Compensation for Environmental Damage caused by Oil Spills: an International Perspective

Presented at the AMURE[1] seminar:
"Ecological damage caused by oil spills: economic assessment and compensation"[2]
18th-19th May 2006, Institut océanographique, Paris[3]

Dr. Brian Dicks
Technical Team Manager (retired)
ITOPF, 1, Oliver's Yard
55 City Road
London EC1Y 1HQ
United Kingdom

RÈSUMÈ

L'indemnisation des coûts de nettoyage et des dommages causés par les déversements d'hydrocarbures issus de pétroliers est régit dans de nombreuses nations maritimes par deux Conventions internationales, la Convention sur la Responsabilité Civile pour les dommages dus à la pollution par hydrocarbures (CLC) et la Convention Internationale sur l'Etablissement d'un Fonds International d'Indemnisation pour les Dommages dus à la Pollution par les Hydrocarbures (FC). Ces Conventions sont entrés en vigueur au début des années 70. Les premières versions ne considéraient pas spécifiquement les dommages environnementaux. L'objectif initial était de permettre l'indemnisation des coûts raisonnables de nettoyage et des pertes économiques prouvées. Les Conventions ont été révisées a plusieurs reprises au cours des vingt dernières années, et dans la version la plus récente, (CLC et FC 1992), leur champ d'application concernant le dommage environnemental a été clarifié. Cette clarification concerne l'admissibilité des coûts des mesures raisonnables de rétablissement de l'espace dégradé et des études entreprises s'attachant à identifier puis à favoriser la restauration. Les Conventions excluent l'évaluation des dommages environnementaux par le calcul à partir d'approches théoriques et de formules mathématiques. Le champ d'application des Conventions pour ce qui concerne le dommage environnemental est exposé et des exemples de ce qui constitueraient des mesures de rétablissement et des études en relation avec le déversement raisonnables sont décrits dans cette présentation.

[1] Research Group "AMURE" (French: "AMénagement des Usages des Ressources et des Ecosystèmes marins et littoraux"; English : "Regulation of the Uses of the Marine and Coastal Ressources and Ecosystems") see: http://www.univ-brest.fr/gdr-amure/index2.php?affich=presentation
[2] « *Les dommages écologiques causés par les marées noires : évaluations économiques et indemnisations* »
[3] Paper updated for ITOPF website in May, 2008

ABSTRACT

Compensation for clean up costs and damages caused by oil spills from tankers is governed in many maritime nations by two International Conventions, the Civil Liability Convention (CLC) and the International Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage (FC). These Conventions came into force in the early 1970s. In their earliest versions compensation for environmental damage was not specifically considered – the primary purpose was to provide compensation only for reasonable costs of clean up and proven economic loss. The Conventions have been revised several times during the last twenty years, and in the latest version (CLC and FC 1992) their scope with regard to environmental damage has been clarified. This has taken the form of admitting costs of reasonable reinstatement measures and post-spill studies, with the focus on identifying and then undertaking measures which enhance recovery of the damaged area. The Conventions exclude valuations of environmental damage calculated by theoretical and formulaic methods. The scope of the Conventions with respect to environmental damage is reviewed and examples are given of what might constitute reasonable reinstatement measures and post-spill studies.

INTRODUCTION

The CLC and FC provide a unique framework for compensating clean up costs and damages for oil spills from tankers on the basis of strict liability, that is without need by those seeking compensation to prove fault on the part of the tanker owner. The system was put in place with the intent of providing rapid compensation for the reasonable costs of clean up (an essential first step in trying to get back to normal after a spill) and for swift compensation for financial/commercial losses incurred by the victims of oil pollution. Environmental damage *per se* was not addressed in the earlier versions of the Conventions, and the focus was more on actual costs and economic loss caused by pollution. In that form, the Conventions have provided an effective framework for compensation during hundreds of spills – ITOPF has attended more than 550 spills in the last 25 years, the great majority of the tanker spills have been compensated/settled under the Conventions.

This approach of compensating only actual costs was based on the premise that the biological effects of spills were known in many circumstances to have been relatively localised and transient and were followed by rapid recovery. In fact, extensive research and detailed post-spill studies have shown that many marine organisms and habitats are resilient to short-term adverse changes and that, as a consequence, a major oil spill will rarely cause permanent effects. There have been many examples of this in Europe in recent years, including studies made following the spills from BRAER, SEA EMPRESS, ERIKA and PRESTIGE. There is no question that oil spills can cause

serious economic impacts, but experience indicates that serious, long-term damage to the marine environment remains the exception rather than the rule.

Whilst concerns are often raised about possible longer-term ("sub-lethal") population effects through, for example, low levels of residual oil affecting the ability of certain species to breed successfully, there seems remarkably little evidence that such subtle effects have caused long-term population or community changes or damage to commercial resources.

Whilst this evidence suggests that the initial premise of no compensation for environmental damage remains valid, the changing commercial world and the way that the public perceives the environment have brought change. Through the 1980's and early 1990's it became clear that rising costs of clean up, the growing value of fisheries and the vast expansion of mariculture world wide, and increasing awareness of environmental issues argued for a change in emphasis and perception of the Conventions. At that time, governments remained aware that the Conventions had provided a very successful framework, and were reluctant to make changes which might endanger the system, or to move from the underlying intent of providing compensation for actual costs rather than speculative ones. The 1992 revisions to the Conventions were aimed at clarifying their scope with regard to environmental issues, and recognizing the potential value of environmental reinstatement (restoration measures to speed up natural recovery) and, in the right circumstances, accepting the need for studies to assess the possibilities for reinstatement and to monitor recovery.

In practice, the wording of the Conventions does not spell out what the compensation covers, but guidance on this issue is to be found published by the International Oil Pollution Compensation (IOPC) Fund in their 1992 Fund Claims Manual. This manual was prepared after deliberations by all the member states as to what costs can be admitted, consistent with the wording of the Conventions.

Set against the pragmatic approach adopted by the signatories to the FC, and despite the scientific evidence that is available to the contrary, there is frequently a basic presumption that widespread, long-term and even permanent damage must have been caused by an oil spill, a message which is amplified by the media. Terms such as "injury", "harm", "loss", "damage", "impairment" and "ecological disaster" are used without reference to any defined meaning or reliable evidence of a causal link. These perceptions of disaster also often lead to the presumptions that the polluter must pay the price and that money can always compensate for any damage.

In truth, the natural recovery of an affected area is frequently rapid and money is rarely able to allow man to do more than help speed up the process through judicious clean up and restoration. It follows, therefore, that there is a limit to the extent that compensation obtained from the 'polluter' can be used to the direct benefit of a damaged environment. Hence, the focus of the Conventions for compensation for environmental damage remains on reasonable reinstatement measures and post spill studies. The calculation of the ‘monetary value’ of environmental damage by theoretical and speculative methods remains inadmissible.

This paper provides some background to the range of effects of oil spills on the marine environment and the potential for natural recovery, and considers the contribution which can be made by reinstatement measures, as envisaged under the international oil pollution compensation Conventions.

BIOLOGICAL IMPACTS AND THE RECOVERY PROCESS

The environmental impact of oil spills has been extensively researched over the past 30 years and a considerable amount has been learnt about the nature and duration of such effects. As a result, our predictive capability is probably better for oil spills than for many other types of marine pollutant. The range of biological impacts after an oil spill can encompass:

- Physical and chemical alteration of natural habitats, e.g. resulting from oil incorporation into sediments;
- Physical smothering effects on flora and fauna;
- Lethal or sub-lethal toxic effects on flora and fauna;
- Changes in biological communities resulting from oil effects on key organisms, e.g. increased abundance of intertidal algae following death of limpets which normally graze the algae.

The severity of oil spill effects is primarily related to the speed of recovery of the damaged habitats and species. However, misunderstandings often arise because of the use of different criteria to determine recovery. Given the difficulties of knowing exactly what the pre-spill conditions were, and how to interpret them in the face of natural ecological fluctuations and trends, it is unrealistic to define recovery as a return to pre-spill conditions. The following definition developed by a group of independent scientists takes these problems into account:

> *“Recovery is marked by the re-establishment of a healthy biological community in which the plants and animals characteristic of that community are present and functioning normally.”*

It may not have the same composition or age structure as that which was present before the damage, and will continue to show further change and development. It is impossible to say whether an ecosystem that has recovered from an oil spill is the same as, or different from, that which would have persisted in the absence of the spill.

Recovery depends upon both removal of oil which is toxic or physically smothering, and biological processes, e.g. settlement of larvae and growth of seedlings. Whilst clean up is normally the first step in the recovery process, complete removal of all oil is not necessary - there are many examples of recovery progressing in the presence of weathered oil residues.

Whatever the extent of damage, the reproductive success of the survivors, as well as the influx of eggs, juveniles or adults from unaffected areas underpins the recovery process. Many marine species produce vast numbers of eggs and larvae which are widely distributed in the plankton by currents. This is a strategy to overcome high rates of natural mortality (sometimes reaching 99.99%). The number of eggs and larvae which survive and eventually develop into adults is therefore normally very low, but this over-production ensures that there is a considerable reservoir for the colonisation of new areas and the replacement of adults which have been killed as a result of short-term unfavourable conditions.

On the other hand, species which are long-lived, slow to breed and which produce few offspring may take many years to recover from the effects of a short-term adverse change in their environment, even though they too may have in-built compensatory mechanisms (e.g. some species of seabirds have been shown to mature earlier and to have extra broods after a period of population decline). As with short-lived species, migration of adults and juveniles from neighbouring areas which have escaped the unfavourable conditions frequently enhance the recovery process.

What are the factors which assist with keeping damage to a minimum and speed up recovery? It is often a combination and includes dilution, weathering and degradation of the oil, along with biological factors such as regenerative potential through over-production of eggs and larval stages. Whilst a full review is beyond the scope of this paper, some simple examples will serve to illustrate some major misconceptions about alleged damage.

Open waters of the oceans and the associated pelagic and seabed communities have rarely shown any impact from spills. The high dilution potential that this habitat provides is a major mitigating factor. Even though laboratory research has shown that planktonic organisms which live

in surface waters can be variously affected by oil, no long-term effects have been demonstrated due to their huge regenerative potential, as well as immigration from outside the affected area. This regenerative potential is fundamental to the important role the plankton plays in the food chains of the world's seas and oceans.

Concerns are often expressed about the potential for oil to damage fish and shellfish eggs and larvae which are found in the plankton, especially as their sensitivity to oil pollution has been demonstrated in laboratory toxicity tests. However, there is no definitive evidence that oil induced mortalities of fish and shellfish eggs and larvae in the open sea have resulted in significant effects on future adult populations. This can be explained because oil-induced mortalities of eggs or young life stages are likely to be of little significance compared with huge natural losses which occur (e.g. through predation, temperature changes or storms).

Probably the most vulnerable of the organisms which use open waters are sea birds, which are easily harmed or killed by floating slicks. Oil ingested during attempts to clean feathers may be lethal, but the most common cause of death due to oiling is from drowning, starvation and loss of body heat following damage to plumage by oil. In large spills, many thousands of sea birds are known to have died. However, only in rare instances has any detectable impact been demonstrated on breeding populations, even when mortalities from oil contamination are known to have been high.

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. The degree of oil retention by a shore considerably affects the short-term impact and duration of damage. Retention depends upon the condition of the oil and beach type e.g. rock, sand, shingle, mud flats. More viscous oils tend to be retained in greater quantities as surface accumulations than less viscous oils. Broken, uneven and gently sloping shorelines with a large tidal range can hold more oil than steep, smooth shores with a small tidal range.

Rocky and sandy shores which are exposed to wave action and the scouring effects of tidal currents are amongst habitats which are most resilient to the effects of a spill, and they tend to self-clean relatively rapidly. These shorelines often have communities of highly adapted species, especially grazers and filter-feeders. If grazers are killed by oil, seaweeds rapidly colonise the area, followed by a slow return of grazers by recolonisation and new recruitment. Recovery to an apparently normal balance is usually achieved in 1 - 5 years, but the complete re-establishment of a shore can take many years in extreme situations where very large areas are affected or where species are close to the limits of their geographical range and recolonisation proves to be slow.

Sediments can present special problems because the potential exists for oil to penetrate into them and remain there for long periods. Whilst oil arriving on the waterlogged lower shore of a hard-packed sand beach is unlikely to penetrate, in contrast oil is very likely to penetrate into coarse grained, well drained sediments and considerable quantities may be held. In such circumstances the likelihood of long-term retention and longer-term environmental impacts is greatly increased. The degree to which penetration and long term retention occurs will also depend on the oil type, and more fluid oils and products penetrate more easily than more viscous oils and weathered residues. When penetration occurs, clean up may require the removal of considerable quantities of sand, although on occasion surf washing may reduce the need to remove beach material. The potential for quite serious damage to shore communities is evident, but like exposed rocky shores the organisms present are well adapted and appear to have rapid recovery potential. An apparently normal balance is often achieved in 1 – 5 years.

Fine sediments (fine sands and mud) are usually found in areas sheltered from wave action and strong currents, and in biological terms tend to be highly productive, particularly in estuaries. They support large populations of migrating birds as well as shell fisheries, and also function as nursery areas for some species. By their nature, intertidal muds are frequently waterlogged and the likelihood of penetration by oil is low. When it does occur, for example by oil entering animal burrows, it can present a real, long-term problem.

In fine sediment areas the upper shore fringe is often dominated by saltmarsh, which research has shown are normally only temporarily damaged by a single oiling, but they can take more than 10 years to recover if damaged through repeated oilings or by clean up. Long-term damage is more usually the result of using inappropriate clean up techniques than as a direct consequence of a the presence of oil. In tropical regions, mangrove swamps occupy the niche filled by saltmarsh in temperate regions, and are an extremely rich and diverse habitat, important in coastal defence and for their high biological productivity. The trees which provide the structure of this community are easily harmed if oil coats their breathing roots or if toxic oils penetrate sediments. Where oiling is heavy, high mortality usually occurs and natural recovery can take several decades. Like saltmarsh, they can be easily damaged by inappropriate attempts at cleaning, and scientific evidence suggests that they are usually best left undisturbed.

According to circumstances, clean up efforts can decrease or increase damage. Decisions frequently have to be made between different, conflicting environmental concerns, or between environmental and economic concerns. Weighing up the advantages and disadvantages of any clean up method is known as net environmental benefit analysis, and this should be considered as

part of the contingency planning process. In many cases, the predicted natural cleaning times may be acceptable, either because they are short, or because, even if long, no net environmental benefit can be predicted by human intervention.

The effects of oil on different marine communities (some examples of which are given above) have been reviewed in detail many times elsewhere, and drawing on the scientific literature as well as ITOPF's experience in the field has allowed the preparation of Table 1 below which summarises typical recovery times.

Table 1 Typical ranges of time for natural recovery (following clean up) of some of the important marine resources.

Plankton	Weeks/months
Exposed rocky shores	1 to 3 Years
Sheltered rocky shores	1 to 5 Years
Sand beaches	1 to 3 Years
Saltmarshes	5 to 20 years
Mangroves	10 to 50 Years

COMPENSATION FOR ENVIRONMENTAL DAMAGE

Victims of oil spills from tankers benefit from having access to an international system of compensation that has been in place for some 35 years and is based on the Civil Liability and Fund Conventions. This system remains unique in the field of marine environmental pollution and ensures that those who incur costs or suffer financial loss as a result of an oil spill from a tanker can be promptly compensated. The full application of these Conventions is described elsewhere, and the purpose here is simply to review how they deal with the issue of compensating for environmental damage.

Cost of post-spill studies and monitoring. The 1992 Fund Claims Manual (available on www.iopcfund.org) sets out the following guidance for costs of studies.

'Expenses for studies are compensated only if the studies are carried out as a direct consequence of a particular oil spill, and as a part of the oil spill response or to quantify the level of loss or damage. The 1992 Fund does not pay for studies of a general or purely scientific character.'

In practical terms there is often a need to conduct studies to assess impacts on commercial resources, such as contamination by PAH's or the acquisition of taint by fish and shellfish and their subsequent depuration. Such studies are related to the management of fishing bans, health issues and direct economic losses, and may therefore be justified in those terms.

The IOPC Fund has also made a fairly pragmatic approach to studies related to marine resources which are not commercially exploited. This is set out as follows in the claims manual:

'Post-spill environmental studies are sometimes carried out to establish the precise nature and extent of the pollution damage caused by an oil spill and/or the need for reinstatement measures. The 1992 Fund may contribute to the cost of such studies, provided that the studies concern damage which falls within the definition of pollution damage laid down in the Conventions as interpreted by the 1992 Fund, including reasonable measures to reinstate the environment. In such cases, the 1992 Fund should be given the possibility of becoming involved at an early stage in the selection of the experts who will carry out the studies, and in the determination of the mandate of these experts. The studies should be practical and likely to deliver the required data. Their scale should not be out of proportion to the extent of the contamination and the predictable effects. The extent of the studies and associated costs should also be reasonable from an objective point of view and the costs incurred should be reasonable.'

Whilst this may at first glance appear straightforward, no specification is given as to what type of damage to resources might justify studies. There is often a strong desire on the part of the scientific community and by politicians for widespread studies of many components of the marine environment. Set against this is the obvious conclusion that studies would be pointless in habitats such as exposed rocky shores in Europe for which the scope of damage is already well documented and in which recovery is known to occur quickly. Hence there needs to be a sound technical justification for conducting a study and recovering the associated costs. On this basis, studies conducted with the aim of determining the degree of damage and whether it might be reinstated would be much more relevant, and this subject is considered further below. It may also be justified to assess spill impacts in cases where the likelihood of damage is less well known and understood. In such circumstances studies may be used to assess the extent of damage and monitor that recovery takes place in a satisfactory fashion. Most importantly, there should be a sound technical justification for the studies and they should be conducted using robust scientific methodology.

In many cases the studies will need to include fingerprinting of the oil, so that damage can be linked to the spill as a direct cause and also to determine whether other sources of contamination are present. This is particularly so in areas of urban and industrial development which potentially receive oil from many other sources.

In practice the need for studies will be assessed on a case-by-case basis, and as yet there are few examples of claims for the cost of studies which have been assessed on the basis of the IOPC Fund Claims Manual.

Costs of environmental damage. It is important to note that one of the underlying principles of compensation is to ensure that claimants are left in the same financial position as they would have been had the oil spill not occurred. This poses a potential problem in the case of damage to natural resources that are not commercially exploited. This has resulted in some groups resorting to abstract calculations using a formulaic approach that attempts to ascribe monetary values to those sectors of the marine environment that have allegedly been damaged by a spill.

Whilst it is clear that oil spills can cause environmental damage and that some characteristics of a spill may appear to be relatively easy to measure or quantify (e.g. the type of oil and amount spilled), it is impossible to extrapolate to the nature and extent of damage that will be caused. Because of the interactions of a great number of factors, two spills in the same place will have very different environmental consequences depending, for example, on the type of oil, the time of year, weather conditions and success of the clean up.

By attempting to oversimplify a very complex and changing situation, the drafters of formulae simply end up with a ‘product’ that may be easy to implement but that is neither scientific nor relates to the true effects of oil spills on the environment, and takes no account of the speed of natural recovery. Attempting to attach a monetary value to this distorted image of reality leads to inconsistencies and injustices and the impression that the main desire is to penalise the 'polluter', with any funds so generated usually being channelled into unrelated activities. Given that the Civil Liability and Fund Conventions require compensation to be paid regardless of fault on the part of the tanker owner, it is inconsistent that attempts should also be made under the system to penalise the same parties for damages that do not affect the financial well-being of individual claimants.

The Claims Manual spells out that admissible claims should be for *‘loss of profit (net income) resulting from damage to the marine environment suffered by those who depend directly on earnings from coastal or sea-related activities, such as fishermen or hoteliers and restaurateurs at seaside resorts’.*

The Conventions also recognise that in circumstances in which environmental damage is likely to last for a long period and that recovery to something close to its original condition may be speeded up by pragmatic reinstatement measures, then the costs of those measures may be recoverable. The Claims Manual sets it out as follows:

'Costs for measures taken to reinstate the marine environment after an oil spill may be accepted by the 1992 Fund under certain conditions. To be admissible for compensation, such measures should fulfil the following criteria:

- *the cost of the measures should be reasonable*
- *the cost of the measures should not be disproportionate to the results achieved or the results which could reasonably be expected*
- *the measures should be appropriate and offer a reasonable prospect of success.*

The measures should be reasonable from an objective point of view in the light of the information available when the specific measures are taken. In most cases a major oil spill will not cause permanent damage to the environment, as the marine environment has a great potential for natural recovery. There are also limits to what man can actually do in taking measures to improve on the natural process. Compensation is paid only for measures actually undertaken or to be undertaken.'

This is a direct and rational application of the principle of economic loss, the loss in this instance resulting from the claimants incurring the costs of restoration or re-instatement measures. This is a concept that is based on real-world economics and which is designed to benefit the damaged environment. It also provides a realistic alternative to a problem which might otherwise become highly divisive, as well as damaging to the interests of those who have suffered real economic loss. However, to date there have been no claims against the IOPC Funds for damages in the above categories, so as yet the system and its application remain untested.

Restoration of a damaged environment is clearly an extension of clean up and requires positive steps to encourage natural recovery, especially in some specific instances where such recovery would otherwise be relatively slow. An example of such an approach following an oil spill would be to replant a salt marsh or a mangrove swamp after the bulk oil contamination had been removed, replacing dead vegetation with live seedlings. In this way erosion of the area would be prevented and other forms of biological life encouraged to return.

However, it is clear from the earlier summary of natural recovery processes that attempts at restoration will neither be feasible nor appropriate in every case. In many instances natural recovery proceeds sufficiently quickly that attempts at intervention by man, other than by judicious clean up, would have no benefit.

Whilst it may be possible to help restore damaged vegetation and physical structures, animals are generally a more difficult problem. In some cases an artificial breeding programme or enhanced protection of a natural breeding population at a nearby site may be warranted to help overcome pollution related losses. Thus it may be feasible to encourage, for example, a greater natural survival of juvenile turtles or birds in areas unaffected by the oil spill through affording the area special protected status. By minimising early predator impact this protected population could be expected to flourish thereby providing a reservoir from which the recolonisation of the damaged areas would occur. It may in some cases even be justified to carry out an artificial breeding and release programme if the technology exists and the likelihood of a successful enhancement of the wild population is high. The justification for any such approach would, however, have to be the enhancement of natural recovery and there would have to be a high level of certainty that this would occur before the programme could be considered acceptable. Any programme that was purely experimental or merely carried out to satisfy public demand and to defuse public outrage would clearly have little practical benefit in terms of restoration.

CONCLUSION

Given the complexity of the marine environment it follows that there are limits to the extent to which damage can be repaired by artificial means. Any attempts to meticulously reinstate a damaged site will be both impossible and unreasonable, especially if natural recovery is likely to be rapid. In addition it should be appreciated that excessive intervention by man, for example, by trying to remove every last drop of a pollutant, or by trying to 'engineer' the environment can often itself be destructive and hinder natural recovery. The appropriate clean up and restorative response will therefore always depend upon the environment in question, the nature and extent of the impact, and the capacity of the damaged area to recover naturally.