect of the provision of any Services from a Member, on whose behalf such costs are incurred. ITOPF will not normally charge a fee for providing Services to a Member but may do so from time to time when circumstances warrant at ITOPF's discretion. It is a condition of entitlement to Services that a Member will agree to, and arrange for, the payment of such costs and fees when so requested by ITOPF.

8. ITOPF reserves the right in its absolute discretion:

a) (i) to terminate the Membership of any Member; and/or

(ii) to decline to respond or cease responding either in whole or in part to any request by or on behalf of a Member for the provision of Services where the continuation of such Membership and/or where such response or its continuation may in any way howsoever expose ITOPF to the risk of being or becoming subject to any sanction, prohibition or adverse action in any form whatsoever by any state or international organisation;

b) not to respond to a request by or on behalf of a Member for the provision of Services where in its absolute discretion ITOPF has determined that the spill (or the threat thereof) of oil, or of HNS or any other cargo from a Tanker has arisen other than directly in connection with the operation of the Tanker including, but not limited to, as a result of a blow-out, cratering, seepage or any other uncontrolled flow from a well or reservoir or any equipment not contained within the Tanker; and/or

c) not to respond either in whole or in part to any request by or on behalf of a Member for the provision of Services whether because of a failure on the part of the Member to meet a condition set by ITOPF, or because of a lack of available ITOPF staff capacity, or for any reason which in ITOPF's absolute discretion might adversely affect ITOPF, the safety of its staff, or the provision of the Services requested. In the case of competing demands for its Services, ITOPF will normally give priority to its Members.

9. To the extent permitted by law, ITOPF shall have no liability to any Member or other person for any direct, indirect, special or consequential loss, expenses and/or costs arising out of or in connection with the provision of, or failure to provide, any Services.

Note: Membership of ITOPF and payment of the relevant subscription referred to in paragraph 5 of these Terms and Conditions of Membership is normally arranged by a tanker owner's P&I insurer. The subscription is currently calculated on the basis of 0.67 of a UK penny per gross ton plus £20 Administration fee per tanker.

# Terms and Conditions of Associate Status

## (effective 12th July, 2018)

1. Associate status of ITOPF is subject to these Terms and Conditions, which apply to all Associates of ITOPF as at 12th July 2018, and to all persons who thereafter become Associates. The Directors of ITOPF have the right from time to time to add to or modify these Terms and Conditions.

2. Associate status of ITOPF is available only to such persons as the Directors of ITOPF may determine being an owner or demise charterer ("Owner") of any ship other than a tanker ("Ship"). For these purposes "tanker" means any ship (whether or not self-propelled) designed, constructed or adapted for the carriage by water in bulk of crude petroleum, hydrocarbon products and any other liquid substance.

3. An Associate may be required to notify ITOPF (or ensure that ITOPF is notified) in writing from time to time of the name and tonnage of Ships of which it is or becomes Owner and in respect of which it wishes to be entitled to the services of ITOPF. An Associate who is no longer the Owner of any Ship shall automatically cease to be an Associate of ITOPF.

4. Subject to these Terms and Conditions, an Associate has the right to request ITOPF to provide technical and other services, advice and information ("Services") in relation to:

a) a spill (or the threat thereof) of oil, or of HNS, whether as cargo or bunkers, or of any other cargo from a Ship, including on-site attendance to give technical advice with the aim of effecting an efficient response operation and mitigating any damage;

b) the technical assessment of damage caused by a spill of oil, or of HNS, whether as cargo or bunkers, or of any other cargo from a Ship;

c) the technical assessment of claims for compensation resulting from a spill (or the threat thereof) of oil, or of HNS, whether as cargo or bunkers, or of any other cargo from a Ship;

d) contingency planning, response techniques, fate and effects, and compensation resulting from a spill (or threat thereof) of oil, or of HNS, whether as cargo or bunkers, and of any other cargo;

e) training courses, drills, exercises and similar events in respect of oil, or of HNS, whether as cargo or bunkers, or of any other cargo;

f) the provision of such of ITOPF's publications as are for general circulation and such other general information and advice as is within the scope of ITOPF's Services.

5. ITOPF will charge each Associate an annual subscription to assist in meeting its general expenses. It is a condition of entitlement to Services that the Associate's ITOPF subscription has been paid in respect of the current year commencing 20th February and for all prior periods of Associate status, either directly or by another body on the Associate's behalf and in respect of all Ships notified pursuant to paragraph 3 of which the Associate is the Owner. If in a winding-up of ITOPF there remains any surplus which is attributable to Associates' subscriptions, that surplus shall be distributed among Associates in proportion to the amounts subscribed by them.

6. Although under no obligation to solicit or obtain such information, ITOPF reserves the right from time to time to request any Associate or its insurer to provide information satisfactory to ITOPF concerning the Associate's pollution liability insurance cover. It is a condition of entitlement to Services that any Associate or its insurer of which such a request is made will duly comply.

7. ITOPF reserves the right to recover costs incurred in respect of the provision of any Services from an Associate on whose behalf such costs are incurred. ITOPF will not normally charge a fee for providing Services to an Associate but may do so from time to time when circumstances warrant at ITOPF's discretion. It is a condition of entitlement to Services that an Associate will agree to, and arrange for, the payment of such costs and fees when so requested by ITOPF.

8. ITOPF reserves the right in its absolute discretion:

a) (i) to terminate the Associate status of any Associate; and/or

(ii) to decline to respond or cease responding either in whole or in part to any request by or on behalf of an Associate for the provision of Services where the continuation of such Membership and/or where such response or its continuation may in any way howsoever expose ITOPF to the risk of being or becoming subject to any sanction, prohibition or adverse action in any form whatsoever by any state or international organisation;

b) not to respond to a request by or on behalf of an Associate for the provision of Services where in its absolute discretion ITOPF has determined that the spill (or the threat thereof) of oil, or of HNS or any other cargo from a Ship has arisen other than directly in connection with the operation of the Ship including, but not limited to, as a result of a blow-out, cratering, seepage or any other uncontrolled flow from a well or reservoir or any equipment not contained within the Ship; and/or

c) not to respond either in whole or in part to any request by or on behalf of an Associate for the provision of Services whether because of a failure on the part of the Associate to meet a condition set by ITOPF, or because of a lack of available ITOPF staff capacity, or for any reason which in ITOPF's absolute discretion might adversely affect ITOPF, the safety of its staff, or the provision of the Services requested. In the case of competing demands for its Services, ITOPF will normally give priority to its Members.

9. To the extent permitted by law, ITOPF shall have no liability to any Associate or other person for any direct, indirect, special or consequential loss, expenses and/or costs arising out of or in connection with the provision of, or failure to provide, any Services.

10. Notices to Associates may be given in such manner as ITOPF may determine and shall be deemed given if given to an Associate's insurer or by way of press advertisement.

Note: ITOPF Associate status and payment of the relevant subscription referred to in paragraph 5 of these Terms and Conditions of Associate Status is normally arranged by a shipowner's P&I insurer. The subscription is currently calculated on the basis of 0.56 of a UK penny per gross ton of entered ships.

# CORE VALUES

## COLLABORATION

inspiring teamwork and cooperation to achieve the goal of effective spill response

## INTEGRITY

engendering trust in our work through honesty and scientific principles

## OBJECTIVITY

providing unbiased, consistent advice to all who seek it

## RESPECT

empowering a friendly, supportive culture that values diversity and the abilities and experience of all

## DILIGENCE

delivering our services to the highest standards of excellence, with skill and good judgment

## Emergency contact

**+44 (0)20 7566 6999**
(UK Business Hours)

**+44 (0)20 7566 6998**
(After Hours)

*We are moving!*

## Until July 2023

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