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for the Seas of East Asia (PEMSEA)

Regional Consultative Workshop on Strengthening Recovery of Ship Pollution Clean-up Costs and Damage Claims



Singapore
5-6 September 2001

**REGIONAL CONSULTATIVE WORKSHOP ON
STRENGTHENING RECOVERY OF SHIP POLLUTION
CLEAN-UP COSTS AND DAMAGE CLAIMS**

*GEF/UNDP/IMO Regional Programme on Building Partnerships in Environmental
Protection and Management for the Seas of East Asia (PEMSEA)
RAS/98/G33/A/IG/19*

Singapore
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OF SHIP POLLUTION CLEAN-UP COSTS AND DAMAGE CLAIMS**

January 2002

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MISSION STATEMENT

The Global Environment Facility/United Nations Development Programme/International Maritime Organization Regional Programme on Building Partnerships in Environmental Management for the Seas of East Asia (PEMSEA) aims to promote a shared vision for the Seas of East Asia:

"The resource systems of the Seas of East Asia are a natural heritage, safeguarding sustainable and healthy food supplies, livelihood, properties and investments, and social, cultural and ecological values for the people of the region, while contributing to economic prosperity and global markets through safe and efficient maritime trade, thereby promoting a peaceful and harmonious co-existence for present and future generations."

PEMSEA focuses on building intergovernmental, interagency and intersectoral partnerships to strengthen environmental management capabilities at the local, national and regional levels, and develop the collective capacity to implement appropriate strategies and environmental action programs on self-reliant basis. Specifically, PEMSEA will carry out the following:

- build national and regional capacity to implement integrated coastal management programs;
- promote multi-country initiatives in addressing priority transboundary environment issues in sub-regional sea areas and pollution hotspots;
- reinforce and establish a range of functional networks to support environmental management;
- identify environmental investment and financing opportunities and promote mechanisms, such as public-private partnerships, environmental projects for financing and other forms of developmental assistance;
- advance scientific and technical inputs to support decision-making;
- develop integrated information management systems linking selected sites into a regional network for data sharing and technical support;
- establish the enabling environment to reinforce delivery capabilities and advance the concerns of non-government and community-based organizations, environmental journalists, religious groups and other stakeholders;
- strengthen national capacities for developing integrated coastal and marine policies as part of state policies for sustainable socio-economic development; and
- promote regional commitment for implementing international conventions, and strengthening regional and sub-regional cooperation and collaboration using a sustainable regional mechanism.

The eleven participating countries are: Brunei Darussalam, Cambodia, Democratic People's Republic of Korea, Indonesia, Malaysia, People's Republic of China, Philippines, Republic of Korea, Singapore, Thailand and Vietnam. The collective efforts of these countries in implementing the strategies and activities will result in effective policy and management interventions, and in cumulative global environmental benefits, thereby contributing towards the achievement of the ultimate goal of protecting and sustaining the life support systems in the coastal and international waters over the long term.

Dr. Chua Thua-Eng
Regional Programme Director
PEMSEA

Regional Consultative Workshop on Strengthening Recovery of Ship Pollution Clean-up Costs and Damage Claims

Singapore, 5-6 September 2001

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REGIONAL CONSULTATIVE WORKSHOP ON STRENGTHENING RECOVERY OF SHIP POLLUTION CLEAN-UP COSTS AND DAMAGE CLAIMS

Singapore
5-6 September 2001

WORKSHOP REPORT

INTRODUCTION

On 5 – 6 September 2001, the Regional Consultative Workshop on Strengthening Recovery of Ship Pollution Clean-Up Costs and Damage Claims, co-organized by the Regional Programme on Partnerships in Environmental Management for the Seas of East Asia (PEMSEA) and the Maritime and Port Authority of Singapore (MPA Singapore), was held in Singapore. The workshop brought together participants from East Asian Seas countries to interact with each other and with the international community. The workshop included focused discussions on the implementation of international instruments dealing with liability for pollution from ships and compensation of related damages and proposals for strengthening capacities at national and regional level.

This was the second such regional workshop, the first having been held in 1999. The workshop was scheduled to immediately follow the international oil and chemical pollution conference and exhibition (*ICOPCE 2001*), a major forum held regularly every two years in Singapore, gathering about 400 participants. The conference and workshop give participants from East Asian countries exposure to the latest global developments in the field of oil and chemical spill response, a forum to interact with international experts and managers, and, an opportunity to discuss the relevant compensation issues in their respective countries. (The workshop agenda may be seen in Annex A.)

There were 18 participants from 8 countries in attendance -- namely Cambodia, China, Indonesia, Malaysia, Philippines, Thailand, Singapore, Vietnam -- representing four subregional seas and pollution hotspots: Malacca Straits, Bohai Sea, Manila Bay and the Gulf of Thailand.

The workshop was enlivened by the participation of a number of resource persons, including representatives of the International Maritime Organization, (IMO), International Oil Pollution Compensation (IOPC) Funds, P & I (Protection and Indemnity) Clubs, MPA Singapore, and the East Asia Response Pte Ltd (EARL). Three other resource persons, representing the Republic of Korea, Malaysia and France, presented case studies. (The List of Participants and Resource Persons may be seen in Annex B.)

OPENING REMARKS

Mrs. Mary Seet-Cheng, Director for Policy of the MPA Singapore, and Mr. S. Adrian Ross, Senior Programme Officer of PEMSEA, welcomed the participants and resource persons to the workshop.

Mrs. Seet-Cheng expressed the satisfaction of MPA Singapore to be working with PEMSEA for the second time, and saw it as an opportunity to share various experiences on and strengthen regional partnerships for the expeditious recovery of costs and damages from ship pollution. She expressed her thanks to Dr. Chua Thia-Eng and to the Training Division of MPA for this effort, and wished the participants and resource persons a fruitful and enjoyable workshop.

Mr. Adrian Ross remarked on the opportunity for participants to gain much knowledge from the ICOPCE Conference and bring that knowledge to the Workshop for discussion on the practical aspects of implementing the conventions. He informed the workshop of the Environmental Strategy for the Seas of East Asia, and the regional and national consultations that would be undertaken in the coming months. Mr. Ross said that the Strategy is designed to build environmental management capacity individually among the countries and collectively in the region, and the workshop was a specific effort contributing to that initiative. Mr. Ross thanked MPA Singapore for its cooperation in organizing and conducting the workshop.

Mr. Zafrul Alam, First Secretary for Maritime Affairs of the Singapore High Commission in London, chaired the workshop on the first day, while Mr. Adrian Ross chaired on the second day. Mr. Alam, upon assuming the chairmanship on the first day, joined the MPA Singapore and the PEMSEA in welcoming the participants and resource persons to the workshop.

WORKSHOP DISCUSSIONS

Discussion Topic 1: Regional and Subregional Collaboration

The discussion was focused by identifying the following questions to be addressed:

Do existing regional and subregional collaborations in contingency planning and oil spill response adequately address recovery of oil spill costs and damage claims? How can these collaborations be expanded and strengthened as fully functional regional and/or subregional mechanisms that will facilitate recovery of oil spill costs and damage claims, as well as other benefits?

The Workshop noted the following current status of national contingency plans and related subregional arrangements:

1. National contingency plans are at different levels of development and adequacy in the represented countries, ranging from very minimal (Cambodia) to fully developed

(Singapore). Whatever the condition of the national contingency plan, however, it is never perfect and has to be constantly updated to conform to new standards (for instance, those incorporated in new international conventions or amendments), technology and developments.

2. None of the national contingency plans have incorporated the requirements for the recovery of costs and damages. However, this is a common situation throughout the world. Cost recovery is often not included in contingency plans, and oil spill drills rarely include cost recovery procedures.
3. There are a number of existing regional and subregional collaborative arrangements, with only a few changes from two years ago. (The list of agreements may be seen in Annex C.) In respect of the ASEAN-OSRAP, Thailand is planning to reactivate OSRAP and include Cambodia and Myanmar. Other countries are also initiating such arrangements. Joint oil spill response exercises are carried out regularly under existing arrangements.
4. None of the existing arrangements include cooperation regarding recovery of costs and damage claims. The SOP/Revolving Fund for the Straits of Malacca provides a procedure for response and a revolving fund (provided by Japan) to initially finance the operations. But the revolving fund is limited to response activities, and has to be reimbursed from payments made by shipowners/insurers and the IOPC Funds.
5. In Europe, there are very strong and effective regional cooperative arrangements on pollution response, some of which include claims for costs and damages. Cooperation in this field has never even been attempted, as countries view it as a purely national concern. However, all European countries have, in one form or another, a national emergency fund to finance response operations. So far, national governments are able to bear response costs that cannot be compensated under international regimes. There are no funding arrangements for damage compensation.

The following observations were made regarding regional cooperation:

6. The question is how much cooperation is possible in respect of damage compensation. OPRC clearly provides for regional cooperation and should be the first area in which to develop cooperation. Procedures on response activities and clean-up are more straightforward and easier to standardize, whereas claims for damages from economic loss, etc., are more difficult to develop.
7. The level of regional and subregional cooperation is dependent on effective national standards and plans. In order to have good cooperation, the task at hand is the passage of good national laws and the establishment of strong standards and enforcement measures. To be able to do this, CLC and FUND have to be effectively adopted through appropriate national legislation. To be able to have appropriate legislation, there is a need to build capability and awareness in the country. This may include advocacy work among legislators.
8. Cooperation can take the form of discussion on how to improve capacities and working relationships. Workshops such as this one are a form of cooperation.

9. Documentation was recognized as an important part of claims procedures and should be included in contingency plans. The national contingency plan could be a public document. It must have clear instructions as to priorities, which help responders to make decisions on-site. The country has the responsibility to decide its priorities.
10. The HNS and Bunkers Conventions are areas for future cooperation.

The Workshop was advised:

11. On the matter of developing competency in claims for compensation under CLC and FUND, countries have to be "claim-smart", i.e., they must know the requirements and procedures by heart. In many of the countries, there is a lack of expertise due to a lack of personnel – e.g., no one to advise the response organizations of the gaps and weaknesses of their procedures with respect to future claims. Attending the meetings of the IOPC Funds is very instructive in the rules and their application. Another useful method of learning is by reading the Annual Reports of the IOPC Funds. The case reports are very educational.
12. An intersessional Working Group of the 1992 Fund is developing a possible optional protocol establishing a third tier for compensation, funded by oil receivers in States Party, thereby increasing the limits for compensation. The Working Group is also reviewing the admissibility of claims for the costs of post-spill studies in support of environmental reinstatement as well as the recovery of additional fixed costs in respect of personnel and equipment resources for responding to oil spills to encourage preparedness. The recommendations of this Working Group will be considered by the 1992 Fund Assembly in October 2001.
13. The International Group of P & I Clubs are working on increasing voluntarily the limits of liability in respect of small ships for countries that ratify the proposed new protocol.

Discussion Topic 2: National Legislation

The following questions opened the discussion:

Do your domestic laws give effect to CLC 69 or CLC 92 and/or Fund 71 or Fund 92? Where are the gaps and weaknesses and how do they affect the preparation and processing of claims from, or on behalf of, pollution victims? What actions are being taken to strengthen domestic legislation?

The Workshop noted the developments and current situation on ratification of the conventions, as follows:

1. The only change in the status of membership in CLC and FUND in the region is the accession of Cambodia to the 1992 Conventions. (The status of ratification and implementing legislation may be seen in Annex D.) However, this does not mean that countries have not done anything. Thailand and Vietnam have been working hard to accede to the Conventions but their respective political processes are very complicated. Malaysia has also been working to change from the 1969/1971 conventions to the 1992 Conventions, with the same results.

2. A priority for countries that have not yet left FUND 71 in favor of FUND 92 is to convince their governments to do so. The 1971 Fund Convention will cease to be in force by May 2002. It is to the best interests of the members to join FUND 92. If this is going to be a difficult process (due to the burden on the national oil industries), it is a good strategy to accede to CLC 92 first, as this convention imposes little monetary obligation.
3. P & I Clubs also rely on the international conventions for rules and procedures. In a major incident where the IOPC Funds will most likely be involved, the P & I Clubs cooperate closely with the IOPC Funds Secretariat.
4. While CLC and FUND are very important, these are limited to providing compensation for pollution damage resulting from spills from oil tankers. There are other vessels to take into consideration for national legislation.
5. OPRC, CLC/FUND, HNS, and the Bunkers Convention should be seen as part of a framework of international law on marine pollution, including prevention, management, response and compensation.

On national legislation, the Workshop noted:

6. Some of the countries have developed implementing legislation, but cannot pass them until they have acceded to the conventions. The Philippines' proposed legislation has been overtaken by changes of administration, thus delaying its passage.
7. It is better to be ready with the implementing legislation than not to have any upon accession.
8. Administrative regulations are an important aspect of implementation.

As regards cooperation on policy and legislation, the Workshop considered the following:

9. The experience of Singapore, Malaysia and Indonesia regarding claims shows that cooperation is complicated by the different claims regimes of the three countries.
10. A way for everyone to benefit is to produce a block diagram or flowchart based on the IOPC Funds' Claims Manual and incorporating the experiences of countries within and outside the region. This could be distributed among the countries together with claims forms from the IOPC Fund and those that were developed by Malaysia and RO Korea in the cases that they had.
11. Should the countries who have had difficulty in developing national legislation be prioritized for assistance? How can PEMSEA appropriately help countries? In order for PEMSEA to be able to provide the appropriate assistance in developing national legislation to countries that need it, countries should communicate formally with PEMSEA, stating clearly what assistance is required. They should also be committed to go through with the appropriate activities to achieve the objective. Neighboring countries, the IOPC Funds and P & I Clubs are also potential sources of assistance.

Discussion Topic 3: Tools for Pollution Damage Assessment

The discussion revolved around the following questions:

What importance do you place on pre-negotiated compensation fees for equipment and services, risk assessment and environmental sensitivity mapping as tools for enhancing recovery of costs and damage claims? What is your view on the overall role of environmental databases and information systems in improving recovery of damage claims? Are they worth the effort?

The Workshop identified the following experiences and problems vis-à-vis damage compensation:

1. During the Evoikos incident Malaysia had to contract PIMMAG, a private response organization, to assist in undertaking response operations. While some of PIMMAG's equipment were kept on standby and not actually used, PIMMAG made no distinction in the charges for equipment actually used and equipment on standby. However under CLC only the cost of equipment that was actually used was reimbursed.
2. Indonesia foresees related problems in the future, as PERTAMINA, the national oil company, which has equipment stockpiles formerly available to the government for free, will now charge for the use of the equipment.
3. The countries identified the following as the problems relating to pollution damage assessment: (a) databases have been focused on research rather than on application; (b) multiple agencies have jurisdiction over the coastal and marine area, and the results of research projects often are kept within the implementing agency and do not reach the other agencies.
4. For environmental databases and information systems to be effective, they have to be maintained and kept up-to-date. This is a difficult responsibility, and is the main factor in the problem of finding an institution to host and maintain a database. The lack of users' awareness and the lack of user-friendliness or suitability of the database are other obstacles to the effectivity of a database.
5. Another problem is the high cost of acquiring and maintaining the commercial programs to run the databases. If a database is shared by two or more countries, maintenance costs can be shared as well.

The Workshop noted the following on the present situation in the region:

6. In RO Korea, tariffs for response equipment, reviewed by ITOPI and other concerned organizations, are published. These include rates for equipment on standby. Tariffs are also available in Singapore.
7. While pre-negotiated fees for response equipment are very useful, they are not air-tight because unforeseen events may happen during actual emergencies.
8. Cooperative agreements within the private sector, such as the EARL-OSRL alliance, have an advantage because all costs are pre-agreed. Rates of such private sector

groups are reviewed annually and published in a yearbook. There are separate rates for standby equipment.

9. Environmental databases and information systems are very useful for such activities as the formulation of a response strategy. With respect to compensation claims, damages resulting from an oil spill can be determined through comparisons of before and after situations.
10. Some countries reported that their government agencies are now sharing information from environmental databases with each other.
11. Sensitivity mapping is being used in Manila Bay and Vietnam for planning purposes. In Manila Bay, the government agencies are also cooperating with NGOs for sensitivity mapping.
12. Statistical data and research are equally important when making damage claims. For example, to show losses in fish production, the lack of specific proof can be remedied by presenting records on fisheries production in the area to show the production trend. Research is needed to show the physical conditions before, during and after the spill.
13. The Conventions do not compensate based on theoretical models. However, in terms of cost recovery, studies on impact on the environment are considered reasonable under CLC and FUND as long as they relate to pollution damage as defined in the Conventions.

The Workshop further noted the following:

14. The experience of Malaysia is a good example to show that pre-negotiated fees are desirable. The problem can be avoided through a pre-existing contract where it can be agreed that equipment on standby, and unused, need not be paid full charges.
15. Ideally, the state should take charge of the cleanup and thereafter claim compensation. But in some countries, this is not the case. For example, in the Philippines, responders are on their own. Shipowners are required to have contracts with private response organizations.
16. Environmental databases, information systems, sensitivity mapping and risk assessment are definitely worth the effort. But they should be used primarily for planning purposes and prevention efforts, and only subsidiarily for compensation claims. In general, environmental systems should be set up for their overall utility, not just for a particular purpose such as claims compensation.
17. Countries must ensure that statistical data records are complete and up to date. In order to cooperate in claims recovery, it would be beneficial to have standardized data among countries.
18. The proposed Marine Electronic Highway (MEH), a project being implemented by GEF, World Bank and IMO London with Indonesia, Malaysia, and Singapore in the Straits of Malacca, is a good example of sharing information for the common public good and interest of the three States.

Discussion Topic 4: Training Program

The following questions were addressed during the discussion:

Do you see any benefit in developing and implementing an enhanced training program on contingency planning, oil spill preparedness and response, and damage claims? Do you see as an advantage to including representatives from countries sharing a subregional sea as participants in such training programs? Is there any existing training initiative on these areas in your country? Is there a role for the private sector in these capacity building activities?

The workshop noted the following:

1. Training is very important and must be pursued to be successful in preparedness and response and liability and compensation. For example, details that are not in the IOPC Funds' Claims Manual can be provided by training.
2. Priorities for training include: risk assessment, contingency planning, oil spill response, and damage claims recovery.
3. A current thrust in Indonesia and other countries is the development of local contingency plans. Consequently, there is a demand for training at the local level on contingency planning, preparedness and response. It is now clear that compensation plans should be included in planning and training.
4. The private sector is an important player in training, as it brings real stories and professional and focused advice. Currently, there already is extensive cooperation with the private sector in training programs, either as trainers or trainees, or to provide training support. In countries like China, the government is making an effort to cooperate with NGOs.
5. While training at national level is a priority, the countries have seen through experience that subregional training has benefits. It builds networks, promotes cooperation and friendship, and experiences are shared. It allows countries to work together when needed, such as when incidents occur.

The workshop further noted:

6. The IMO has existing training modules for oil spill preparedness and response as well as contingency planning. There is a need to develop a comprehensive module for cost recovery and damage claims. Representations to the IMO should be made by PEMSEA and the countries in the region for the development of a module on cost recovery and damage claims.
7. Inter-sectoral and sub-regional training programs should be pursued. It provides a venue to establish networks, win friends and exchange learning experiences.

8. It is advisable for training modules to be designed with a limited subject but more depth, and with sufficient case studies. Training must also be continuing to be effective.
9. A user friendly manual on damage claims and cost recovery can be developed. The Korean Manual on fisheries and aquaculture damage claims may be used as guide for preparing the manual on tourism claims among others.

CASE STUDIES

Case Study 1: Damage Claims in a Transboundary Oil Spill – Regional Experience

Mr. Rossid Musa presented a case study on the Malaysian experience in relation to the *Evoikos* incident (Annex E), while Mr. Ardi Turyawan made a presentation on the Indonesian efforts regarding resource damage assessment following the *Natuna Sea* incident (Annex F).

Mr. Musa recounted events relating to the *Evoikos* incident (1997), beginning with Malaysia's being notified by Singapore of an oil spill moving towards Malaysian waters, followed by Malaysia's response efforts, the later efforts to claim compensation, and the problems and results of their efforts. He reported that 83.5 percent of claims for response and clean-up costs and 65 percent of fisheries claims were paid by the shipowner's insurer. The claims were coordinated by the Department of Environment for the response and clean-up claims and the Fisheries Department for the fisheries claims. Everyone was reportedly satisfied with the resolution of the claims.

Mr. Turyawan presented the studies that Indonesia conducted after the *Natuna Sea* spill incident (2000) over the possibly contaminated areas, describing the three resource subsystems existing in the area (coral reef, seagrass and mangrove) and the condition in which they were found after the incident. The Indonesian team found oil in the areas and was able to fingerprint the samples. They are conducting economic valuation of the said resources, and in this connection are developing a model of system dynamic to determine the exact interaction between the resource subsystems.

After the presentations, the Workshop noted:

1. The Malaysian case is a very positive one from which not only the region but the world can learn. The percentage of claims that were paid was high relative to majority of compensation claims cases.
2. Malaysia was able to take immediate response action due to the existence of coordination arrangements with Singapore and a contingency plan.
3. Malaysian government agencies were required to coordinate with ITOPF, the shipowner's insurer, and IOPC Funds because the victims/claimants were not familiar

with the procedures. It was also a learning process for the government, and what they learned in this case they were able to apply in the later *Natuna Sea* incident.

4. Malaysia will share more details about the experience with the other countries, subject to authorization by the government. Singapore, which also made claims for compensation under the same incident, was not yet in a position to share its experience as the claims have not yet been settled. However, they will also be willing to share this experience at a later date.
5. A possible model for sharing experiences is the European practice to report every case to a Council, to which everyone has access.
6. There are very useful lessons to be learned from the Indonesian case as well. The valuation method being used to assess damage is not an acceptable one under the conventions because they are based on theoretical models. They may be useful scientifically and for environmental management purposes but not for compensation claims purposes.
7. Not being a member of FUND, Indonesia can only claim under CLC. The IOPC Funds take an interest in the matter, however, as it was pointed out that Malaysia and Singapore will also have claims under CLC, and the IOPC Funds will have to pay the difference if Malaysian and Indonesian claims are not fully paid by the shipowner's insurer.
8. Indonesia should review its decision not to be a member of FUND, considering the country's vulnerability to oil spills. This was the product of a political decision in Indonesia and does not necessarily reflect the views of the environment and marine sectors in the country.

Case Study 2: Negotiating Damage Claims in a Transboundary Oil Spill – Extra Regional Experience

Dr. Michel Girin, Director of the Centre for Documentation, Research and Experimentation on Accidental Water Pollution (CEDRE), France made a presentation regarding the role of advisors during transboundary oil and chemical spill incidents (Annex G). Dr. Girin said that most oil spills are transboundary in nature, in the sense that the owner of the ship and/or the owner of the cargo are usually nationals of a different country. Thus foreign rules and standards are immediately introduced. As national rules are different from each other, and the international rules are different from national rules, these situations often result in conflict and delayed resolution that does not satisfy any of the parties, especially the claimants. Experts/advisors play a big role in the decisions that are made during the response operations and in the resolution of claims that follow.

Among the lessons that Dr. Girin and his organization have learned are:

- Experts or technical advisors have to take into consideration the rules and standards of the other parties. It is their responsibility to try to bridge the social and cultural gap between parties.

- On-site negotiation plays a major role in future claims. It can be used positively to avoid problems in settling the claims later.
- Experts / advisors must keep communication lines open, even when negotiations have officially been suspended.
- Experts / advisors should master the applicable rules and standards through study and experience.

During the discussion following the presentation, the Workshop noted:

1. Among the countries in the European Union, whenever an incident occurs, experts from all the other countries are invited to observe the response operations. In this way, they all learn.
2. The IOPC Funds use a big network of experts on oil spill response spread all over the world. Among these, ITOPF has the most experience, thus will continue to be an important player in oil spills. ITOPF has the task of giving the best technical advice on-site. It is then up to the government whether or not to follow the advice, given other considerations such as social and political ones. The risk is that decisions that are not technically sound may not be acceptable to the IOPC Funds. However, it is possible to negotiate with the IOPC Funds within reasonable limits, giving the reasons why the purely technical solutions were not feasible.
3. Countries are free to choose any expert. It is important to get a credible expert. The IOPC Funds will make public a list of experts in their network which the countries can use to identify the people they want to work with.
4. During the response operations, it is important for all involved to agree among themselves on the standards or level or quality of response that will be undertaken, then to consult with the payors (insurers and IOPC Funds) or those acting on their behalf about whether it is acceptable for compensation.
5. Usually, a compromise has to be made between what would be strictly compensable under the CLC/FUND rules and what the public demands.
6. It is a good strategy for the countries of the region to take common stands in IOPC Funds Council or Assembly Meetings. It was proposed that discussion on this matter be initiated among IOPC Funds members in the group.
7. PEMSEA can provide avenues for further cooperation on this matter, such as its legal and other networks and capacity-building activities, particularly in the subregional seas sites. The workshop group could also be the source of expertise that can be tapped later.
8. It is possible to follow uniform principles in computing for equipment costs. This is also how EARL and PIMMAG compute their rates. The participants were asked to refer to the IOPC Funds paper entitled *The Need for Reasonable and Cost Effective Response Operations* (Annex H).

Case Study 3: Damage Claims for Fisheries and Aquaculture

Mr. K.H. Lee presented a case study on the *Sea Prince* incident (1995) in the Republic of Korea, the claims that were paid, and the development of a Fisheries Claims Manual in that country through the experiences from a number of oil spills (Annex I). Mr. Lee showed how fishing vessels, caged fish and common fishing grounds were affected by the spill, and how the claims were proved and computed.

After the presentation, the Workshop noted:

1. The claimants in ROK were able to prove their claims because the country's fisheries statistics are well developed, and could be used as the basis. Where such statistics are not available, information has to be collected or extrapolated.
2. The development of the Claims Manual in RO Korea is an excellent example of how the IOPC Manual has been developed into a country-specific, detailed manual that is very useful to its targets. It also serves as a good example to the other countries in the region, together with the Malaysian experience.
3. A Manual is very useful during an actual incident, when people are in shock and forget what to do. While the IOPC Funds' Claims Manual gives the basic requirements, there are many questions that it does not answer. A localized manual should be able to answer these questions.

WORKSHOP CONCLUSIONS

The Workshop made the following conclusions:

I. Regional and Subregional Collaboration

1. There are existing regional and sub-regional collaboration but mostly confined to oil spill response. There is no collaboration in the area of clean-up cost recovery and damage claims.
2. Cooperative arrangements between or among countries sharing a common subregional sea are practical and cost-effective. Existing subregional arrangements do not include cost recovery procedures.
3. Regional collaboration has a better chance of being successful if states within the region have the same compensation regimes. Participants from countries that have not yet acceded to CLC and FUND 92 should strengthen their efforts in this regard. If it is too difficult to accede to both, a strategy is to start with CLC 92, as it has minimum cost to the government.
4. Countries that have not acceded to any of the conventions can ask for technical assistance of international organizations, the Fund Secretariat or other countries that

have acceded to the conventions and experienced all the administrative, legal and technical procedures.

5. It is important to look at international conventions as a package. For example, international conventions addressing the scope of ship-sourced marine pollution include MARPOL (Prevention), OPRC (Preparedness and Response) and CLC/FUND (Compensation for Clean-up Costs and Damage).
6. The HNS and Bunkers Conventions are relatively new conventions that countries should consider as they address important types of ship pollution. While they are not yet in force, they should be considered for national legislation.
7. One example of collaboration among the private sector is the creation of cooperative response organizations which are non-profit organizations composed of the shipping, petroleum and other related industries. They share and pool their resources for capacity building, response planning and operation.
8. The OPRC has specific provisions which oblige parties to collaborate bilaterally and regionally.

II. National Legislation

1. Participants from countries that have already drafted implementing legislation are making every effort to strengthen their efforts to have the legislation passed.
2. Countries that have not yet drafted implementing legislation recognize the need to develop a plan and schedule, identify their needs for assistance, and formally call upon organizations for such assistance, ensuring that their countries have the political will to pursue the plan.
3. In cases where countries have acceded to the Conventions but do not have implementing legislation, it will be difficult to successfully pursue claims through the courts.
4. Procedures established under the Fund Conventions are accepted international practice for compensation claims.
5. The establishment of national emergency funding arrangements for bridging costs for response operations, as in Europe, has potential application in the region.
6. Admissibility of claims, and the speed with which they are processed, are related to the reasonableness of the claim and the quality of documentation.
7. The Conventions make it clear that environmental damages other than reinstatement measures are not admissible. However, the IOPC Fund Assembly is considering ways to be more flexible in respect of post-spill studies such as environmental impact assessment.

8. Aside from ITOPF there are other experts used by the Funds and the P&I Clubs. The role of ITOPF and other experts or technical advisors during the response is purely advisory.
9. Cooperation between claimants, shipowners' insurers, the IOPC Funds, and the government is important. If claimants are unable to settle their claims on an amicable basis, they could either pursue them through the courts or through representation of their governments at the governing sessions of the IOPC Funds.

III. Tools for Pollution Damage Assessment

1. There is a consensus that pre-negotiated rates for equipment and services will help facilitate cost recovery. If possible the rates should be vetted by the international Group of P&I Clubs.
2. Risk assessment and sensitivity mapping are useful tools but are not sufficient for purposes of cost recovery. These approaches are more useful for planning, response decisions and reinstatement of the environment.
3. When looking at the different tools and models, it is important to identify and assess the usefulness of the information to be generated from such models. This information should be considered in the development of the contingency plan.

IV. Training Program

1. A comprehensive module for damage claims would be helpful to the countries, and such manual would need to be developed in cooperation with IMO. The collaboration of the IOPC Funds and expert groups would also be advantageous in this effort.
2. Sub-regional and inter-sectoral trainings are beneficial and should be pursued. Such training helps to establish networks and forge collaboration. Learning experiences of other countries are very effective methods of information transfer.
3. Joint trainings with private sector are seen as beneficial since oil spill preparedness and response is a joint responsibility of the state and the private sector. The private sector can also bring in practical case studies based on their own experiences.
4. The Korean manual on fisheries and aquaculture damage claims is a very practical and useful document for countries of the region. The manual expands and clarifies the procedures which have been outlined in the IOPC claims manual, for use by local stakeholders.

WORKSHOP RECOMMENDATIONS

The Workshop recommended:

I. Regional and Subregional Collaboration

1. Countries should consider ways and means to share information on lessons learned from recent incidents, the response made and extent of costs and claims recovered, such as networking, publications of relevant organizations, the internet. PEMSEA's established regional networks may be tapped as a venue for information and technology transfer.
2. Countries need to set up or upgrade their national contingency plans to include cost and damage recovery requirements. Drills and exercises should include the claims procedure. The contingency plan should be published and continuously reviewed to incorporate recent developments.
3. Oil spill exercises to be held by countries and under subregional arrangements should include documentation / record keeping, personnel and equipment deployment, usage and claims procedure.

II. National Legislation

1. Countries that have not ratified the 1992 Conventions could accede to CLC 1992 first, and then undertake cost benefit analysis of accession to FUND 1992.
2. Procedures established under the Fund Conventions should be incorporated into national legislation whether or not countries have ratified or acceded to the Fund.
3. Countries, especially those that are already members of the Conventions should continue efforts to develop national implementing legislation.
4. Countries of the region should collaborate in developing claims procedures that include claims forms, flowcharts and real experiences -- for example, Malaysia and the Republic of Korea.
5. Participating countries should develop/co-sponsor proposals which have regional benefit and implications at the IOPC Funds and the IMO.

III. Tools for Pollution Damage Assessment

1. Participating countries need to develop and agree on uniform principles for computing costs to be charged whenever an incident occurs.
2. Countries should develop sensitivity maps as part of their environmental management plans.

IV. Training Program

1. Representations can be made to IMO by representatives of countries and PEMSEA for the development of a comprehensive module on cost recovery and damage claims.
2. The training module should be field tested in the region as part of PEMSEA sub-regional sea areas training program in collaboration with the IOPC Funds, IPIECA and other appropriate international organization.

CLOSING REMARKS

On behalf of MPA Singapore, Captain Wang Kong Choi thanked the participants and resource persons for their keen participation and for putting together a set of excellent recommendations.

Ms. Brenda Pimentel of the Philippines, on behalf of the participants, thanked the organizers of the workshop for allowing them to benefit from the discussions and gain from the expert advice of the resource persons. She expressed the hope of participating in similar discussions and actions in the future.

On behalf of PEMSEA, Mr. Adrian Ross thanked the resource persons for taking the time to participate in the workshop and prepare papers for presentation, thereby giving new insights to all. He thanked MPA Singapore for its professionalism and technical assistance in co-organizing the workshop, and to the participants he expressed the hope that the workshop met their expectations, provided a good exchange of experiences and ideas, and gave them new energy to take back and apply what they had learned.

ANNEXES

ANNEX A

Regional Consultative Workshop on Strengthening Recovery of Ship Pollution Clean-up Costs and Damage Claims

5-6 September 2001
Singapore

A joint initiative of the Maritime and Port Authority of Singapore (MPA) and the GEF/UNDP/IMO
Regional Programme on Building Partnerships in
Environmental Management for the Seas of East Asia (PEMSEA)

REVISED PROGRAMME SCHEDULE

Day 1: Wednesday, 5 September 2001

Registration and welcoming remarks

8:00 Registration Opens

8:30 Guests and participants to be seated

8:30 Welcome Remarks

Mrs. Mary Seei-Cheng
Director (Policy), Maritime and Port Authority of Singapore

Mr. S. Adrian Ross
Senior Programme Officer, GEF/UNDP/IMO PEMSEA

8:45 – 9:00 Introduction of Workshop Objectives and Format

Chair: Mr. Zafri Alam, MPA

Discussion Topic 1: Regional and subregional collaborations

Questions to be addressed: *Do existing regional and subregional collaborations in contingency planning and oil spill response adequately address recovery of oil spill costs and damage claims? How can these collaborations be expanded and strengthened as fully functional regional and/or subregional mechanisms that will facilitate recovery of oil spill costs and damage claims, as well as other benefits?*

9:00 – 9:10 a) Topic presentation

9:10 – 10:10 b) Round-the-Table Responses by Country Representatives

10:10 - 10:30 **Coffee and Tea Break**

10:30 – 11:00 c) Resource Person Comments/Suggestions

11:00 – 11:10 d) Discussion Wrap Up

Discussion Topic 2: National legislation

Questions to be addressed: *Do your domestic laws give effect to CLC 69 or CLC 92 and/or Fund 71 or Fund 92? Where are the gaps and weaknesses and how do they affect the preparation and processing of claims from, or on behalf of, pollution victims? What actions are being taken to strengthen domestic legislation?*

- 11:10 – 11:20 a) Topic presentation
- 11:20 – 12:20 b) Round-the-Table Responses by Country Representatives
- 12:20 – 13:20 **Lunch Break**
- 13:20 – 13:50 c) Resource Persons Comments/Suggestions
- 13:50 – 14:00 d) Discussion Wrap Up

Case Study 1: Damage Claims in a Transboundary Oil Spill – Regional Experience

- 14:00 – 14:20 a) Case presentation
Mr. Rossid bin Musa, Marine Department, Malaysia
Mr. Ardi Turyawan, BAPEDAL, Indonesia
- 14:20 – 15:00 b) Round-the-Table Discussion by Country Representatives/Resource Persons
- 15:00 – 15:20 c) Proposed Actions in support of regional and subregional approaches
- 15:20 – 15:40 **Coffee and Tea Break**

Case Study 2: Negotiating Damage Claims in a Transboundary Oil Spill – Extra Regional Experience

- 15:40 – 16:00 a) Case presentation
Dr. Michel Ginn, CEDRE
- 16:00 – 16:40 b) Round-the-Table Discussion by Country Representatives/Resource Persons
- 16:40 – 17:00 c) Proposed Actions in support of regional and subregional approaches
- 17:00 – 17:20 **Wrap-up of Activities – Day 1**

Day 2: Thursday, 6 September 2001

- 9:00 – 9:10 **Introduction of Day 2 Activities**
Chair: Mr. S. Adrian Ross, PEMSEA

Discussion Topic 3 : Tools for Pollution Damage Assessment

Questions to be addressed: *What importance do you place on pre-negotiated compensation fees for equipment and services, risk assessment and environmental*

sensitivity mapping as tools for enhancing recovery of costs and damage claims? What is your view on the overall role of environmental databases and information systems in improving recovery of damage claims? Are they worth the effort?

- 9:10 – 9:20 a) Topic presentation
- 9:20 – 10:20 b) Round-the-Table Responses by Country Representatives
- 10:20 – 10:40 **Coffee and Tea Break**
- 10:40 – 11:10 c) Resource Persons Comments/Suggestions
- 11:10 – 11:20 d) Discussion Wrap Up

Discussion Topic 4: Training Program

Questions to be addressed: *Do you see any benefit in developing and implementing an enhanced training program on contingency planning, oil spill preparedness and response, and damage claims? Do you see as an advantage to including representatives from countries sharing a subregional sea as participants in such training programs? Is there any existing training initiative on these areas in your country? Is there a role for the private sector in these capacity building activities?*

- 11:20 – 11:30 a) Topic presentation
- 11:30 – 12:30 b) Round-the-Table Responses by Country Representatives
- 12:30 – 13:30 **Lunch Break**
- 13:30 – 14:00 c) Resource Persons Comments/Suggestions
- 14:00 – 14:10 d) Discussion Wrap Up

Case Study 3: Damage Claims for Fisheries and Aquaculture

- 14:10 – 14:30 a) Case presentation
Mr. K.H. Lee, Managing Director
Hyosung Surveyors & Adjusters Corporation, Pusan, RO Korea
- 14:30 – 15:10 b) Round-the-Table Discussion by Country Representatives/Resource Persons
- 15:10 – 15:30 c) Proposed Actions in support of regional and subregional approaches
- 15:30 – 15:50 **Coffee and Tea Break**
- 15:50 – 16:30 **Conclusions and Delineation of Priority Actions, Roles and Schedules**
- 16:30 – 16:40 **Closing Remarks**

ANNEX B

REGIONAL CONSULTATIVE WORKSHOP ON STRENGTHENING RECOVERY OF SHIP POLLUTION CLEAN-UP COSTS AND DAMAGE CLAIMS

5 - 6 September 2001
Plaza Parkroyal Hotel, Singapore

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EXISTING COLLABORATIVE ARRANGEMENTS
IN THE EAST ASIAN REGION

1. ASEAN-OSRAP

Brunei Darussalam, Indonesia, Malaysia, Philippines, Singapore, Thailand

2. Standard Operating Procedure for joint spill combat in the South China Sea –
Brunei Bay / Proposed Bay of Brunei Contingency Plan

Brunei Darussalam and Malaysia

3. Tripartite Plan for the Straits of Malacca and Singapore / Standard Operating
Procedure for Combatting Oil Spills in the Straits of Malacca and Singapore

Indonesia, Malaysia, Singapore

4. Sulawesi Sea Oil Spill Response Network [Cooperative Agreement]

Indonesia, Malaysia, Philippines

5. Lombok-Makassar Contingency Plan

Indonesia and Malaysia

ANNEX D

**STATUS OF RATIFICATION / ACCESSION IN EAST ASIA
OF CONVENTIONS ON POLLUTION LIABILITY AND COMPENSATION**

	CLC		FUND		HNS 96	Bun- ker Oil 01	Implementing Legislation
	Conv 69	Prot 92	Conv 71	Prot 92			
Brunei	92		92				None
Cambodia	94	01		01			None
China	d	99	d				CLC 92 partially
DPR Korea							None
Indonesia	d	99	d				CLC 92 partially
Malaysia	95		95				CLC 69 and FUND 71
Philippines		97		97			None
Rep. of Korea	d	97	d	97			CLC and FUND 92
Singapore	d	97		97			CLC and FUND 92
Thailand							None
Vietnam							None

Numbers represent year of ratification / accession
d - denounced

ANNEX E

THE *EVOIKOS* INCIDENT AND MALAYSIA CLAIMS

A Case Study

by Mr. Rossid bin Musa
Principal Assistant Director
Unit of Enforcement
Marine Headquarters

The *EVOIKOS* INCIDENT AND MALAYSIA CLAIMS

Rossid bin Musa
Marine Headquarters Malaysia

THE INCIDENT

The 80823 GRT eastbound Cypriot tanker *Evoikos* collided with a 138037 GRT Thai registered tanker *Orapin Global* at the approximate position $01^{\circ} 10.5' N$ $103^{\circ} 48.5' E$, while passing the Strait of Singapore at 2054 hours on 15 October 1997. The *Evoikos* was carrying 130000 tonnes of heavy fuel oil. She suffered damage to three cargo tanks and spilled an estimated 29 000 tonnes of oil. The spilled oil is a heavy fuel oil characterized by a high viscosity (360 centistokes at $50^{\circ} C$) and a specific gravity of $0.98g/cm^3$.

The *Orapin Global* was in ballast and did not spill any oil.



RESPONSE

The Singapore Administration informed Malaysia to be aware of possibility of spill moving into Malaysia water immediately after the incident occurred. Department of Environment has activated National Oil Spill Contingency Plan on the 17th of October 1997. On the 19th of October Singapore Administration again notified Malaysia that a large quantity of oil was moving into Malaysian waters.

Report from air surveillance on 19 October confirmed that oil with a radius of 8 miles was moving to Tanjung Piai. The oil pollution response team of Marine Department Southern Region was mobilized immediately. Three vessels were deployed to spray dispersant in the area near Tanjung Piai and later in Kukup. Sorbent material was also used to collect oil.

Department of Environment contracted Petroleum Industry of Malaysia Mutual Aid Group (PIMMAG) to supply the equipment and materials such as booms and skimmers for use in the spill control, to complement the government-owned source. Besides the Marine Department, Marine Police and Civil Defence Force, fishermen and contractors to DOE were in the response team to control the spill and monitor its movement. Experts from the International Tanker Owners Pollution Federation Limited were also present to give advise to the response team to take appropriate measures to control the spill.



By 22 October the patches of oil were seen 5 miles from the coast of Batu Pahat and progressing up the Malacca Strait. Over flight reports on 27 October indicate that the amount of oil on the surface was reduced, but the threat of beach polluting remained. Oil reached Malacca and Negri Sembilan. The Marine Department immediately formed the Emergency Committee and convened a meeting in Port Dickson on 28 October.

In early November, the slick has reached the Selangor waters. The first step of action was to take measure to protect fish cage along the coast using plastic sheeting. The coastal area of Kuala Selangor District was heavily polluted with oil in early December. The slick was progressing further north reaching Pulau Pangkor in the state of Perak by mid December.

Equipment and material deployed

Equipment and material deployed for used or standby in the oil spill cleanup for two months' duration include 4000 meters of booms, 10 sets of oil skimmers, 20 bales of sorbent materials, 40 drums of dispersants, oil barges, floating tanks, knapsack sprayers, plastic sheeting, and helicopter dispersant bucket sprayer.

Several other equipment and material such as shovel and plastic bags for beach clean-up were used at several affected locations along the coast.

Problems in response

After more than 2 month since the spill the oil had spread widely and fragmented into small pieces. The oil was scattered over an area of more than 3 000 square kilometers. The viscosity and specific gravity increased further with time as a result of weathering processes such as evaporation, oxidation and incorporation of particulate matter in seawater.

The highly viscous consistency of oil together with its wide distribution made it impossible to attempt the application of dispersant, or mechanical recovery using skimmers and booms. The proportion of the scattered oil which could be collected was so small that no significant reduction in the threat to sensitive coastal resources would be achieved.

Long sandy beaches can not be protected, but are easily cleaned using manual collection methods. Mangroves are impossible to protect and any attempt at cleaning will do more harm than good since mangroves are extremely sensitive to physical disturbance and damage to the root systems.

The best prospect for dealing with the threat of spill to the coastline is to protect key sensitive locations such as prawn and fish farms using plastic sheeting or physical barriers. Frequent overflights to monitor the location and movement of drifting oil is a vital element so that shoreline clean up and other protective measures can be deployed at the appropriate time. Surface craft and land vehicles are also used to complement air surveillance.

CLAIMS

Total claims by Malaysia amounted to RM 3 542 647.33, of which RM 1 805 962.72 was for fisheries claims and RM 1 736 684.61 for non-fisheries claims. The former were composed of claims from fishermen for losses of income and the latter was for the cost of cleanup. More than 800 fishermen submitted their claims to the Fisheries Department.

Claims were paid by two payments. The first payment of RM 777,579.89 was paid 17 December 1999. The second payment was made on 5 December 2000.

Table 1 illustrates the breakdown of individual claims and the amount they were paid by the ship owner/ insurer.

	Organization	Claims (RM)	Receipt (RM)	% Receipt / Payment
1.	Jabatan Laut W Tengah	163,460.68	163,460.68	100
2.	Jabatan Laut W. Selatan	40,208.84	40,208.84	100
3.	DOE Materials	2,349.40	2,349.40	100
4.	Kontena Nasional	3,504.80	3,504.80	100
5.	Protection at Kukup	114,180.00	111,480.00	98
6.	Response Centre Cost	90,840.00	90,840.00	100
7.	Police (Air Wing)	79,695.74	66,661.74	87
8.	Marine Police	20,629.01	20,629.01	100
9.	Jabatan Alam Sekitar (HQ)	44,198.00	37,868.21	86
10.	Jabatan Alam Sekitar (Selangor)	5,806.09	4,662.27	80
11.	Pejabat Daerah Kuala Selangor	27,970.60	22,376.48	80
12.	Majlis Daerah Sabak Bernam	5,300.00	4,240.00	80
13.	Jabatan Pertahanan Awam	5,021.70	5,021.70	100
14.	Jabatan Pertahanan Awam	3,375.00	3,375.00	100
15.	Boat hire, Kukup	23,440.00	23,440.00	100
16.	Tug boat hire	14,975.00	14,975.00	100
17.	Trade Deal Sdn Bhd	3,850.00	3,850.00	100
18.	Protection Pulau Ketam	30,376.50	27,096.50	89
19.	Sorbent material at Port Klang	27,000.00	13,500.00	50
20.	Quick lime purchase	12,975.00	10,380.00	80
21.	DOE Johore	17,006.96	17,006.96	100
22.	DOE Perak	4,032.30	3,225.84	80
	Total	740,195.62	690,152.43	93
23.	PIMMAG	996,488.99	734,044.83	74
	Total	1,736,684.61	1,424,197.26	83.5
24.	Fisheries Claims	1,805,962.72	1,172,260.30	65
	Total	3,542,647.33	2,596,457.56	74

Table 1 – Summary of the claims

Coordination of claims

Even though there were not many claimants, it certainly required some sort of coordination. Malaysia had not experienced a big oil spill for quite some time. The last spill was the incident of the Nagasaki Spirit in 1992.

Claims were coordinated by two government agencies, i.e. the Department of Environment and the Fisheries Department. The Department of Environment took care of the claims submitted by its contractors and the government agencies that were involved in the response and cleanup operation. The Fisheries Department coordinated claims from fishermen for loss of income and damage claims on their fishing equipment and boats. Fisheries and DOE then submitted claim documents to the Marine Department who in turn forwarded them to the P&I Club correspondent in Kuala Lumpur.

The DOE took charge of coordinating claims due to the following reasons:

- i. The Environmental Quality Act 1974 conferred the power to recover all costs and expenses in relating to the pollution incidents from the polluter to the Director General of DOE.
- ii. DOE had coordinated the spill response and cleanup operation.
- iii. DOE had established a Fund; In the *Evoikos* incident the Director General authorized the release of some amount of money from the Fund to purchase equipment, material, pay rental, etc.
- iv. A few government agencies and private contractors had submitted their claims to DOE.

The Fisheries Department took responsibility to coordinates fisheries claims due to:

- i. A local claim office after the incident had not been established.
- ii. There were very many victims, all from the same state (province).

Observation regarding to the settlement of claims

The pollution victims generally were quite satisfied with the level of payment made by the owner. None of the victims brought the claim before the court. However it took more than 3 years before the P&I Club came to agree for settlement of all the claims. The reasons could be the following;

- i. ITOPF might find it difficult to understand some claim documents because they were submitted in the Malaysian language.
- ii. Local claim office was not established.
- iii. Correspondence between P&I Club was via local P&I correspondent office.
- iv. Disagreement over the rate of hire of equipment.
- v. There was no standard form used for documentation of the claims.
- vi. Dispute over the *An Tai* incident (23 November 2001)

CONCLUSION

The successful response to control the pollution has been attributed to the National Oil Spill Contingency Plan. The National Plan has long been established since 1976. Prompt notification by the Singapore administration enabled the Malaysian authorities to activate the plan and take appropriate measures to combat the oil pollution threatening to our coast and its environment.

The response team too benefited from technical advice and support from ITOPF personnel in monitoring the movement of the slick. Continuous advice and frequent overflight surveillance enabled the response team to measure and plan the next step of action.

Every victim of the pollution was fairly compensated finally. Everybody was satisfied with the settlement. The government agencies such as DOE, Fisheries and Marine Department played their role assisting the claimants. The IOPC, ITOPF and P&I club were very accommodating toward prompt payment of the claims.

ANNEX F

ENVIRONMENTAL DAMAGE CLAIM; THE *MT NATUNA SEA OIL SPILL*

A Case Study

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ENVIRONMENTAL DAMAGE CLAIM: THE *MT NATUNA SEA* OIL SPILL

by Ardi Turyawan

INTRODUCTION

Batam Waters is under the local jurisdiction of Batam Municipality, Riau Province, Republic of Indonesia. Environmental issues in Batam Waters are under the supervision of BAPEDALDA Batam. Besides Batam Municipality, Batam Industrial Development Authority is in charge of industry and investment matters, and some environmental issues are also their concern.

On October 3rd, 2001, at approximately 06:15 Western Indonesian Time, *MT Natuna Sea* – 92,313 metric ton DWT – carrying 523,088 barrels of crude oil, struck a reef in Batam Waters. The volume of the oil spill was approximately 60% of the total cargo. The geographic coordinate of this site is 01° 11' 29" North, 103° 53' 05" East, which is to the north of Belakang Padang Island and Sambu Island (Indonesia).

SPOT image acquired on October 8th, 2000; and ERS-2 Radar image acquired on October 11th, 2000 clearly show the oil slick in Batam Waters and its surroundings.

Various efforts to claim environmental damage and social-economic loss caused by *MT Natuna Sea* are being carried out at local and national levels. BAPEDAL, the institution that has an important role in this issue, has taken actions by collecting information and conducting initial environmental impact evaluation.

INITIAL ENVIRONMENTAL SETTING

In relation to the potential damage caused by the oil spill in Batam waters, we focus our investigation on the following areas: mangrove, coral reef, sea grass, fishery, tourism facilities, and rare species. Detailed description of these entities are as follows:

A. *Mangroves*

On Batam Island, mangroves grow along the north, west, and southwest coasts. Only small portions of the east coast and southeast coast are covered by mangrove forest.

Table 1. Mangrove Coverage of Each Region

Canopy of Mangrove	Area (ha)									
	I	II	III	IV	V	VI	VII	VIII	IX	X
Sparse Mangrove	282.87	119.70	129.24	1,125.72	2,370.15	2307.24	472.95	1,531.62	2,654.10	711.54
Medium Mangrove	275.04	636.93	1,475.64	2,600.01	1,383.66	3,755.61	4,340.34	585.27	4,934.07	4,913.28
Dense Mangrove	19.89	321.48	2,002.86	1,023.39	1,443.51	3,137.13	4,922.19	30.33	1,019.07	5,539.41
Total	557.80	1,078.11	3,607.74	4,749.12	5,197.32	9,199.98	9,735.48	2,147.22	8,607.24	11,164.23

B. Coral Reefs

Coral reefs are distributed underwater to the north of Batam Island, from west to east. In the eastern part (Region V) the coverage of live coral is 333.99 ha. These numbers were calculated based on digital image processing on Landsat image (Figure 5), and verified during field checking.

Table 2. Coral Reef and Seagrass Coverage for Each Region.

Class	Area (ha)									
	I	II	III	IV	V	VI	VII	VIII	IX	X
Coral Reef	1,320.39	468.99	991.71	186.93	333.99	718.11	91.17	0.00	0.00	460.98
Seagrass	3.60	0.36	0.72	0.99	11.52	6.03	0.09	0.00	0.00	5.49
Sand	323.73	145.35	292.95	144.27	3,444.66	1,773.54	294.66	0.00	0.00	607.32

C. Sea Grass

The existence of seagrass was determined using satellite image, and verified during field observation. The locations where seagrass was found include Pemping Island, Anak Ladang Island, Lumba Besar Island, and Bulan Island. These ecosystems cover 3.96 ha -- however field observation suggested that the seagrass was not scattered throughout the indicated areas, but only found locally within those areas. Based on these facts, we estimated that the real coverage of the seagrass is approximately 10% of the areas indicated on Landsat image.

D. Fisheries

Fishery data were collected for Bareleng Area (Batam and Rempang Island) and Bintan Island in 1998. These data show that in Bareleng, in 1998, shrimp production reached 402.2 tons and fish production was 1,017.8 tons. The total value of these two resources was US\$ 11,061,240. On the other hand in 1998, shrimp production and fish production in Bintan Island were 1,142.4 tons and 5,003.1 tons subsequently. The total value was US\$ 45,358,380.

E. Tourism

Coastal tourism is located along the northern coast of Batam Island and small islands surrounding the main island where the most pristine, sunny, and white sandy beaches are found. Two main tourist resorts are identified, namely Pulau Puteri (Nongsa Island) and Palm Spring. Pulau Puteri is a popular spot for exploring coral reefs and many colorful fishes, fleshly-lipped clams, shy cuttlefish, hawksbill turtle and other creatures make these reefs their home. Palm Spring beach facing Pulau Puteri has a beautiful sandy beach.

F. Endangered Species

The hawksbill turtle is once of the endangered species found at Pulau Puteri. According to local people, turtles comes at least twice a year for nesting around the pristine shore of Pulau Puteri. In each nesting season, approximately 200 eggs are laid in the area.

IDENTIFICATION AND FACT FINDING MISSION

A. Oil Identification on Satellite images

SPOT image acquired on October 8th, 2000 and ERS-2 image acquired on October 11th, 2000 show the oil slick in Batam Waters. The oil can be identified in the images because the oil that covers the sea surface almost does not reflect the sunlight to the sensor on-board. This phenomenon appears dark in the images, darker than the seawater.

A team of investigators from BAPEDAL has taken a number of samples from the remaining oil on *MT Natuna Sea* on December 28th, 2000. This sampling was performed according to the techniques guidelines issued by Indonesia, Malaysia and Singapore.

B. Sea and Field Monitoring

To improve the results of the fact-finding mission, an interdepartmental team of experts conducted a sea and field monitoring in Batam Waters on May 21 – 24, 2000. The team consisted of experts for economic valuation and coastal resource dynamic modeling; mangrove, coral reef, and seagrass inventory; trajectory modeling and economic valuation; and fisheries, sand and beach damage assessment.

C. Samples

The following are locations of samples and identification numbers of samples collected during pre-surveys, from the tankers, and during sea and field monitoring.

METHODS AND RESULTS

A. Oil Spill Models

A major oil spill can contaminate shoreline and cause long-term damage to the aquatic environment (including fisheries and wildlife) and tourism facilities, foul harbor facilities and vessels, and threaten other human activities. Therefore, oil spill accidents are very harmful to the ocean environment and to the health of humans.

A finite element hydrodynamic model has been set up to simulate current behavior in the area of the strait between Batam Island and Singapore and adjacent seas. The model used data from tidal observation stations available within Indonesian waters (source: DisHidros) and Singapore waters (source: MPA). Wind data was collected from Hang Nadim Airport, Batam. The bathymetry maps of this area are digitized from maps produced by DisHidros (8 map sheets)

The results of the hydrodynamic simulations show that during the ebb period, the main current flows in a northeast direction, close to the area of the *MT Natuna Sea* accident. The currents separate into two due to deeper parts of the sea bottom in the center of the strait. One current then flows along the coast of Batam Island and the other flows along the coast of Singapore. During the flood period, the current flows mostly in a south-southwest direction. A 15-day simulation, calibration, and verification exercise shows that the pattern and direction of the current produced by the model are congruent with actual data.

Using the results of the hydrodynamic model on current pattern and direction, the transport properties of a surface oil slick are obtained. The analyses are performed for Indonesian waters where most of the oil spread.

B. Remote Sensing to Map Oil Distribution and Potential Damage

1. Oil Distribution

Remote sensing images are very useful to prove the existence of oil slick on the sea surface, as well as to map the dispersion of the oil at a certain time (i.e. the time when the image is recorded by the sensor on-board). To prove the existence of the oil spill from *MT Natuna Sea* that ran aground on October 3rd, 2000, we purchased and processed the following images:

- a) ERS-2 Radar image, acquired on October 11th, 2000, orbit # 28637
- b) ERS-2 Radar image, acquired on June 18th, 2000, orbit # 26983
- c) SPOT image, acquired on October 8th, 2000, K-J 275-347, level 1B
- d) SPOT image, acquired on August 25th, 2000, K-J 275-347, level 1B

The images acquired October 3rd, 2000 were used to monitor and to map the actual location of the oil spill from *MT Natuna Sea*, whereas the images acquired before October 3rd, 2000 were used to compare the difference between the normal sea surface condition and the contaminated condition.

Based on the reflectance of the sea surface as appears on SPOT and ERS-2 images, the oil slick is identified and mapped in Batam waters and its surroundings. On October 8th, 2000 –as shown on the SPOT image- the sea surface north of Batam Island was partly covered by oil. This oil was clearly visible around Belakang Padang Island, Sambu Island, Pemping Island, Sekupang, Tanjung Pinggir, and Batu Ampar. The surrounding area of Belakang Padang Island and Sambu Island, as well as smaller islands in the south and southwest, are coral reef areas. The northeastern part of Batam Island

(Sekupang, Tanjung Pinggir, Batu Ampar, Nongsa) is mainly built-up area, including ports, offices, business district, warehouses, residential, and tourism facilities.

On October 11th, 2000 (see ERS-2 image) the oil was still covering the sea surface in the north of Batam, include Pemping Island, Belakang Padang Island, Sambu Island; and Sekupang, Tanjung Pinggir, and Nongsa at the northeastern coast of Batam Island. Compared to the similar phenomenon on October 8th, 2000, three days later the oil was more widely spread. Thus, the potential of the oil to deteriorate the environment and to destroy fishes and other creatures was even higher.

On the SPOT and ERS-2 images over the very same area, acquired before October 3rd, 2000, oil did not appear to cover the sea surface. On the SPOT image, the seawater appeared dark blue to black without distinct phenomena, whereas on the ERS-2 image the seawater reflected the radar signals almost evenly throughout the northern Batam waters. These phenomena indicate that there was no oil slick in Batam waters, at least until August 25th, 2000.

2. Potential Damage

a. Mangrove

The identification of mangrove ecosystem areas contaminated by the oil spill from the *MT Natuna Sea* uses Landsat-5/Thematic Mapper image acquired on March 19th, 2000, and Landsat-7/Enhanced Thematic Mapper image acquired on April 15th, 2001. Both images are geometrically corrected, and classified using unsupervised classification process with Maximum Likelihood Classification (MLC) method to map the land cover in the contaminated area.

During field monitoring, we found a number of mangrove species and vegetations associated with mangrove. The observation of the density of mangrove canopy suggests that the mangrove in Batam Island and other surrounding islands are mostly dense mangrove. This condition indicates the fertility of the waters around mangrove area. High density is related to good water primary productivity. If the mangroves dry up, it results in a lower water productivity and fish potential in the area.

The result of this spatial analysis was then overlaid with the area affected by oil resulting from the modeling. This operation provides quantitative data on the area of mangrove ecosystem contaminated by the oil spill.

b. Coral Reef

Landsat 7 image with an ETM+ sensor provides information on coral reef ecosystem. This image has two bands with long wavelength that can penetrate into the water.

Further classification of the image results in the following classes: live coral, dead coral, sand, and seagrass; where each class has a different range of transformed values. Live coral is coral reef ecosystem that contains more than 25% live coral, whereas dead coral contains more than 75% dead coral. Another class within the coral ecosystem is sand. This class mostly consists of sand and mud that is sometimes covered by a small portion of seagrass. If the seagrass is predominant, the class is called 'seagrass'.

c. Seagrass

Seagrass is an important component of a coral reef ecosystem. Seagrass can form a unique ecosystem, separate from coral reef. However, both ecosystems are often found in sand or soft sand areas. The classification techniques are similar to those of coral reef mapping.

3. Economic Valuation Method

Data collection in this study began with literature survey of the statistic data sources appropriate to the study, studying reports related to the objectives and purposes of the study, including the analysis of area and ecosystems.

Beside literature survey, site visit to the study area was also conducted to estimate both use value and non-use value of the stated ecosystems. In this context, site survey is a rapid rural appraisal method focusing on the information and data of fishermen who have been taking benefits from the ecosystems.

Principally, the economic valuation method used in this study is appropriate to the characteristics of function or benefit of the three ecosystems, which are successfully identified. Besides, the right choice of valuation method will also optimize time and costs of the study. Table 3 presents a matrix of economic valuation methods used in this study.

Table 3. Matrix of Economic Valuation of Mangrove, Coral Reef and SeaGrass Ecosystems in Barelang and Bintan.

No.	Classification of Value	Valuation Method
1	Use Values	
	• Direct Use Values	Effect on Production
	• Indirect Use Values	Effect on Production and Replacement Cost
2	Option Values	Benefit Transfer
	• Non-Use Values	
	• Existence Values	Benefit Transfer

Source: Modified from Barton (1994)

C. *Model Development*

To understand and develop a model of system dynamic for coastal resources is hardly feasible because of its high complexity. This model, therefore, is confined to the interaction between populations, resources/environment (mangrove, coral reef, sea grass and fisheries). The economic model is shown by the resource subsystem.

The resource subsystems of the coastal area are comprised of mangrove, coral reef, fisheries, and seagrass. These components are interconnected, thus, damage to an ecosystem can give impact to other ecosystems. Human activities that impact on natural resources must protect their sustainability. Pollution in the coastal region that does not take carrying capacity into account will likewise result in damage to the ecosystems. The interconnection of the resource components on others is shown in Table 4 as follows:

Table 4. Interconnection Matrix of Resource Components in the Coastal Zone

No.	Component	1	2	3	4	5	6
1	Mangrove		√	√	√	√	√
2	Coral Reef	√		√	√	√	
3	Fisheries	√	√		√	√	√
4	Sea Grass	√	√	√		√	√
5	Population	√	√	√	√		√
6	Pollution	√	√	√	√	√	

The benefit of causal relationship and the function of mangroves have an important role to support the life of the biota:

LABORATORY TESTING

A. Sample

The first samples of oil were taken from the tanker compartments (December 28th, 2000) and second samples from four locations (Batam area) on May 21 – 24, 2001. The samples were analyzed in the Molecular Analysis Laboratory at LEMIGAS. The analysis comprised of:

1. Density Analysis
2. Aromatic and Paraffin Content Analysis
3. Pristane and Phytane Content Analysis
4. Vanadium/Nickel Content Analysis
5. Sulfur Content Analysis

B. Finger Printing for Data Consistency

The results of finger printing analysis show that the samples taken from the surrounding islands have similar characteristics with those taken from the tanker.

LIST OF TERMS

BAPEDAL	Environmental Impact Management Agency
BPPT	Agency for the Assessment and Application of Technology
BAPEDAL REGIONAL	Environmental Impact Management Agency for Sumatra Region
BAPEDAL Batam	Local Batam Environmental Impact Management Agency
BAKOSURTANAL	National Coordinating Agency for Survey and Mapping
DKP	Ministry of Marine Affairs and Fisheries
HUBLA	Directorate-General for Sea Communication
LAPAN	National Institute of Aeronautics and Space
LEMIGAS	Institute for Oil and Gas Research and Development
PEMKOT BATAM	City Government of Batam
PKSPL IPB	Research Center for Marine and Coastal Resource – Bogor Agriculture University
PPLI	Central Treatment Plant for Hazardous Wastes
BIDA	Batam Industrial Development Authority

ANNEX G

ROLE AND RESPONSIBILITIES OF TECHNICAL ADVISORS AND EXPERTS IN NEGOTIATING RESPONSE AND DAMAGE CLAIMS IN TRANSBOUNDARY OIL / CHEMICAL SPILLS

by Dr. Michel Girin
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ROLE AND RESPONSIBILITIES OF TECHNICAL ADVISORS AND EXPERTS IN NEGOTIATING RESPONSE AND DAMAGE CLAIMS IN TRANSBOUNDARY OIL / CHEMICAL SPILLS

By Dr. Michel Girin, Director of Cedre

THE CONCEPT OF TRANSBOUNDARY POLLUTION

For the general public, a pollution incident is a transboundary one when a pollution occurring within a boundary crosses the boundary and impacts the other side.

A typical example of such a pollution at sea was the March 1991 spill of 2000 tons heavy fuel caused by the wreckage of the barge Vistabella in international Caribbean waters, part of which drifted to the coastlines of the independent islands of St Kitts and Nevis, the Netherlands Antilles islands of Saba and Saint Martin, the French Antilles island of Saint Barthelemy, British Virgin islands, and the US territories of the Virgin islands and Puerto Rico.

A typical example of such a pollution inland was the February 2000 spill of 100 000 m³ of waste water from the Rumanian Baia Mare Gold mine, including cyanide and heavy metals, part of which flowed along the courses of the Tisza and to Danube rivers, affecting riverside through Hungary, Serbia, Bulgaria and again Rumania.

Pollution specialists, aware of the basic subtleties of international agreements, consider pollution to be transboundary when the nationality of the source of the pollution is different from all or part of the affected areas and interests. This is the case of an oil or chemical spill from a ship running aground on a foreign coast.

A typical example was the running aground of the bulk cargo vessel Fenex in September 1996, releasing 2600 tonnes of edible wheat in shallow waters of a little bay with protected benthic species, within the French Lavezzi islands, a marine reserve.

A key point, unknown to the general public, is that a ship stuck on a foreign reef remains the territory/property of its flag country and owner. It, including the cargo in it, is protected to a certain extent by international rules from the laws of the country to which the reef belongs. Normally, the pollutant crosses a border when spilled.

Those who have experienced being affected by a large spill, crossing limits between different administrative areas of a single country, also (only half jokingly) associate it to transboundary pollution: pollution response is as varied between administrative areas within a country as between countries.

This last situation will not be discussed here. What will be discussed are situations of actual *transboundary pollution*, and *the essential point that whatever the place of occurrence of the spill, the spilled product is foreign property*. Foreign interests and players will therefore be involved. And those interests and players may soon claim that internationally recognised rules and standards have precedence over national rules and standards. On the other hand, local interests and players will oppose all or part of those foreign views, on the ground that only national rules and standards should apply to a pollution incident in their country.

THE PLAYERS

Players involved in any pollution incident can be divided into three main categories:

- ▶ The decision makers, mandated by the rules in force to respond to the pollution with the most adequate moves, whether for public interest or for their own interest;
- ▶ The knowledge providers, having experience on related matters and either charged by the rules in force to deliver that experience to the decision makers, or willing to do so;
- ▶ The observers, who may keep their opinion for themselves or express it with up to such a strength that it fuels a public crisis or becomes accepted public opinion.

Decision makers are those in charge of managing pollution response (technical, economic, financial, legal, etc.) and those directly concerned by the pollution (polluter and victims). *Any of their decisions may have dramatic consequences on the amount and/or acceptability of future claims, from both their organisation and other parties*. But, for the vast majority of them, that pollution incident is a first experience. Only a handful of them, namely the decision makers of specialised insurance companies (the Protection and Indemnity Clubs in the shipping industry) or specialised compensation Funds (national or international), have a proper background of the basic rules involved.

Observers include all those not directly concerned but who may have an opinion and who may feel they have to express it. This includes not only the general public, but also opinion leaders and knowledge brokers, namely politicians, lobbyists and journalists. The vast majority will not only have no experience of the rules in force, but many will easily consider a rule they do not understand, or a rule that goes against their culture/feelings, as unacceptable in the circumstances.

The 20000 tons heavy fuel spill of the tanker Erika off the French coast in December 1999 was a typical example of public rejection of the rules in force. French observers strongly rejected as unfair and unacceptable the IOPC Fund convention France was party to, establishing that the charterer of the vessel, the TotalFina oil group was not legally liable. TotalFina was pressured by public opinion to accept a "social responsibility" and to bear a part of the response.

Both decision makers and observers rely for their decisions and positions on what they may gather from the knowledge providers. I shall not embark here into the vast problem of the

self-nominated experts, who rush to the media and Ministers with ill-conceived solutions derived from a genuine will to help. Nor into the possibly vaster problems of those who look for publicity, or use the situation to promote unrelated political interests, unavoidable nuisances in any crisis situation. The knowledge providers considered here are the genuine ones, resource persons who do have some actual experience to deliver.

Those genuine knowledge providers can be divided into technical advisors and experts. They bear heavy responsibilities and *their work may have considerable influence on future claims : they may, voluntarily or not, open to them an easy path or send them the hard way.*

Technical advisors are crisis management professionals with undeniable experience on more or less extended aspects of pollution response. Their role is to sit by the decision makers and to provide them all along with honest and experience-based analysis of the situation and most adequate moves. *Experts are reputed professionals, often scientists, who fully master the subtleties and secrets of a particular problem.* Their role is to make clear what may possibly or will necessarily happen, should a particular action/decision/event take place.

WORKING WITHIN PAYERS' RULES

Because many will easily consider a rule they do not understand, or a rule that goes against their culture or personal sentiments as unacceptable in the circumstances, decision makers may imagine that those rules, or at least part of them, could be changed when applied to a particular incident. Many claims are built on that assumption. An important joint responsibility of the technical advisers and experts is to make clear to decision makers that the chances for changing a rule in the course of an incident are to the best very slim, in general nil. Rules are made by the payers and regular payers are much more prepared to fight for their rules than one-time claimants are to fight against them.

Payers can be divided into three main categories:

- ▶ National Funds, governmental bodies applying state payment rules and only those rules,
- ▶ Insurers (Protection & Indemnity Clubs for shipping), private companies with preference for the most favourable and non-obligatory out-of-Court settlement within the applicable rules, but prepared to fight in Court any claim beyond that limit,
- ▶ IOPC Funds, international bodies built by member states, happy to pay any amount within members' agreement on the interpretation of the Funds Conventions, but with unlimited determination and capacity to fight any claim beyond that limit

Examples for the 3 categories, drawn from actual experience will be given in the verbal presentation

Given those rules, claimants have four possible strategies :

- ▶ making the best possible use of the rules in force, including claiming different components of their damage/expense from different payers when applicable, depending on their acceptability to each payer,
- ▶ following the rules, but lobbying so that others who could have access to the same compensation funds, would voluntarily put themselves last in line,
- ▶ making use of a particular circumstance to increase the compensation budget or widen the compensation sources they may have access to,
- ▶ making use of a contradiction between two rules in force at different levels, to obtain a court decision in favour of the rule most favourable to them.

Only the first two can be achieved out of Court. The third strategy may prove beneficial to a particular group of claims, but only after a long and costly court procedure. The fourth strategy should be reserved to claimants ready to fight not for their immediate interest, but to change rules for future incidents.

Examples of successful/unsuccessful such initiatives will be given in the verbal presentation

TECHNICAL ADVISORS IN A TRANSBOUNDARY SPILL

Technical advisors are either contracted by a decision maker or referred to him by the response plan in force.

Pollution experts from the International Tanker Owners Federation (ITOPF) are, per the bylaws of the Federation, the technical advisors for pollution response of P&I clubs. They are regularly contracted by the International Oil Pollution Compensation Funds (IOPC Funds) for technical advisory services. Their experience of such services is by far larger than that of any other advisors. But, although P&I Clubs and the IOPC Fund are far different structures, they both are on the payers side. As a consequence, the experience of ITOPF has been entirely acquired through activities undertaken for the members of that side.

Pollution experts of Cedre are the technical advisors for pollution response referred by the French Polmar (Maritime Pollution) rule to the Polmar decision makers, namely the maritime and land prefects. Pollution experts of Cedre are also occasionally contracted as technical advisors by ITOPF, P&I Clubs or the IOPC Funds. Our staff members have actual experience of such services in much less incidents than ITOPF experts. But that experience has been acquired through activities undertaken both for members of the response side as well as for members of the payers side.

Whether referred or contracted, technical advisors are involved in a pollution incident to serve the decision makers of one of the parties involved, so that those decision makers could use the cards they have in hand to the best interest of their party. This does not mean that technical advisors are biased. We have as an example at Cedre the deepest respect for the professional integrity of ITOPF staff and we do think the same applies on their side. Technical advisors are endorsed with the highly challenging responsibility to gain and

maintain the trust of decision makers. Only fair, honest and objective advice guarantees such trust in the long term. But gaining and keeping human trust is not an easy task and a technical advisor may at times have difficult choices to make between integrity and efficiency.

Subjects for debate, drawn from actual incidents:

A technical advisor for the response side fails to convince the response authority in charge that the latter's information on the pollutant adrift at sea is insufficient and that foreign assistance should be called upon. Should he put it in writing to that authority ? Or to a higher authority ? With what potential consequences on future claims ?

In the first days of an incident, a technical advisor to the payers' side feels that the advisors of the response side are recommending the mobilisation of potentially excessive response. He warns his client but fails to convince him. Should he make it know to others, to protect his interests ? In writing ? With what potential consequences on future claims ?

The same uncompromising advice can be delivered in many different ways. Technical advisors have the dangerous power to influence decision makers in their choices. They may gear those choices toward conflict generating positions or toward negotiation opportunities. For that reason, it is of paramount importance that advisors consider themselves bound to objectively inform decision makers of all potential consequences, including long term ones, of on-site decisions/positions they recommend.

Also, **technical advisors of the different parties involved cannot ignore the rules and standards of the others**. They should be prepared to stand beside the decision makers they work for and fight for their technical positions. But they should also be prepared to understand those of other technical advisors and, whenever possible, to pave the way toward an acceptable agreement between the decision makers they work for.

Proposed do's and don'ts of technical advisers, drawn from actual Cedre experience of such situations, will be shown in the verbal presentation

EXPERTS IN A TRANSBOUNDARY SPILL

Experts are professionals who know the scientific and technical secrets of a particular problem and are charged with the responsibility to establish that this or that will necessarily happen, should a particular action/decision/event take place.

They may exercise their expertise in the context of an oil/chemical spill:

- At the request of media, to establish a particular point, because their experience is known to journalists
- At the request of an authority concerned, as a public duty
- On contract from one of the parties concerned

In the Erika incident, the IOPC Fund asked a French Court to determine whether traditional salt harvesters in a particular production area were right or wrong not to produce salt over the year following the spill, in order to avoid any risk of jeopardising the image of their product. The Court ordered a chemical expert to provide a technical assessment of the actual risks.

Experts do not need to have particular experience in oil or chemical spills, nor in the rules applying to such situations. But they have to be extremely professional. They should in particular never embark in works beyond the limits of their professional expertise. They should always be ready to recognise, when appropriate, that another expert could reach a different conclusion from the same available information. Whenever they use a scientific reference, they should be absolutely sure that its adequacy/accuracy cannot be disputed. Whenever they use a model to make a point, or extrapolate information established in a particular situation, they should make sure that their model or extrapolation will fully withstand scrutiny.

In the criminal Court procedure of the Aegean Sea oil tanker spill (Spain), experts commissioned by a group of claimant jeopardised their claim assessment by using an obsolete scientific reference: an expert from the other side could easily show that the author had recognised in a later paper that his earlier work was flawed.

In a Court proceeding on the Nissos Amargos tanker spill (Venezuela), experts for the Ministry of the Environment jeopardised their environmental damage assessment by basing it on a demonstration of losses incurred on a commercial species, which were compensated as economic loss.

Expertise is by essence uncompromising. It aims at establishing the truth. But truth assessments can be delivered in many different ways. Experts have the dangerous power to influence decision makers in their choices by, for example, the failure to distinguish between undeniable fact and a personal guess. They may gear their clients toward long, costly and dubious court battles, or toward openings for acceptable resolution. It is their paramount duty to objectively inform decision makers of the precise strength and limits of their expertise.

In the chemical spill of the Ievoli Sun, 3 different groups of experts (French ones mobilised by the French Authorities, British ones contracted by the P&I Club, Italian ones mobilised by the Italian Authorities and the European Community) were all asked to assess the risks inherent to the chemicals concerned and to recommend the appropriate response. Assessments were basically identical. But response recommendations were very different.

Experts of the different parties should be very careful to refrain from disputable statements on matters beyond their expertise or, if embarking in such statements, they should be fully conscious of the potential consequences and leave their clients an opening for possible mitigation

BRIDGING THE EXPERIENCE AND CULTURE GAP

Oil and chemical spills, especially transboundary spills, are not only technical problems but also social and cultural ones. Local experts often have to deal with foreign or international advisors and experts brought in by the shipowners, the governments of the affected countries, or other government and non-governmental organizations. The foreign/international experts apply different rules, claiming that these have precedence over domestic rules. They use different references, claiming these are the valid ones. More often than not, the experts from the different sides are unable to bridge the cultural and social gap.

It is a responsibility of the national authorities to ensure that local/national technical advisors and experts are prepared to bridge their part of the gap. Foreign/international advisors and experts are not necessarily enemies and they should not be treated as such. For the duration, they are one's unavoidable partners/opponents.

Local/national advisors and experts should never ignore the considerable advantages offered by potential on-site negotiation. Response actions/costs directly borne by the payers side will not have to be discussed, justified, and negotiated years later. It does not mean local/national advisors and experts should compromise their professional integrity in negotiations at any price. But they should be clearly aware that what can be agreed upon in the heat of action will save considerable time and expenses to future claimants, even if it may cost them some professional pride.

Like all others involved, technical advisors and experts concerned with accidental marine pollution have to act within set rules and procedures. In a transboundary situation, whether because a spill was caused in their country by a foreign vessel, or because the pollutant drifted from international waters or from waters of another country, ***they have to fully master the particularities of the applicable rules, and how circumstances may influence their respective weights.*** Contrary to local advisors/experts' frequent belief, national rules apply only when they do not conflict with international agreements to which their country is party. But, if the case is taken to Court, the relevant Court will be national, and it will in all probability not strictly abide by all the terms of the international agreements in force, in spite of what foreign advisors/experts may claim.

Cedre has been charged by the French authorities with the responsibility to permanently build on experience gained in technical advice and expert services provided to the French Government, Industry, Insurers and International Bodies in various pollution incidents, for further improvement of the quality and efficiency of its advisory and expert services. ***We have learnt from experience two points of paramount importance for compensation interests:***

- ▶ that experts of all sides should always be prepared to recognise the merits of other experts' positions, even when opposed to theirs,
- ▶ that technical advisors of all sides must keep communication lines open between themselves, even when negotiations have officially been suspended.

Technical advisors should in addition be fully prepared to give priority to the interests of those they work for, even at the expense of some personal pride, or against their own

economic interests, as long as there is room for an acceptable amicable settlement. If the case reaches the court despite their best efforts, they should be prepared to make the best possible use of the available expertise.

Experts on their part should always be clear about their limitations to those who use or may use their services, before things have gone too far to be stopped.

ANNEX H

THE NEED FOR REASONABLE AND COST EFFECTIVE RESPONSE OPERATIONS

by

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THE NEED FOR REASONABLE AND COST EFFECTIVE RESPONSE OPERATIONS¹

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INTRODUCTION

Two international Conventions, the 1992 Civil Liability Convention and the 1992 Fund Convention, govern compensation for pollution damage caused by spills from oil tankers.

The Civil Liability Convention, which governs the liability of tanker owners, lays down the principle of strict liability and introduces a system of compulsory liability insurance. The tanker owner is normally entitled to limit his liability to an amount linked to the tonnage of his ship.

The 1992 Fund Convention is supplementary to the 1992 Civil Liability Convention by providing compensation for pollution damage when the amount available under the Civil Liability Convention is inadequate. The International Oil Pollution Compensation Fund 1992 (1992 Fund) is a world-wide intergovernmental organisation set up to provide compensation in States which are Party to the 1992 Fund Convention. The 1992 Fund is administered by a Secretariat in London, which also administers another Organisation, known as the 1971 Fund, which operates in parallel to the 1992 Fund. Each Fund has an Assembly composed of representatives of all Member States of the respective Organisation and an Executive Committee of 15 Member States elected by the respective Assembly. The main function of the Executive Committees is to approve settlements of claims for compensation, to the extent that the Director of the two Funds is not authorised to make such settlements.

Compensation is available under both Conventions for pollution damage, including the costs of reasonable preventive measures. A uniform interpretation of the definition of pollution damage and preventive measures is essential for the functioning of the system of compensation.

This paper focuses on preventive measures, including clean-up, and draws upon the IOPC Funds' experience in handling claims for compensation arising from over 100 incidents. The paper considers the criteria against which claims for preventive measures are assessed by the 1992 Fund, in particular the question of reasonableness.

THE INTERNATIONAL REGIME AND RECENT DEVELOPMENTS

The 1992 Conventions apply to pollution damage caused by spills of persistent oil from tankers and suffered within the territory, territorial waters or the exclusive economic zone (EEZ) or equivalent area of a State Party. Expenses incurred for preventive measures are recoverable even when no spill occurs, provided that there was a grave and imminent threat of pollution damage. The Conventions apply not only to spills from tankers carrying oil in bulk as cargo, but also, in some circumstances, to spills of bunker oil from unladen tankers.

¹ Originally written for the Interspill Conference in Brighton, UK in October 2000.

Apart from exemptions from liability for pollution damage caused by acts of war, grave natural disasters, sabotage by a third party or negligence by public authorities in maintaining navigational aids, the owner of the tanker has strict liability (ie he is liable also in the absence of fault).

The limits of the tanker owner's liability under the 1992 Civil Liability Convention are:

- a) for a ship not exceeding 5 000 units of account, 3 million SDR² (£2.7 million);
- b) for a ship with a tonnage between 5 000 and 140 000 units of tonnage, 3 million SDR (£2.7 million) plus 420 SDR (£375) for each additional unit of tonnage; and
- c) for a ship of 140 000 units of tonnage or over, 59.7 million SDR (£53.4 million)

The tanker owner is deprived of the right to limit liability if it is proved that the pollution damage resulted from his personal act or omission, committed with the intent to cause such damage, or recklessly and with knowledge that such damage would probably result.

The 1992 Fund pays compensation to those suffering oil pollution damage in a State Party who do not obtain full compensation under the 1992 Civil Liability Convention in the following cases:

- d) the tanker owner is exempt from liability under the 1992 Civil Liability Convention because he can invoke one of the exemptions under that Convention; or
- e) the tanker owner is financially incapable of meeting his obligations under the Civil Liability Convention in full and his insurance is insufficient to satisfy the claims for compensation; or
- f) the damage exceeds the tanker owner's liability under the Civil Liability Convention.

The maximum compensation payable under the 1992 Fund Convention in respect of an incident is 135 million SDR (£120 million), including the sum actually paid by the tanker owner (or his insurer) under the 1992 Civil Liability Convention.

The 1992 Fund is financed by contributions levied on any person who has received in one calendar year more than 150 000 tonnes of 'contributing oil' (crude oil and heavy fuel oil) after sea transport in a State Party to the 1992 Fund Convention. Each contributor pays a specified amount per tonne of contributing oil received, the amount levied being decided each year by the 1992 Fund Assembly.

The 'old' regime in decline

Two other Conventions, the 1969 Civil Liability Convention and the 1971 Fund Convention preceded the 1992 Conventions. These earlier Conventions have been denounced by a number of States and the number of 1971 Fund Member States will have fallen from 77 to 27 by October 2001.

² The unit of account in the Conventions is the Special Drawing Right (SDR) as defined by the International Monetary Fund. In this paper, the SDR has been converted into US dollars at the rate of exchange applicable on 1 October 2000, i.e., 1 SDR = £0.894.

The 'old' regime in decline

Two other Conventions, the 1969 Civil Liability Convention and the 1971 Fund Convention preceded the 1992 Conventions. These earlier Conventions have been denounced by a number of States and the number of 1971 Fund Member States will have fallen from 77 to 27 by October 2001.

A consequence of this departure from the 1971 Fund is that the total quantity of contributing oil, on the basis of which contributions to that Fund are assessed, has been drastically reduced, the effect of which is a considerably increased financial burden on contributors in remaining 1971 Fund Member States. Furthermore, there are at present over 20 Member States where there are no contributors because no entities receive more than 150 000 tonnes of contributing oil in a calendar year. In the situation set out above, the remaining 1971 Fund Member States may not have the financial protection which they would expect in accordance with the provisions of the 1971 Fund Convention. However, in order to overcome this difficulty the 1971 Fund has now taken out insurance to cover its liabilities arising from any new incidents.

Under Article 43.1 of the 1971 Fund Convention, that Convention ceases to be in force when the number of Contracting States falls below three, a number that is unlikely to be reached in the foreseeable future. In September 2000, the IMO convened a Diplomatic Conference at which a Protocol was adopted to amend Article 43.1 of the 1971 Fund Convention to the effect that the Convention would cease to be in force on the date on which the number of Member States fell below 25 or 12 months following the date on which the Fund Assembly (or other body acting on its behalf) noted that the total quantity of contributing oil received in the remaining Member States fell below 100 million tonnes, whichever was the earlier. The Protocol will enter into force on 27 June 2001 unless at least one third of the remaining Contracting States lodge opposition to its entering into force by 27 March 2001. On the assumption that such objections will not be lodged the Convention would cease to be in force during the summer of 2002 at the latest.

Improvements to the 1992 Conventions

Increase in the compensation limits

Some 1992 Fund Member States have expressed the view that two major incidents involving the 1992 Fund, namely the *Nakhodka* (Japan, 1991) and *Erika* (France, 1999) incidents, have shown that even with the higher amount of compensation available under the 1992 Conventions, there are still difficulties in providing full compensation to victims. A number of Governments submitted a proposal to the IMO to increase the limits in the 1992 Conventions. The Legal Committee of the IMO met in October 2000 and adopted two Resolutions amending the limits laid down in the 1992 Civil Liability Convention and the 1992 Fund Convention by 50.37%, thereby resulting in a maximum amount available for compensation under the 1992 Conventions of 203 million Special Drawing Rights (£180 million). The amendments will enter into force on 1 November 2003, unless prior to 1 May 2002, a quarter or more of the Contracting States communicate to the IMO that they do not accept the amendments.

The 1992 Fund Assembly decided in April 2000 that it would be appropriate to consider whether, in the light of experience, the compensation regime needed improvements in order to meet the needs of the international community. A Working Group of the 1992 Fund met in July 2000 to hold a preliminary exchange of views and draw up a list of issues that could merit further discussion. Subjects discussed included:

- Ranking of claims/priority treatment (including prescription periods)
- Uniform application of the Conventions
- Sanctions for failure to submit oil reports
- Dissolution and liquidation of the Fund
- Maximum compensation levels
- Weighting of contributions according to the quality of ships used to transport oil
- Environmental damage

The 1992 Fund Assembly has decided that the Working Group should meet in March and June 2001 to continue to consider issues identified as important for the purpose of improving the compensation regime and to make appropriate recommendations to the Assembly.

ADMISSIBILITY OF CLAIMS FOR COMPENSATION FOR PREVENTIVE MEASURES, INCLUDING CLEAN-UP

General considerations

The policy of the 1992 Fund on the admissibility of claims for compensation has been established by the Governments of Member States. The 1992 Fund has published a Claims Manual setting out the criteria for the admissibility of various types of claims and containing general information on how claims should be presented.

For a claim to be accepted by the 1992 Fund, it has to be proved that the claim is based on a real expense actually incurred, that there was a link between the expense and the incident and that the expense was made for reasonable purposes.

The 1992 Fund compensates the costs of measures to prevent or minimise pollution damage, such as reasonable measures to combat oil at sea, to defend sensitive resources, to clean shorelines and coastal installations and to dispose of collected oil and oily debris. The Fund also accepts costs arising from preventive measures associated with salvage operations provided that the primary purpose was to prevent pollution damage. If clean-up measures result in damage to roads, piers and embankments the cost of any necessary repairs is admissible. However, claims for work that involves improvements rather than the repair of damage resulting from the clean-up are not accepted.

Claims for measures to prevent or minimise pollution damage are assessed on the basis of objective criteria. The fact that a government or other public body decides to take certain measures does not in itself mean that the measures are reasonable for the purpose of the

Conventions. The technical reasonableness is assessed on the basis of the facts available at the time of the decision to take the measures, and those in charge of the operations should continually reappraise their decision in the light of developments and further technical advice.

Claims for costs are not accepted when it could have been foreseen that the measures would have been ineffective. On the other hand, the fact that the measures prove to be ineffective is not in itself a reason for rejecting a claim for the costs incurred. Such costs, and the relation between those costs and the benefits derived or expected, should be reasonable. In its assessment, the 1992 Fund takes into account the particular circumstances of the incident.

Claims for the cost of personnel and the hire or purchase of equipment and materials are admissible as are the costs of cleaning and repairing equipment and of replacing materials consumed in any clean-up response. If equipment was purchased for a particular spill, deductions are made for the residual value when the amount of compensation is assessed. If a public authority has purchased and maintained materials or equipment so that they are immediately available if an incident occurs, compensation is paid for a reasonable part of the purchase price of the resources actually used in the clean-up.

The 1992 Fund accepts reasonable additional costs incurred by public authorities that use permanently employed personnel, vessels and other resources to undertake clean-up. Authorities may also claim for 'fixed costs', i.e. costs which would have arisen even if the incident had not occurred, such as normal salaries of permanently employed personnel and capital costs of vessels owned by the authorities. The 1992 Fund accepts a reasonable proportion of such costs, provided that these correspond closely to the clean-up period in question and do not include remote overhead charges.

Clean-up operations at sea

Monitoring the movement and behaviour of oil

The value of monitoring oil slicks at sea is well recognised, particularly if the monitoring is backed up with good communications, since it can facilitate the deployment of clean-up resources where they are most likely to benefit the overall response. Regular monitoring also helps in the prediction of which coastal areas or other sensitive locations are at risk of pollution, so enabling defensive resources to be deployed to best advantage.

It is also generally accepted that, subject to weather conditions and the availability of suitable aircraft, aerial surveillance is superior to the use of ships in terms of both speed and accuracy. In reviewing claims for the costs of monitoring oil at sea, the IOPC Funds have often found that there is a lack of overall co-ordination between air and sea operations. This has resulted in oil recovery vessels being utilised in the search for oil instead of the purpose for which they were intended. Aircraft are also sometimes diverted from their principal reconnaissance role and are used to transport people not directly involved in responding to an incident. Claims for costs associated with duplication of effort or public relations are not accepted by the 1992 Fund.

Dispersants

The application of dispersants to floating oil at sea offers one of the most effective ways of minimising the contamination of shorelines and other sensitive areas. Aircraft have been shown to be particularly effective in treating large amounts of oil in a relatively short period of time. Provided the oil is amenable to dispersant treatment and spraying operations are monitored to ensure they remain effective, claims for the associated costs are accepted.

The Fund has in the past rejected claims for the costs of using dispersants to treat viscous oils, such as heavy fuel oil, after field observations have indicated that the chemical is having no effect. The traditional method of monitoring the efficacy of dispersant spraying has relied on visual observations of the subsurface cloud of dispersed oil shortly after the application of chemicals.

Recent research has indicated that the oil viscosity criterion currently used to determine whether or not a particular type of oil is amenable to dispersant treatment is not always appropriate. Laboratory and field experiments have shown that under certain conditions some dispersants are effective against bunker fuels and viscous water-in-oil emulsions. However, the dispersion process for such oils is said to take much longer and is less discernable than it is with low viscosity oils. For this reason the researchers argue that the current method of assessing dispersant effectiveness is in some cases unsuitable. They advocate the in-situ measurement of dispersed oil concentrations as the only effective way of monitoring dispersant spraying operations.

While it remains to be seen whether these recent findings will lead to the widespread use of dispersants in the treatment of viscous oils, the Fund will continue to assess any claim in respect of such operations on the basis of its own merits and in light of the particular circumstances of the case.

Oil recovery

The application of dispersants to combat oil at sea continues to be as controversial today as it was thirty years ago and many countries still prohibit their use. The only viable alternative, other than to allow the oil to go ashore, is to attempt to recover the oil at sea. Despite the overall ineffectiveness of oil containment and recovery techniques in open waters, many countries have invested heavily in specialised vessels and equipment.

The 1992 Fund's policy with regard to the assessment of claims for the costs of oil recovery operations at sea is exactly the same as with any other response technique, ie on the basis of objective criteria. All response measures at sea suffer from the problem of diminishing benefits once slicks become fragmented and scattered over a wide area. This problem is particularly acute in the case of at sea recovery when it becomes increasingly difficult to encounter oil in sufficient quantity to merit the deployment of skimming systems.

It has been the Fund's experience that oil recovery systems often remain deployed long after their continued use cannot be justified on technical grounds. There are no doubt political as well as media considerations that have to be addressed during any response and these may sometimes prevail over any technical consideration. Not surprisingly, given that the Fund assesses claims solely on the basis of technical criteria, claimants seek to justify their actions accordingly, even when their motives at the time were not driven by technical

considerations. Many claimants simply justify the prolonged deployment of recovery systems while ever there is any oil at sea on the ground that shoreline clean-up, on a cost per ton basis, is very expensive. The assumption therefore is that every tonne of oil collected at sea leads to large savings in overall response costs. This is a spurious argument because, at this stage the effectiveness of at sea recovery is often so poor that the vast majority of the oil will usually end up on the shoreline irrespective of the number of units deployed.

Shoreline cleaning

Shoreline clean-up is usually straightforward and does not normally require the use of specialised equipment. A balance has to be struck between the desire to remove as much oil as possible in the shortest time and the need to avoid further damage to the shoreline and its resources. Heavy earth moving equipment, for example, is capable of removing large volumes of oil quickly, but the use of such equipment can result in serious erosion of shorelines and will inevitably generate substantial quantities of oily waste for disposal.

One of the most contentious issues in the context of determining the admissibility of claims for shoreline clean-up costs is the extent and duration of the operations. Once bulk oil has been removed, the Fund would expect consideration to be given to the overall benefits of further cleaning, taking in account the nature of the shoreline, its immediate importance, environmental factors and the rate at which natural cleaning is likely to take place.

Whilst exhaustive cleaning of amenity areas is usually justified, particularly if an incident occurs close to or during the holiday season, this is rarely the case for remote areas and shorelines that are not accessible to the public. Claims for the costs of cleaning shorelines to a higher standard than the pre-spill condition would not be admissible.

The costs of dismantling and reassembling sea defences constructed of tetrapods or rocks in order to remove oil trapped in their interstices would generally be considered inadmissible, unless there was a substantial risk of major pollution damage resulting from oil leaching out of the structures.

Costs

Whilst the assessment of claims for their technical reasonableness presents the Fund with many challenges, the assessment of response costs is often the most difficult to resolve, particularly with the tendency for public authorities to rely more and more on the private sector to undertake clean-up operations.

This is less of a problem when pre-contracts have already been negotiated with response organisations and all hire rates for equipment and personnel have been agreed in advance of an incident. Pre-contractual arrangements are key elements of any oil spill contingency plan and it can have serious consequences if it is overlooked. The main difficulty arises when resources are obtained on the spot market when those responsible for organising the response have no time to engage in prolonged negotiations and there are no readily available competitors. Whilst some opportunism on the part of commercial contractors may be expected in such circumstances, the Fund has received claims, for example for the costs of chartering vessels, where the rates are up to four times higher than current market rates.

The Fund policy on hire rates of specialised equipment such as booms and skimmers is to base the rate on the amortised capital cost of the equipment over its expected useful working life. A percentage uplift is then applied to allow for overheads such as storage and maintenance and, in the case of commercial contractors, profit. The Fund would normally expect the hire rates of clean-up equipment to be reduced by 50% when the equipment is on standby, unless it can be shown that it would have been deployed elsewhere but for the incident that led to its mobilisation.

Record keeping

It is essential when presenting a claim for clean-up costs that supporting documentation is submitted showing how the expenses are linked with the actions taken. Comprehensive records should be kept of all operations and expenditures, including daily records detailing the work being undertaken, the equipment in use, where and how it is being used, the number of personnel employed, how and where they are deployed and the materials consumed.

The Fund has frequently had to reject substantial amounts from claims as a result of claimants having not scrutinised invoices submitted by commercial contractors to ensure that only those resources actually deployed were charged for, that the rates charged were appropriate and in accordance with prior agreements.

CONCLUSIONS

Although the total compensation available under Fund Conventions has in only relatively few cases been exceeded during the 22 years of their existence and the maximum amount payable by the 1992 Fund will probably increase substantially in 2003, it is important that clean-up response measures remain within the bounds of reasonableness. This is particularly important in view of the tendency of governments to rely on the private sector to undertake clean-up, which will inevitably lead to increased costs without any improvement in the response.

However, provided that the measures taken are based upon a realistic technical appraisal and that the operations are effectively controlled and monitored, the compensation amount available through the Conventions should be sufficient to meet the needs of the great majority of future incidents.

ANNEX I

OIL POLLUTION DAMAGE CLAIMS FOR FISHERIES AND AQUACULTURE

WITH REFERENCE TO
THE KOREAN MANUAL AND *SEA PRINCE* INCIDENT

A Case Study

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OIL POLLUTION DAMAGE CLAIMS FOR FISHERIES AND AQUACULTURE

by K. H. Lee

INTRODUCTION

In the Republic of Korea (ROK) the Cypriot tanker *Sea Prince* (144,567 GRT) part-laden with over 80,000 tons of Arabian crude oil grounded off Sorido island near Yosu of Chonnam-Province on the 23rd July, 1995 and some 5,000 tons of Arabian crude oil was spilled as a result of the grounding. Most of the spilled oil affected shorelines along the south and east coasts of the Korean peninsula. This was the biggest of all the oil spill incidents in Korea.

Following the *Sea Prince* incident in the year of 1995 various types of oil spill incidents occurred from ships. One large oil spill by the Korean barge *Keunmdong No. 5* (481 GRT) which occurred on the 27th September, 1993 has not been settled since that time and is still in dispute.

Under such circumstances, the National Federation of Fisheries Cooperatives (NFFC) needed to set up an objective standard for damage claims for fisheries and aquaculture so that claimants could receive compensation as soon as possible. The NFFC, assisted by the Ministry of Maritime Affairs and Fisheries (MOMAF), organized an expert group to study the matter. The expert group published the 'Manual for Survey of Oil Pollution Damage' in October, 1995.

BRIEF DESCRIPTION OF THE MANUAL

The Manual is composed of three parts. Part I of this Manual briefly sets out the legal framework within which the IOPC Fund operates and describes how the organization works. Part II explains how the oil pollution damage could be properly assessed. Scientific survey to prove oil pollution damage is dealt with in Part III.

Part I : Compensation Scheme for Oil Pollution Damage

This Part introduces the legal framework as the 1971 International Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage (1971 Fund Convention) and the 1969 International Convention on Civil Liability for Oil Pollution Damage (1969 Civil Liability Convention) -- because at the time of publication of the Manual the ROK was party to the 1969 Civil Liability Convention and the 1971 Fund Convention. The procedure for presenting a claim and the admissibility of claims defined by the IOPC Fund's claims manual were also introduced. Establishment of a Korean P & I Club and a National Plan to minimize oil pollution damage were recommended.

It was also pointed out that in order to obtain a reasonable level of compensation for oil pollution damages it is not sufficient for the fishermen to submit their own claim documents

as they naturally tend to be subjective about their claims. It is therefore necessary for the fishermen to be guided by an objective standard for damage claims or to appoint a surveyor to investigate and assess oil pollution damage to fisheries and aquaculture.

In case the fishermen appoint a surveyor, the surveyor should, from the beginning, investigate and assess oil pollution damage jointly with surveyors of IOPC Fund and the P & I Club to minimize differing views between both surveyors and to reach mutual agreement at an early stage.

Although both surveyors jointly carry out the survey on oil pollution damage it may be necessary for both surveyors to have a guideline to survey and assess oil pollution damage because the fishery industries are complicated and diverse, and so are the types of oil pollution damage. Accordingly the NFFC suggests as follows.

- The Manual can be used by the fishermen and the Fisheries Cooperative Union (FCU) as a guideline for damage claims of fisheries and aquaculture.
- The Manual can be used by the surveyors' internal guideline when they investigate and assess oil pollution damage to fisheries and aquaculture.
- The Manual can be used as part of mediators' background materials when damage claims for fisheries and aquaculture are in dispute between the parties concerned.

Part II : Guidance for Assessment of Oil Pollution Damage

The Manual classifies oil pollution damage to fisheries and aquaculture as follows. The classification is only based upon typical fishery sectors and can be changed according to the situation and circumstances of specific oil pollution incidents taking into consideration the various kinds of fishery sector and the varying extent of oil pollution damage.

Fishing vessels: Business interruption, decrease in catch, change of fishing area, pollution damage to fishing vessel and its equipment.

Aquaculture: Mortality, decrease in price, expectation of mortality, disposal of premature fish due to risk of oil pollution.

Common Fishing ground: Mortality, decrease in price of marine product, prohibition to catch marine product (ban).

Others: Clean-up costs, expenses incurred by countermeasure committee, loss of or decrease in sales commission.

Assessment of pollution damage to fishing vessels

The Manual divided pollution damage to fishing vessels as follows:

Business interruption

Decrease in catch (product)

Change of fishing area

Pollution damage to fishing vessel and its equipment

Business interruption.

This means that the fishing vessels are not able to fish due to oil pollution and loss results from suspension of fishing. The loss of business can be calculated based on number of days business was interrupted, average value of fish catch per day per vessel and rate of income.

Decrease in catch (product)

This means that although fishing vessels are free to continue fishing, the quantity of fish caught by the fishing vessel is less than that before the oil spill. Accordingly this is different from business interruption. However compensation for loss resulting from decrease in catch is seldom awarded because the causal relation between decrease in catch and the oil pollution itself must be established. So it is necessary to file claims with concrete and objective evidences in this case.

Change of fishing area

This means that due to oil pollution the fishing vessels are unable to fish in their original fishing area and they are forced to fish in other fishing areas, or to change the type of fishing. In this claim, details of the change of fishing area and type of fishing should be accurately shown in claim documents.

Pollution damage to fishing vessels and their equipment

In cases where fishing equipment (various kinds of fishing net or gear) is contaminated by oil, the extent and degree of contamination should be considered. If it is not possible for the equipment to be cleaned, then replacement costs are accepted, taking into account depreciation of the equipment.

It is necessary for the fishermen to keep photographs of fishing equipment contaminated by oil because the number of equipment and the extent and degree of contamination thereon may be disputed. Sometimes it is also necessary for the fishermen to keep the contaminated equipment itself as evidence.

Assessment of pollution damage to Aquaculture.

This Manual divided pollution damage to aquaculture as follows:

Mortality

Decrease in price

Expectation of mortality

Disposal of premature fish due to risk of oil contamination

In case of mortality of fish, the IOPC Fund and the P & I Club tend to accept the claim if the quantity of fish killed is clear and it is proved that the mortality is caused by the oil and /or oil dispersant chemicals. However there have been long disputes on decrease in price and expectation of mortality because the causal relation between the above claims and the oil pollution itself is difficult to establish. The IOPC Fund and P & I Club do not accept loss resulting from disposal of premature fish due to risk of oil contamination because this loss is

a kind of anticipated loss. Therefore it is necessary to present claims supported by reasonable and objective evidences.

In cases where aquaculture facilities (nets, buoys ropes, etc.) are contaminated by oil the extent and degree of contamination should also be considered. If it is not possible for the facilities to be cleaned, then replacement costs are accepted, taking into account depreciation of the facilities.

Assessment of pollution damage to Common Fishing Ground (CFG)

The Common Fishing Ground (CFG) is the basic and essential way of life for fishermen. The CFG comprises the inter-tidal and sub-tidal zone to depths of 10 meters, at the time of the lowest ebb tide, of specified coastal regions. The CFGs are controlled and managed by individual Village Fishery Associations (VFA). A wide variety of species of mollusca, seaweed and sedentary animals are inhabited therein.

Generally it is very difficult to obtain accurate data concerning sales from CFG products because the fishermen are free to choose either to sell the product through FCU or private outlets. Transactions with the latter may be done privately without invoice and receipt, while the FCUs are required to report details of all transactions to the tax office. Therefore, the attraction of selling products privately is that besides avoiding any sales commission, tax levies can also be evaded.

The fishermen should know 'No evidence, No compensation' and this principle is applied in court and also in the settlement of the claims out of the court. Sometimes fishermen try to change private sale amounts to Cooperative sale (Commission sale) amounts. However IOPC Fund does not admit this kind of sales amount.

If the VFA cannot get hold of the details of the actual sale amounts of product, the VFA should get hold of the actual condition of the CFG or date and quantity of the seed spray at least.

The fishermen often claim the expected losses in the years following the oil pollution incident in addition to damage in the year of incident. However such claims have not been compensated due to the natural purification of the marine product and the lack of showing of a causal relation between the expected losses in the following years and the oil pollution itself.

Also assessment of damage to CFGs is very difficult because it is a kind of environmental damage. Therefore it is one type of claim in which mutual agreement between the claimant and IOPC Fund is difficult to achieve.

As it is difficult to assess damage to the CFG, the 'Income Comparison Method' is often used. The 'Income Comparison Method' compares the income in the year of the oil spill incident with the income of the year prior to the oil spill. The 'Income Comparison Method' has resulted in many critical disputes because characteristics of marine ecology are not considered in its assessment. However normally this method is used because there is no other method.

However, if the VFA or FCU has no data on income of fishermen, the 'Income Comparison Method' is useless. Furthermore, if the production in the year of the incident are more than those of the preceding years, it is also useless.

Part III. Guidance for Scientific Survey to prove oil pollution

This Part introduces consequential loss, pure economic loss and environmental damage defined by the IOPC Fund's claims manual and pointed out that it is very difficult for the fishermen to prove these kinds of losses and damages because scientific survey with high technology and special knowledge is needed.

Scientific survey requires chemical analysis and taint testing of the marine products taken from the polluted area and a non-polluted area.

Survey on the water quality, survey on the sediment condition, survey on the living condition and ecological survey are also included within the scope of Scientific survey.

As the reasonable level of compensation can only be paid if the oil pollution damage is fully supported by objective, documentary, reasonable and scientific evidence, it is best for the fishermen to take full advantage of assistance from various fisheries institute or fisheries universities to prove pure economic loss and environmental damage.

Further, it is desirable to ensure the accuracy of the statistics relating to fisheries and to regularly conduct surveys of the marine ecosystem. Aquatic resources and water quality, which would make confirmation of pollution damage and its extent easier, provide a standard for the restoration of the marine environment, and help assess the damage to the environment.

For the sake of mutual understanding, a more detailed outline of the Manual are attached. Empirical assessment of pollution damage to Fishing vessels, Aquaculture and Common Fishing Grounds which were adopted in the case of the *Sea Prince* incident are also attached.

DETAILED OUTLINE OF THE MANUAL

The Manual is composed of three parts. Part I of this Manual briefly sets out the legal framework within which the IOPC Fund operates and describes how the organization works. Part II explains how the oil pollution damage could be properly assessed. Scientific survey to prove oil pollution damage is dealt with in Part III.

PART I : COMPENSATION SCHEME FOR OIL POLLUTION DAMAGE

Section 1. Background

The National Federation of Fisheries Cooperatives(NFFC), in their past experiences, noted that in order to obtain a reasonable level of compensation for oil pollution damage claims it is not sufficient for the fishermen's own claim documents assessed subjectively. It is therefore necessary for the fishermen to be guided by an objective standard for damage claims or to appoint a surveyor to investigate and to assess oil pollution damage to fisheries and aquaculture.

In case the fishermen appoint a surveyor, the surveyor should, from the beginning, investigate and assess oil pollution damage jointly with surveyors of the IOPC Fund and the P & I Club to minimize different views between both surveyors and to reach mutual agreement at an early stage.

Although both surveyors jointly carry out survey on oil pollution damage it may be necessary for both surveyors to have a guideline to survey and assess oil pollution damage because the fisheries industries are varied and complicated, and types of oil pollution damage are highly diverse.

Section 2. 1971 Fund Convention

This section introduces the legal framework of the 1971 International Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage (1971 Fund Convention) and the 1969 International Convention on Civil Liability for Oil Pollution Damage (1969 Civil Liability Convention) because at the time of publication of the Manual the Republic of Korea (ROK) was party to the 1969 Civil Liability Convention and the 1971 Fund Convention.

It was also suggested that the ROK ratify the 1992 International Convention on Civil Liability for Oil Pollution Damage (1992 Civil Liability Convention) and the 1992 International Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage (1992 Fund Convention).

Note: The ROK ratified the 1992 Civil Liability Convention and the 1992 Fund Convention on the 7th of March, 1997 and at present the ROK is party to both Conventions.

Section 3. Compensation standard of the IOPC Fund

This Section introduces Presenting a Claim and Admissible Claims defined by the IOPC Fund's claims manual.

PRESENTING A CLAIM

Who is entitled to compensation?

Anyone who has suffered pollution damage in a Fund Member State may make a claim against the IOPC Fund for compensation. Claimants may be private individuals, partnerships, companies, private organizations or public bodies, including States or local authorities.

If several claimants suffer similar damage, they may find it more convenient to submit co-ordinated claims. This can also facilitate claims handling by the IOPC Fund Secretariat.

To whom should a claim be addressed?

Claims for compensation under the Civil Liability Convention should be brought against the shipowner liable for the damage, or directly against his insurer. The insurer will normally be one of the Protection and Indemnity Associations (P & I Clubs) which insure the third-party liabilities of shipowners.

To obtain compensation under the Fund Convention, claimants should submit their claims directly to the IOPC Fund.

The IOPC Fund co-operates closely with the P & I Clubs in the settlement of claims. The P & I Club concerned and the IOPC Fund usually jointly investigate the incident and assess the damage. Full supporting documentation should be submitted either to the shipowner/P & I Club or to the IOPC Fund. If the documentation is presented to the shipowner or the P & I Club, the IOPC Fund should be notified directly of any claim against it under the Fund Convention.

In some cases, claims are channelled through the office of a designated local surveyor. Claimants should in such cases submit their claims to that office, for forwarding to the IOPC Fund and the P & I Club for decision. Occasionally when an incident gives rise to a large number of claims, the IOPC Fund and the P & I Club jointly set up a local claims office so that claims may be processed more easily. Claimants should then submit their claims to that local claims office. Details of claims offices are given in the local press. All claims are referred to the P & I Club and to the IOPC Fund for decision on their admissibility. Neither designated local surveyors nor local claims offices may decide on the admissibility of claims.

Within what period should a claim be made?

Claimants should submit their claims as soon as possible after the damage has occurred. If a formal claim cannot be made shortly after an incident, the IOPC Fund would appreciate being notified as soon as possible of a claimant's intention to present a claim at a later stage.

Claimants will ultimately lose their right to compensation under the Fund Convention unless they bring court action against the IOPC Fund within three years of the date on which the damage occurred, or make formal notification to the IOPC Fund of a court action against the shipowner or his insurer within that three-year period. Although damage may occur some time after an incident takes place, court action must in any case be brought within six years of the date of the incident. The same applies to claimants' right to compensation from the shipowner and his insurer under the Civil Liability Convention. Claimants are recommended to seek legal advice on the formal requirements of court actions, to avoid their claims becoming time-barred.

The IOPC Fund endeavours to settle claims out of court. However, claimants are advised to present their claims against the Fund well in advance of the expiry of the periods mentioned above. This allows time for claims to be examined and settled out of court, but also ensures that claimants will be able to sue the IOPC Fund for compensation and prevent their claims from being time-barred, if they and the Fund are unable to agree on amicable settlements of the claims.

How should a claim be presented?

Claims against the IOPC Fund should be made in writing (including telefax or telex). A claim should be presented clearly and with sufficient detail for the IOPC Fund to assess the amount of the damage on the basis of the facts and the supporting documentation presented. Each item of a claim must be substantiated by an invoice or other relevant supporting documentation, such as work sheets, explanatory notes, accounts and photographs. It is the responsibility of claimants to submit evidence supporting their claims.

The IOPC Fund usually appoints surveyors and technical advisers to investigate the technical merit of claims. Claims can be settled promptly only if claimants co-operate fully with these surveyors and advisers and provide all information relevant to the assessment of the claims.

The speed with which claims are settled depends largely on how long it takes for claimants to provide the IOPC Fund with the required information. Claimants are therefore advised to follow this Manual as closely as possible. If the documentation in support of a claim is likely to be considerable, claimants should contact the IOPC Fund (or where appropriate the designated surveyor or local claims office) as soon as possible after the incident to discuss claim presentation.

The working languages of the IOPC Fund are English and French. Claim settlement will proceed more quickly if claims, or at least claim summaries, are submitted in one of these languages.

What information should a claim contain?

Each claim should contain the following basic information:

- the name and address of the claimant, and of any representative
- the identity of the ship involved in the incident
- the date, place and specific details of the incident, if known to the claimant, unless

- this information is already available to the IOPC Fund
- the type of pollution damage sustained
- the amount of compensation claimed

Claim settlement procedure

The IOPC Fund's claim settlement procedure is laid down in its Internal Regulations, which are adopted by the Governments of Fund Member States.

Claims submitted to the IOPC Fund are dealt with as promptly as possible.

The Director of the IOPC Fund has the authority to make final settlement of claims within certain limits. If those limits are exceeded, the Director has to submit the claim settlements to the IOPC Fund's Executive Committee for decision. The Executive Committee is composed of representatives of the Governments of 15 Fund Member States. The Committee normally meets two or three times a year. The Executive committee has often given the Director extended authority to settle claims arising from a particular incident.

The Director may make provisional payments before the final settlement of a claim, if victims would otherwise suffer undue financial hardship. Provisional payments are subject to special conditions and limits.

If the total amount of the claims approved by the IOPC Fund, or established by a court for a particular incident exceeds the total amount of compensation available under the Civil Liability Convention and the Fund Convention (60 million SDRs), the compensation paid to each claimant will be reduced proportionately. When there is a risk that this situation will arise, the Fund may have to restrict payments of approved claims or provisional payments to a fixed percentage, to ensure that all claimants are given equal treatment.

ADMISSIBLE CLAIMS

IOPC Fund's claims policy

The IOPC Fund can accept only those claims which fall within the definitions of *pollution damage* and *preventive measures* laid down in the Civil Liability Convention and the Fund Convention. A uniform interpretation of the definitions is essential for the functioning of the system of compensation established by the Conventions.

The IOPC Fund's policy on the admissibility of claims for compensation has been established by the Governments of Fund Member States. Each claim has its own particular characteristics, and it is therefore necessary to consider each claim on the basis of its own merits, in the light of the particular circumstances of the case. The criteria adopted by the IOPC Fund therefore allow for a certain degree of flexibility.

General criteria

The following general criteria apply to all claims:

- any expense/loss must actually have been incurred

- any expense must relate to measures which are deemed reasonable and justifiable
- a claimant's expense/loss or damage is admissible only if and to the extent that it can be considered as caused by contamination
- there must be a link of causation between the expense/loss or damage covered by the claim and the contamination caused by the spill
- a claimant is entitled to compensation only if he has suffered a quantifiable economic loss
- a claimant has to prove the amount of his loss or damage by producing appropriate documents or other evidence

A claim is thus admissible only to the extent that the amount of the loss or damage is actually demonstrated. A certain flexibility is nevertheless exercised in respect of the requirement to present documents, taking into account the particular circumstances of the claimant or industry concerned or of the country in question. All elements of proof are considered, but the evidence provided must give the IOPC Fund the possibility of forming its own opinion on the amount of the loss or damage actually suffered.

Clean-up operations and property damage

Clean-up operations on shore and at sea, and property damage

Clean-up operations on shore and at sea would in most cases be considered as *preventive measures*, i.e. measures to prevent or minimize *pollution damage*.

The IOPC Fund compensates the cost of reasonable measures taken to combat the oil at sea, to defend sensitive resources and to clean shorelines and coastal installations.

Loss or damage caused by measures to prevent or minimize pollution is also compensated. For example, if clean-up measures result in damage to roads, piers and embankments, the cost of the resulting necessary repairs is admissible. However, claims for work which involves improvements rather than the repair of damage resulting from a spill are not accepted.

Claims for measures to prevent or minimize pollution damage are assessed on the basis of objective criteria. The fact that a government or other public body decides to take certain measures does not in itself mean that the measures are reasonable for the purpose of the Conventions. The technical reasonableness is assessed on the basis of the facts available at the time of the decision to take the measures. However, those in charge of the operations should continually reappraise their decisions in the light of developments and further technical advice.

Claims for costs are not accepted when it could have been foreseen that the measures taken would be ineffective. On the other hand, the fact that the measures prove to be ineffective is not in itself a reason for rejection of a claim for the costs incurred. The costs incurred, and the relationship between these costs and the benefits derived or expected, should be reasonable. In the assessment, the IOPC Fund takes account of the particular circumstances of the incident.

Claims for clean-up operations may include the cost of personnel and the hire or purchase of equipment and materials. The cost of cleaning and repairing clean-up equipment and of replacing materials consumed during the operations is accepted. If the equipment used was purchased for a particular spill, deductions are made for the residual value when the amount of compensation is assessed. If a public authority has purchased and maintained materials or equipment so that they are immediately available if an incident occurs, compensation is paid for a reasonable part of the purchase price of the materials and equipment actually used.

Salvage and preventive measures

Salvage operations may in some cases include an element of preventive measures. Such operations can be considered as *preventive measures* only if the primary purpose is to prevent *pollution damage*. If the operations have another purpose, such as salving hull and cargo, the costs incurred are not admissible under the Civil Liability Conventions and the Fund Convention. If the activities are undertaken for the purpose of both preventing pollution and salving the ship and cargo, but it is not possible to establish with any certainty the primary purpose of the operations, the costs are apportioned between pollution prevention and other activities. The assessment of compensation for activities which are considered to be *preventive measures* is not made on the basis of the criteria applied for assessing salvage awards; the compensation is limited to costs, including a reasonable element of profit.

Disposal of collected material

Clean-up operations frequently result in considerable quantities of oil and oily debris being collected. Reasonable costs for disposing of the collected material are admissible. If a claimant has received any extra income following the sale of recovered oil, these proceeds would be deducted from any compensation to be paid.

Property damage

Claims for the cost of cleaning or repairing property which has been contaminated by oil (for example boats, yachts and fishing gear) are accepted. If it is not possible for the property to be cleaned or repaired, then replacement costs are accepted, though with a reduction for wear and tear.

Cost 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 IOPC Fund does not pay for studies of a general or purely scientific character.

Fixed costs

Clean-up operations are often carried out by public authorities which use permanently employed personnel, or vessels, vehicles and equipment owned by those authorities. The authorities may then incur *additional costs*, i.e., expenses which arise solely as a result of

the incident and which would not have been incurred had the incident and related operations not taken place. Reasonable *additional costs* are accepted by the IOPC Fund.

Authorities may claim compensation for so-called *fixed costs*, i.e., costs which would have arisen for the authorities concerned even if the incident had not occurred, such as normal salaries for permanently employed personnel and capital costs of vessels owned by the authorities. The IOPC Fund accepts a reasonable proportion of *fixed costs*, provided that these costs correspond closely to the clean-up period in question and do not include remote overhead charges.

Claim presentation

It is essential that supporting documentation shows how the expenses for clean-up operations are linked with the actions taken at specified work sites.

Major expenditures may be incurred for the use of aircraft, vessels, specialised equipment, heavy machines, trucks and personnel. Some of these may be government-owned; others may be the subject of contractual arrangements. Claimants should keep comprehensive records of all operations and expenditures resulting from an incident. Supervisory personnel should daily record the operations in progress, the equipment in use, where and how it is being used, the number of personnel employed, how and where they are deployed and the materials consumed. Standard work sheets, designed to suit the particular circumstances of the spill and the response organization in the country concerned, are useful for such records. It is often useful to appoint a financial controller to keep adequate records and control expenditure.

Claims for *clean-up operations* and *preventive measures* should be itemized as follows:

- Delineation of the area affected, describing the extent of the pollution and identifying those areas most heavily contaminated (for example using maps or nautical charts, supported by photographs or video tapes)
- Analytical and/or other evidence linking the oil pollution with the ship involved in the incident (such as chemical analysis of oil samples, relevant wind, tide and current data, observation and plotting of floating oil movements)
- Summary of events, including a description and justification of the work carried out at sea, in coastal waters and on shore, together with an explanation of why the various working methods were selected
- Dates on which work was carried out at each site
- Labour costs at each site (number and categories of response personnel, regular or overtime rates of pay, hours or days worked, other costs)
- Travel, accommodation and living costs for response personnel
- Equipment costs at each site (types of equipment used, rate of hire or cost of purchase, quantity used, period of use)
- Consumable materials (description, quantity, unit cost and where used)
- Any remaining value at the end of the operations of equipment and materials purchased

- Age of equipment not purchased but used in the incident
- Transport costs (number and types of vehicles, vessels or aircraft used, number of hours or days operated, rate of hire or operating cost)
- Cost of temporary storage (if applicable) and of final disposal of recovered oil and oily material.

Claims for *damage to property* should be itemized as follows:

- Extent of pollution damage to property and an explanation of how the damage occurred
- Description and photographs of items destroyed, damaged or needing replacement, repair or cleaning (for example boats, fishing gear, roads, clothing), including their location
- Cost of repair work, cleaning or replacement of items
- Age of items to be replaced
- Cost of restoration after clean-up, such as repair of roads, piers and embankments damaged by the clean-up operations, with information on normal repair schedules

Section 4. Plan to minimize oil pollution damage

This section suggests that it is necessary for the ROK to establish an organization specialized to protect the marine environment and to minimize oil pollution damage by promptly and effectively responding to oil spill from ships, and by training, educating, researching new technological development in the area of marine pollution prevention and response.

Note: The Korea Marine Pollution Response(KMPRC) was established on the 13th November,1997 and at present the KMPRC has a mutual cooperation system with the Singapore Oil Spill Response Center Pte. Ltd. in Singapore (SOSRC), Marine Disaster Prevention Center in Japan (MDPC), East Asia Response Private Ltd. in Singapore (EARL), etc.

The ROK has also ratified the International Convention on Oil Pollution Preparedness, Response and Cooperation (OPRC) 1990 on the 9th November, 1999 and prepared the National Contingency Plan for oil spills.

Section 5. Method to utilize 'Manual for Survey of Oil Pollution Damage'

The NFFC suggests utilization of the Manual as follows:

- The Manual can be used by the fishermen and the Fisheries Cooperative Union (FCU) as a guideline for damage claims of fisheries and aquaculture,
- The Manual can be used by the surveyors as an internal guideline when they investigate and assess oil pollution damages to fisheries and aquaculture.
- The Manual can be used by mediators' as background material when damage claims for fisheries and aquaculture are in dispute between parties concerned.

It is to be demonstrated that the oil pollution damage claims should be assessed based upon objective methodology.

Section 6. Plan to compensate oil pollution damage which resulted from an unknown source

In the event of oil pollution damage from an unknown source, the victims are unable to obtain compensation from the IOPC Fund. Accordingly, it is necessary that a fund is reserved for the compensation of victims in such cases.

The Fund could be financed by the central government, local government, the FCUs, the Shipowners' Association and Petroleum Association, etc.

Section 7. Plan to establish Korean P & I Club

The Manual sets up that establishment of the Korea Ship Owner's Mutual Protection and Indemnity Association (the Korean P & I Club) is necessary considering tonnage of the ships owned by the Korean Shipowners, etc.

Note : The Korean P & I Club was established on the 27th January, 2000 and is currently in operation.

PART II : GUIDANCE FOR ASSESSMENT OF OIL POLLUTION DAMAGE

Section 8. Synopsis

A. Classification of damage caused by oil pollution incidents.

- 1) Decrease in amounts of marine product and decrease in prices of marine product
- 2) Damage to shellfish and/or seaweed
- 3) Business interruption
- 4) Damage to aquaculture farms (bastard halibut, sea bream, yellow tail, sea mustard, etc.)
- 5) Loss of fishing ground (due to sunken ship)
- 6) Decrease in sales commission by the FCU
- 7) Costs of labour and materials for clean-up countermeasure committee
- 8) Clean-up costs such as labour cost, hire of vessels and cars, etc.
- 9) Pollution to fishing facilities, equipment and fishing vessel
- 10) Change of fishing ground and/or fishery sector
- 11) Loss due to impossibility of sale and returning of merchandise
- 12) Expenses of countermeasure committee's activities

B. Classification of damage to fisheries sector caused by oil pollution incident.

- 1) Fishing vessels : Business interruption, decrease in catch, change of fishing area, pollution to fishing vessel, facilities and equipment
- 2) Aquaculture : Mortality, decrease in price, expectation of mortality, disposal of premature fish due to risk of oil pollution
- 3) Common fishing ground : Mortality, decrease in price of marine product, prohibition to catch marine product (ban)
- 4) Others: Clean-up costs, expenses incurred by countermeasure committee, loss of or decrease in sales commission

The above classification is only based upon typical fishery sector and can be changed according to the situations and circumstances of oil pollution incident considering kinds of fishery sector in variety and oil pollution damage to varying degrees.

Section 9. Assessment of oil pollution damage to fishing vessels

The FCU should, as soon as possible, get the following information to establish the scope of affected fishermen within the polluted area. These are the basic data for survey of oil pollution damage and are very useful for deciding scope of compensation. When an incident occurs, these data are always requested by the surveyors of the IOPC Fund and P & I Club.

- Number of members of the Fishing Village Association (VFA) and the FCU
- Number of fishing vessels according to tonnage
- License of each fishing vessel
- Type of fishing, fishing area and manpower per each vessel
- Fishing season, price of fish species, method of sale
- Prohibited period of fishing per type of fishing vessel, average number of fishing days per vessel, catches and amount per vessel for previous three years
- Fishing costs per type of fishing vessel
- Actual condition for additional business
- Fishing equipment and spare parts - scale, structure, duration, purchase of date and price

The Manual divided pollution damage to fishing vessels as follows:

- Business interruption
- Decrease in catch (product)
- Change of fishing area
- Pollution damage to fishing vessels and equipment

Loss due to business interruption

It means that fishing vessel were not able to fish due to oil pollution, and loss resulted from suspension of fishing. The formula for loss due to business interruption is as follows.

$$\text{Loss} = \text{Business interruption days} \times \text{Average value of fish catch per day per vessel} \times \text{Rate of income.}$$

'Business interruption days': Heavy weather, days of side business, rest days of the fishing market are excluded.

'Average value of fish catch per day per vessel' can be calculated by:

- 1) Average catch for one week just before oil spill incident if the days of interrupted fishing are less than one week.
- 2) Average catch for one month just before oil spill incident if the days of interrupted fishing are less than one month.
- 3) Average catch for same period of previous three years if days of interrupted fishing are more than one month. In this case average unit price of fish catch for one week just before oil spill incident is to be applied.

'Rate of income' can be calculated by the following formula.

$$\text{Rate of income} = (\text{income} - \text{saved expenses}) / \text{income}$$

As shown in the formula, all the saved expenses should be deducted from income.

Loss due to decrease in catch (product)

It means that although fishing vessels are free to continue fishing, the quantity of fish caught by the fishing vessel is less than that before the oil spill. Accordingly this is different from loss due to business interruption. However compensation for loss due to decrease in catch is seldom awarded because the casual relation between oil pollution itself and decrease in catch has to be proven. So it is necessary to file claims with concrete and objective evidences in this case.

The formula for loss due to decrease of catch is as follows,

- 1) $\text{Decrease in catch} = \text{Average catch per day per vessel before oil spill incident} - \text{Average catch per day per vessel for the period of oil pollution}$
- 2) $\text{Loss} = \text{Decrease in catch} \times \text{Rate of income}$

'Rate of Income': There are no expenses to be deducted from income except the sales commission of the FCU because all the expenses are actually incurred during the fishing period.

Loss due to change of fishing area

It means that due to oil pollution the fishing vessels are unable to fish in their original fishing area and they are forced to fish in other fishing areas or to change the type of fishing. In this

claim, the details of the change of fishing area and type of fishing should be accurately shown in claim documents.

The formula for loss due to change of fishing area is as follows:

- 1) Difference of catch = Average catch per day per vessel in the original fishing area - Average catch per day per vessel in other fishing area.
- 2) Loss = (Difference of catch + Additional Expenses) x Rate of Income.

'Rate of Income' is more than 95% because the fishing vessels are actually operated for the period of pollution and most of the expenses are actually incurred. Additional expenses may be incurred due to change of fishing area or type of fishing. In this case details of such expenses should be given in claim documents.

Pollution damage to fishing vessels and equipment

Costs of cleaning vessels which have been contaminated by oil are payable.

In cases where fishing equipment (various kinds of fishing net or gear) is contaminated by oil, the extent and degree of contamination should be considered. If it is not possible for the equipment to be cleaned, then replacement costs are accepted, taking into account depreciation of the equipment.

$$\text{Loss amount for replacement of equipment} = \text{Purchase price} \times \left(\frac{\text{Residual years}}{\text{Duration years}} \right)$$

It is necessary for the fishermen to keep photographs of fishing equipment contaminated by oil because the number of equipment and extent and degree of contamination thereon may be disputed. Sometimes it is also necessary for the fishermen to keep the contaminated equipment itself as evidence.

Section 10. Assessment of oil pollution damage to Aquaculture

The FCU should get hold of the following as basic data in connection with the pollution damage of aquaculture.

- Number of members of the VFA and FCU
- Kinds of aquaculture and their license
- Average aquaculture products for previous 3 years
- Species of aquaculture products
- Management costs for aquaculture
- Actual condition for additional business
- Facilities and scale of aquaculture
- Purchasing costs for seeds or juvenile fish

The Manual divided pollution damage to aquaculture as follows:

Mortality

Decrease in price

Expectation of mortality

Disposal of premature fish due to risk of oil pollution

In this case the premature fish are less than adult fish.

In case of mortality of fish, IOPC Fund and P & I Club tend to accept the claim if number of fish killed is clear and it is proved that the mortality is caused by oil and /or oil dispersant chemicals. However there have been long disputes on decrease in price and expectation of mortality because of the necessity to show the causal relation between the above claims and the oil pollution itself. IOPC Fund and P & I Club do not accept loss resulting from disposal of premature fish due to risk of oil pollution because this loss is a kind of expected loss. Therefore it is necessary to present claims supported by reasonable and objective evidence.

The formula for loss or damage to aquaculture is as follows:

Mortality of fish = weight or number of mortality x unit price.

Decrease in price = weight or number x difference of unit price.

Expected quantity of mortality = weight or number x unit price.

'Weight or number' can be surveyed accurately if all the fish died in the aquaculture facilities. However if only a part of the fish died, we have to consider the situation as a whole to get hold the weight or number of fish based upon objective factors.

'Unit price' can be adopted by the unit price of fish of neighborhood aquaculture where no oil pollution occurred at the time of mortality.

In case aquaculture facilities (nets, buoys ropes, etc.) are contaminated by oil, the extent and degree of contamination should also be considered. If it is not possible for the facilities to be cleaned, then replacement costs are accepted, taking into account depreciation of the facilities.

Section 11 & 12 : Assessment of oil pollution damage to Laver

The characteristics of laver cultivation farms are as follows:

- 1) It is easy to get the number of chack (Unit of cultivated facility is 1.8 meters x 40 meters).
- 2) It is easy to investigate the damage period and expected loss of laver resulting from oil pollution because the cultivation plan is uniform.
- 3) It is easy to find the scale of damaged laver because it is cultivated within a limited area.

The laver cultivation farm has characteristics similar to agriculture rather than aquaculture considering the above factors.

The Manual divided pollution damage to laver cultivation farms as follows:

Pollution to laver

Pollution damage to dried laver

Decrease in price

Abandonment to start laver cultivation itself because the area to be laver cultivated has already been polluted

Damage to facilities of laver farms(laver net, bamboo, pole, etc.)

Section 13. Assessment of pollution damage to Common Fishing Ground (CFG)

The Common Fishing Ground (CFG) is the basic and essential way of life for fishermen. The CFG comprises the inter-tidal and sub-tidal zone to depths of 10 meters, at the time of the lowest ebb tide, of specified coastal regions. The CFGs are controlled and managed by individual Village Fishery Associations (VFA). A wide variety of species of mollusca, seaweed and sedentary animals are inhabited therein.

Each VFA and FCU must present the following evidence:

- Number of member per each CFG
- Scale of CFG and condition of marine species lives in CFG
- Permitted period for catching of marine species
- Average catch (product) and income per month for previous 3 years
- Condition of marine species before the oil pollution incident
- Condition of marine species after the oil pollution incident
- Actual conditions if additional business was expected
- Actual conditions for seed spray of marine species

The formula for calculating the loss or damage of the CFG is as follows:

Loss/damage = A x B x C x D x E, where:

A: average product for the preceding 3 years

B: average unit price for the preceding 3 years

C: rate of damage (1st year, 2nd year and 3rd year respectively)

D: rate of income

E: inflation rate

'Average product for the preceding 3 years' is the total products for the preceding 3 years divided by 3 years. If we can get hold of the actual quantity of mortality, the following formula can be used.

Damage = Actual quantity of mortality x unit price x income rate.

'Average unit price for the preceding 3 years' is the total price for 3 years divided by 3 years. However if a damage claim for only one year is filed, the unit price of fishery market on that year can be applied.

'Rate of damage ' is expressed by percentage which means the rate of mortality or decrease in value of the products. Each VFA or FCU has to calculate the rate of damage considering the whole situation and all circumstances because there is no specific formula accepted. The 1st year means the year which the incident occurred, the 2nd year means the following year and the 3rd year means the year following the 2nd year.

'Inflation rate' is necessary to adjust the price of 3 years. However it is not necessary if the claim is presented for the first year.

Section 14. Assessment of other losses caused by the oil pollution

The Manual divided other losses as follows:

- Loss of sales commissions of FCU
- Clean-up costs (Labor costs, hire of clean-up boats and cars)
- Clean-up materials
- Expenses of the Countermeasure Committee

Loss of sales commission of the FCU

The business of the FCU could be divided into two. One is profit business and the other is non-profit business. The commission sale is the major profit business of the FCU, therefore loss of sales commissions due to the oil spill could be compensated.

If there is no decrease in products in spite of the oil spill incident, there is no loss of sales commissions and no compensation is payable. Where there is loss of some kinds of products, but the products are not sold through the FCU, no compensation is payable.

The formula for calculating the loss of sales commissions of the FCU is as follows:

$$\text{Loss} = \text{Loss of sales amount} \times \text{Commission rate.}$$

The commission rate of the FCU is normally less than 5%.

Clean-up costs (labour cost, hire of clean-up boats and cars)

Claims of clean-up expenses are fully compensated if unit costs are fixed and evidences for the accurate number of labourers, clean-up boats, cars, etc. mobilized are submitted. Therefore the FCU should get hold of the number of labourers, clean-up boats and cars, etc. mobilized with detailed daily records of activities of the clean-up work.

The labour costs could be calculated on an hourly basis, however in case of big oil pollution incidents it is recommended to calculate labour costs on a daily basis. As regards hire of clean-up boats there are two kinds of calculation method. One is to divide the category of the boats by tonnage i.e. less than one ton and more than one ton and apply daily hire to

each category. The other is to apply unit cost per tonnage to the respective boat without dividing the category of boats by tonnage.

Expenses of Countermeasure Committee

The expenses of the countermeasure committee are traffic, communication, meeting expenses and overtime charge for members. These expenses are compensated, but these expenses should be directly related to clean-up activities.

The expenses incurred in preparing claims for damage to fisheries and aquaculture and resulting from appeal of claims, etc cannot be compensated.

PART III : GUIDANCE FOR SCIENTIFIC SURVEY TO PROVE OIL POLLUTION DAMAGE

Section 15. Scientific Survey to prove consequential loss and pure economic loss

This section introduces consequential loss and pure economic loss defined by the IOPC Fund's claims manual.

Consequential loss and pure economic loss

The IOPC Fund accepts in principle claims for loss of earnings suffered by the owners or users of property contaminated as a result of a spill (*consequential loss*). One example of consequential loss is a fisherman's loss of income as a result of his nets becoming contaminated.

An important group of claims comprises those relating to *pure economic loss*, i.e. loss of earnings sustained by persons whose property has not been polluted. A fisherman whose boat and nets have not been contaminated may be prevented from fishing because the area of the sea where he normally fishes is polluted and he cannot fish elsewhere. Similarly, a hotelier or restaurateur whose premises are close to a contaminated public beach may suffer loss of profit because the number of guests falls during the period of pollution.

Claims for pure economic loss are admissible only if they are for loss or damage caused by contamination. The starting point is the pollution, not the incident itself.

To qualify for compensation for pure economic loss, there must be a reasonable degree of proximity between the contamination and the loss or damage sustained by the claimant. A claim is not admissible for the *sole* reason that the loss or damage would not have occurred had the oil spill not happened. When considering whether the criterion of reasonable proximity is fulfilled, the following elements are taken into account:

- the geographic proximity between the claimant's activity and the contamination;
- the degree to which a claimant was economically dependent on an affected resource;
- the extent to which a claimant had alternative sources of supply or business opportunities;

- the extent to which a claimant's business formed an integral part of the economic activity within the area affected by the spill.

The IOPC Fund also takes into account the extent to which a claimant was able to mitigate his loss.

The assessment of a claim for pure economic loss is based on the actual financial results of the individual claimant for appropriate periods during the years before the incident. The assessment is not based on budgeted figures. The IOPC Fund takes into account the particular circumstances of the claimant and considers any evidence presented. The criterion is whether the claimant's business as a whole has suffered economic loss as a result of the contamination.

Any saved overheads or other normal expenses not incurred as a result of the incident should be subtracted from the loss suffered by the claimant, for both consequential loss and pure economic loss.

Measures to prevent pure economic loss

Claims for the cost of measures to prevent pure economic loss may be admissible if they fulfil the following requirements:

- the cost of the proposed measures is reasonable;
- the cost of the measures is not disproportionate to the further damage or loss which they are intended to mitigate;
- the measures are appropriate and offer a reasonable prospect of being successful;
- in the case of a marketing campaign, the measures relate to actual targeted markets.

To be admissible, the costs should relate to measures to prevent or minimize losses which, if sustained, would qualify for compensation under the Conventions. Claims for the cost of marketing campaigns or similar activities are accepted only if the activities undertaken are in addition to measures normally carried out for this purpose. In other words, compensation is granted only for the additional costs resulting from the need to counteract the negative effects of the pollution.

The criterion of *reasonableness* is assessed in the light of the particular circumstances of the case, taking into account the interests involved. The assessment is made on the basis of the facts known at the time that the measures are taken. As for marketing campaigns, measures of too general a nature are not accepted.

The IOPC Fund does not normally accept claims for measures to prevent pure economic loss until they have been carried out. The Fund is cautious about advance payments for such measures, since it will not take on the role of a claimant's banker.

When considering the admissibility of claims for the cost of an organization's marketing activities, the IOPC Fund takes into account the organization's attitude towards the media after the incident and, in particular, whether that attitude increased the negative effects of the pollution.

Contamination of fisheries and aquaculture produce

If there are mortalities in fish and aquaculture stocks following an incident, the claimant should document the loss by preserving samples and using photographic and other forms of recording to demonstrate the nature and extent of the loss. Claimants are advised to contact the IOPC Fund (or where appropriate the designated surveyor or local claims office) without delay so that a joint survey of the loss incurred can be carried out.

The IOPC Fund has in the past received claims for compensation based on the destruction of farmed fish and shellfish as a result of orders issued by public authorities in the form of fishing bans or exclusion zones. The Fund does not consider a fishing ban or exclusion zone imposed by a public authority as conclusive justification for destroying produce affected by a ban. Such claims are admissible if and to the extent that the destruction of the produce was reasonable on the basis of the scientific and other evidence available.

When assessing whether the destruction of produce was reasonable, the IOPC Fund considers the following points:

- whether the produce was contaminated;
- the likelihood that the contamination would disappear before the normal harvesting time;
- whether the retention of the produce in the water would prevent further production;
- the likelihood that the produce would be marketable at the time of normal harvesting.

Since the assessment by the IOPC Fund of whether the destruction was reasonable is based on scientific and other evidence, it is important that sampling and testing are carried out, in particular testing for taint. Samples from an area affected by the spill (*suspect* samples) and *control* samples from a nearby commercial outlet outside the polluted area should be tested at the same time. The two groups of samples should be of equal numbers. Taste testers should not be able to identify whether the sample being tasted is a suspect or a control sample (*blind* testing).

Claim presentation

Claimants should substantiate their loss with appropriate documents or other evidence.

Claims for *consequential loss* and *pure economic loss* should include the following information:

- Nature of loss, including proof that the alleged loss resulted from the contamination;
- Comparative figures for earnings in previous periods and during the period when economic loss was suffered, for example in the form of audited accounts or tax returns;
- Comparison with similar areas outside the area affected by the oil spill;
- Method of assessment of loss;
- Saved overheads.

Claimants should indicate whether they have received any extra income as a result of the incident. For instance, fishermen who take part in clean-up operations may have been paid for their participation. Similarly, claimants should indicate whether they have received any aid or payments from public authorities or other international organizations in connection with the incident.

Claimants may wish to use advisers to assist them in presenting claims for compensation. The IOPC Fund will consider reasonable costs for work carried out by advisers in connection with the presentation of claims falling within the scope of the Fund Convention. The question of whether and to what extent costs are payable is assessed in connection with the examination of the particular claim for compensation. The Fund takes into account the necessity for the claimant to use expert advice, the usefulness of the work carried out by the adviser, the quality of the work, the time reasonably needed and the normal rate for work of that kind.

Section 16. Scientific Survey to prove Environmental Damage

This section introduces environmental damage as defined by the IOPC Fund's claims manual.

Environmental damage

Claims for impairment of the environment are accepted only if the claimant has sustained an economic loss which can be quantified in monetary terms. The IOPC Fund's position on such claims is given in a Resolution adopted by the governments of Fund Member States which reads: "... the assessment of compensation to be paid by the International Oil Pollution Compensation Fund is not to be made on the basis of an abstract quantification of damage calculated in accordance with theoretical models".

The IOPC Fund accepts claims 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 IOPC Fund does not pay damages of a punitive nature, calculated on the basis of the degree of the fault of the wrong-doer and/or the profit earned by the wrong-doer.

Costs for measures taken to reinstate the marine environment after an oil spill may be accepted by the IOPC Fund under certain conditions. To be admissible for compensation, such measures should fulfill 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

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 IOPC 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 IOPC Fund, including reasonable measures to reinstate the environment. In such cases, the IOPC 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.

The Manual pointed out that it is very difficult for the fishermen to prove Environmental damages as well as pure economic loss because it can be proved by scientific survey with high technology and special knowledge.

Scientific survey requires chemical analysis and functional examination of the marine products taken from polluted area and non-polluted area.

Survey on the water quality, Survey on the sediment condition, Survey on the living condition, and ecological survey are also included within the scope of Scientific survey.

As the reasonable level of compensation can be only paid in case of oil pollution damage being fully supported by objective, documentary, reasonable and scientific evidences, the fishermen had better take full assistance from various fishery institute or fishery universities to prove pure economic loss and environmental damage.

Further, it would be desirable to ensure the accuracy of the statistics relating to fisheries and to regularly conduct surveys of the marine ecosystem. Aquatic resources and water quality, which would make the confirmation of pollution damage and its extent easier, provide a standard for the restoration of the marine environment, and help assess the damage to the environment.

THE *SEA PRINCE* CASE STUDY

The oil spill from the tanker *Sea Prince* off Yosu in July, 1995 was the biggest of all the oil spill incidents in the Republic of Korea (ROK). At the time of the incident the ROK was party to the 1969 International Convention on Civil Liability for Oil Pollution Damage (69 CLC) and the 1971 International Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage (71 FC).

The tanker owner, his P & I Club (U K P & I Club) and the 1971 International Oil Pollution Compensation Fund (1971 IOPC Fund) requested ITOPF/Hyopsung to attend on site and to investigate oil pollution damage to fisheries and aquaculture.

The Fisheries Cooperative Unions (FCUs) representing fishermen affected by the oil spill formed a Countermeasure Committee and this Committee appointed a local survey firm (Fishermen's Surveyor) to investigate oil pollution damage to fisheries and aquaculture.

The purpose of this brief summary is to review the incident in broad terms, and to identify the reasonable methodology to assess damage claims for fisheries and aquaculture. On account of limited space only three assessments of fishery sectors, i.e. Fishing vessels, Caged fish (Aquaculture) and Common Fishing Grounds are introduced herein.

The incident

The Cypriot tanker *Sea Prince* (144,567 GRT), part-laden with some 85,000 tonnes of Arabian crude oil, grounded off Sorido island near Yosu in the ROK. Explosions and fire damaged the engine room and accommodation area. Some 5,000 tonnes of oil was spilled as a result of the grounding. During the following weeks small quantities of oil leaked from the half-submerged section of the tanker.

Some of the spilt oil spread to the islands immediately north of Sorido island. Most of the oil was carried eastward by currents and some oil eventually affected shorelines along the south and east coasts of the Korean Peninsula. Small quantities of oil also reached the Japanese islands of Oki.

A Japanese salvage company was engaged by the shipowner to salvage the ship and the remaining cargo, under a salvage contract (Lloyds Open Form 95).

The salvor transhipped some 80,000 tonnes of oil into barges, leaving some 950 tons on board. The remaining oil in the cargo tanks was dosed with chemical dispersants to ensure rapid dispersal into the water column if the oil were to be lost during subsequent salvage operations or bad weather.

Further investigation revealed that the vessel had suffered serious structural damage, and the technical experts agreed, on the basis of information supplied by the salvor, that there was an unacceptable risk that the ship could break up during re-floating.

In view of this the salvage contract under Lloyds Open Form 95 was terminated and a contract was signed with another salvage company for the removal of the ship. The *Sea Prince* was successfully re-floating and was towed out of Korean waters.

Clean-up operations and damages to fisheries and aquaculture.

Most of the clean-up operations were completed by the end of October, 1995, and the remainder were completed in July, 1996. Buried oil was found at one location, and removal of this oil was carried out in October, 1996.

In addition to traditional fishery, intensive aquaculture is carried out in the area, particularly around the islands near Sorido. Floating fish cages, mussel farms and set nets were oiled to varying degrees.

Joint surveys to record the oil pollution of aquaculture facilities in the affected area were carried out with the involvement of Fishermen's surveyor with experts arranged by the FCUs, various local fishing representatives, and ITOPF/Hyopsung with marine scientist engaged by the shipowner/P & I Club and the 1971 Fund. Samples of fish, shellfish and seaweed were taken for chemical analysis and taint testing.

Chemical analysis of marine products taken from polluted and non-polluted areas were undertaken in the United Kingdom. Most of the samples taken from the polluted areas showed low levels of petroleum hydrocarbons which were comparable to those found in samples taken from the non-polluted areas. Samples of mussels and clams taken from the polluted area showed high levels of petroleum hydrocarbons. However, the fingerprints of the oils indicated that the *Sea Prince* was not the source of the contamination.

Taste testings of samples were proposed by the experts of the UK Club and the 1971 Fund, however the fishermen have refused to allow these tests to be carried out.

Provisional claims for fisheries and aquaculture damages were submitted to the tanker owner, P & I Club and 1971 Fund by the fishermen through their FCUs in respect of alleged damage to caged fish, common fishery grounds and other fisheries, but without supporting documentation.

The Fishermen's surveyor submitted a report containing revised claims which were assessed by themselves to the tanker owner, P & I Club and 1971 Fund, however the report was not accompanied by supporting documentary evidence.

After discussions with the ITOPF/Hyopsung the Countermeasure Committee provided sales consignment data for most of the fishery sectors allegedly affected by the oil, and the claims for fisheries and aquaculture were assessed by the ITOPF on the basis of field survey, chemical analysis and objective data including the sales consignment, and the ITOPF's assessments were finally agreed by almost all the fishermen.

1.0 FISHING VESSELS

1.1 Nature of fishery

1.1.1 Fishing vessels ranging in size from less than 1 ton to greater than 7 tons are engaged in a variety of fishing activities involving the use coastal traps, drift gill nets, long lines and rods. The main species of fish caught include blue crab, eel, rouple squid, octopus and rockfish. Although oil spills have little direct impact on fish stocks, fishermen

tend to mitigate damage to their nets by suspending fishing operations whilst slicks are present in the vicinity of their fishing grounds.

1.2 Yosu District fishing vessel claims

1.2.1 A total of 11 VFAs operating a total of 331 fishing vessels filed claims for compensation for loss of earnings and for the costs of cleaning the hulls of their vessels. Total claims for cleaning and lost revenue amounted to Won 3,952,765,000 (see Table 3A).

VFA	Number of vessels	Claim (Won)	Fishermen's Surveyor assessed claim (Won)
Changji	12	131,860,000	49,453,193
Ando	40	476,002,000	190,870,800
Yondo	67	654,900,000	383,424,061
Yokpo	52	1,592,541,000	224,232,576
Shinhung	25	15,800,000	59,251,112
Seogoji	42	49,050,000	187,417,456
Daesoyo	36	450,000,000	181,015,096
Shimmi	15	145,037,000	43,022,192
Chikwonpo	12	120,228,000	36,051,972
Woohak	12	140,702,000	32,290,376
Tura	18	176,645,000	45,900,780
TOTAL	331	3,952,765,000	1,432,929,614

Table 3a. *Sea Prince* - Fishing Vessel Claims and Fishermen's Surveyor Assessments

1.3 Fishermen's Surveyor assessment Yosu District fishing boat claims

1.3.1 Fishermen's Surveyor calculated loss of earnings in relation to the size of fishing vessel, and the duration of the clean-up. However, on the basis of interviews with fishermen they concluded that even after the clean-up was completed, catches were reduced for some considerable time afterwards. For this reason Fishermen's Surveyor extended the period of interruption beyond the duration of the clean-up by between 18 and 33 days, although no documentary evidence is provided to confirm the alleged continued reduction in catch and no explanation is given in their report as to how they determined this extra loss.

1.3.2 Fishermen's Surveyor used a business model to estimate the profitability per day of a 2 ton class vessel engaged in the operation of a coastal trap. They increased the derived figure by 30% to assess the profitability of a fishing vessel greater than 3 tons and decreased it by 30% for a vessel of less than 1 ton.

1.3.3 Fishermen's Surveyor estimated cleaning costs for vessels of different sizes according to the manpower required and used labour charges that were applied for shoreline clean-up operations. The cleaning charges and loss of earnings applied by Fishermen's Surveyor were:

Vessel tonnage	Loss per day Won	Cleaning cost (Won)	Labour (Won)
Less than 1 ton	94,056	90,000	1 man, 1 woman
Between 1 ton & 3 ton	134,366	140,000	2 men, 1 women
Between 3 ton & 7 ton	174,675	180,000	2 men, 2 women
Greater than 7 ton	174,675	230,000	3 men, 2 women

1.4 ITOPF's assessment of Yosu fishing vessel claims

1.4.1 In November, 1996 ITOPF obtained from the Yosu Fishery Co-operative Union (YFCU) commission sales records for the years 1992 to 1995 in respect of 7 of the 11 VFAs which filed claims. Table 3B summarises the commission sales records by VFA.

VFA	Commission sales per fishing vessel (Won)				
	1992	1993	1994	Average	1995
Changji	30,304,981	27,735,750	23,468,544	27,169,759	25,867,309
Ando	40,907,507	32,667,521	36,802,766	36,792,598	37,734,409
Yondo	29,586,048	33,835,272	36,675,506	33,365,609	6,042,435
Yokpo	9,371,086	2,714,444	6,079,350	6,054,960	477,667
Shinheung	3,126,156	3,761,297	3,374,983	3,420,812	369,250
Seogoji	18,581,471	19,968,113	25,837,353	21,483,133	17,204,715
Daesoyu	33,157,136	31,651,157	25,451,986	30,086,760	69,250
Shimmi	-	-	-	-	-
Chikwonpo	-	-	-	-	-
Woohak	-	-	-	-	-
Tura	-	-	-	-	-

Table 3b. *Sea Prince* - Fishing Vessels -
Commission Sales Records by VFA

1.4.2 Although the above records are useful in discerning trends in productivity, with some VFAs appearing to have sold more or similar amounts through the YFCU in 1995 compared with the previous three years average, it is difficult to assess claims for business interruption using the data in this form because of the range of ship sizes within each VFA and the lack of commission sales records for 4 of the VFAs.

1.4.3 ITOPF therefore decided to assess claims for business interruption on the basis of commission sales and ship size. However, since there is little difference in the sales amounts for vessels in the size range 1 ton to 7 tons (see Table 3C), ITOPF has consolidated the data into three ship size categories, less than 1 ton, between 1 ton and 7 tons, and greater than 7 tons by applying average annual commission sales of Won 3,278,683 Won 20,456,534 and Won 33,226,460 respectively.

Tonnage	Number of vessels	Average tonnage	Average commission sales (Won)
Less than 1 ton	16	0.7	3,278,683
Between 1 ton & 7 tons	231	3.5	20,456,534
Above 7 tons	84	8.6	33,226,460

Table 3c. *Sea Prince* - Fishing Vessels –
Commission Sales By Vessel Size

1.4.4 In order to obtain some indication of the likely private sales component, ITOPF referred to the Statistical Yearbook of Agriculture, Forestry and Fisheries. Ideally, the private sales component should be by species (see CFG assessments). However, it is impossible to obtain such detailed information from the Yearbook due to the diversity of species caught and the variety of fishing techniques used by the vessels. Table 3D shows the estimated private sales ratio for catches of adjacent water fisheries in Chonnam Province for the years 1992 to 1994.

Year	Co-operative sales Catch M/T (%)	Non-co-operative sales Catch M/T (%)	Total Catch M/T
1992	145,608 (88.50)	18,929 (11.50)	164,537
1993	156,726 (75.77)	50,128 (24.23)	206,854
1994	175,698 (82.36)	37,639 (17.64)	213,327
TOTAL	478,032 (81.75)	106,686 (18.25)	584,718

Table 3d. Ratio of Co-operative and Non-Co-operative Sales of
Adjacent Water Species - Chonnam Province, 1992 - 1994

1.4.5 Applying the above average percentage non-co-operative sales component to the average commission sales records for the three size classes of vessel gives total annual revenues per vessel per year of Won 4,010,411 for vessels under 1 ton, Won 25,021,973 for vessels between 1 and 7 tons and Won 40,641,859 for vessels greater than 7 tons. Table 3E shows the basic input data for a coastal trap fishery used by ITOPF in the business model for these three categories of vessel in order to determine the appropriate loss of earnings per calendar day.

Vessel size range	Less than 1 ton	1 - 7 tons	Over 7 tons
Tonnage	0.5	4	7
- Fixed costs			
Capital cost of vessel	5,000,000 Won	40,000,000 Won	70,000,000 Won
Annual insurance	75,000 Won	600,000 Won	1,050,000 Won
Depreciation of boat	500,000 Won	4,000,000 Won	7,000,000 Won
Fixed cost/fishing day	6,534 Won	26,136 Won	45,738 Won
- Direct costs			
Number of traps	250	500	500
Unit price/trap	800	800 Won	800 Won
Annual replacement	0.67	0.67	0.67
Gear cost/fishing day	761 Won	1,523 Won	1,523 Won
Boat maintenance/day	1,421	11,364 Won	19,887 Won
Fuel consumption/day	7.5 litres	60 litres	105 litres
Fuel price/litre	153 Won	153 Won	153 Won
Fuel cost/day	1,148	9,180 Won	16,065 Won
Ice consumption/day	33 kg	130 kg	130 kg
Ice price/kg	30 Won	30 Won	30 Won
Ice cost/day	990 Won	3,900 Won	3,900 Won
Bait consumption/day	1 Box	3 Box	3 Box
Bait price/box	7,000 Won	7,000 Won	7,000 Won
Bait cost/day	7,000 Won	21,000 Won	21,000 Won
Miscellaneous costs	737 Won	2,949 Won	3,408 Won
Total direct costs	12,057 Won	50,075 Won	65,783 Won
- Fishing data			
Daily catch	22,786 Won	142,170 Won	230,920 Won
Fishing days/month	22	22	22
Fishing months/year	8	8	8
Fishing days/year	176	176	176
Fishing days/calendar year	240	240	240
Annual total sales	4,010,411 Won	25,021,973 Won	40,641,859 Won
- Margin summary			
Gross margin/fishing day	10,729 Won	92,095 Won	165,137 Won
Gross margin/calendar day	7,868 Won	67,536 Won	121,100 Won

Table 3e. *Sea Prince* - Fishing Vessels - Business Model

1.4.6 The calculated gross margin per calendar day for each vessel size category was used to determine loss of earnings. In determining the business interruption period, consideration was given to the fact that unlike fixed nets, fishing boats are relatively free to fish in different locations. Therefore, the level of pollution in the home port should not be a factor used in determining the duration of the fishing suspension period. ITOPF recommends that all

vessels should be allowed the same business interruption period and proposes the 20 days between 23rd July and 11th August. The latter date corresponds with the day that the Maritime Police declared that there was no floating oil remaining on the water.

1.4.7. ITOFF agrees with the vessel cleaning costs assessed by Fishermen's Surveyor. Tables 3F summarise the assessed loss of earnings and cleaning costs by VFA. Individual assessments for each fishing vessel are contained in Appendix I.

VFA	Number of vessels	Cleaning costs (Won)	Business interruption (Won)	Total assessed claim (Won)
Changji	12	2,170,000	17,279,920	19,449,920
Ando	40	7,650,000	72,118,480	79,768,480
Yondo*	67	13,180,000	124,779,200	117,859,200
Yokpo	52	8,360,000	74,278,400	82,638,400
Shinhung	25	3,140,000	19,447,680	22,587,680
Seogoji	42	6,830,000	59,944,080	66,774,080
Daesoyo	36	7,200,000	65,766,400	72,966,400
Shimmi	15	2,390,000	21,332,080	23,722,080
Chikwonpo	12	1,950,000	15,015,280	16,965,280
Woohak	12	2,300,000	19,934,880	22,234,880
Tura	18	2,850,000	25,384,240	28,234,240
TOTAL	331	58,020,000	515,280,640	553,200,640

Table 3f. Fishing Boat Claims - ITOFF Assessments

* Note: Yondo vessel owners already received compensation of Won 300,000 per vessel in respect of cleaning costs. This amount has therefore been deducted from each owners total assessed claim.

CAGED FISH

2.1 Nature of the fishery

2.1.1 The rearing of caged fish is widespread in the sheltered bays of the islands between Yosu and Sorido. The cages consist of wooden pontoons to which are attached styrofoam floats to give added buoyancy. Nets are suspended beneath the structures to retain the fish. The cages are usually deployed in large clusters comprising several hundred units. At different times of the year, the owners stock their facilities with juvenile fish (jacopever and flounder/bastard halibut) purchased from hatcheries, or variable-sized fish (seabass, seabream, rockfish and yellowtail) caught from natural stocks. They rear the fish by feeding them on a regular basis until they reach a marketable size (8 months to 2 years depending upon the species and the size when stocked) or can command a high price. Adult fish are sold all year round in an alive condition, in most cases directly to raw fish restaurants. Only very small quantities are said to be sold through the YFCU.

2.2.1 In the Yosu area a total of 769 individual fishermen from 23 VFAs filed claims in respect of some 7,750 cages used for rearing fish. The claims, which totalled Won 81,899,495,000 were for contamination of the facilities, alleged mortality of stocks due to the oil, and an alleged drop in the market price of fish. Many of the claimants also filed claims through Yeochon County Government for alleged damage to their facilities and stocks as a result of the typhoon 'Faye' and subsequently for 'red tide' damage.

2.3 Fishermen's Surveyor assessment Yosu District caged fish claims

2.3.1 Fishermen's Surveyor assessments of caged fish claims in the Yosu area allowed for alleged mortalities, estimated future mortalities, management costs, facility damage and market price depreciation. Fishermen's Surveyor tried initially to assess the claims on the basis of documents supplied by cage owners to the Yeochon County Office for typhoon damages. However, they concluded that the data were 'too much exaggerated' and they therefore decided to assess the claims on the basis of site surveys and interviews with claimants. No details are provided in the Fishermen's Surveyor reports as to how alleged mortalities were verified or assessed or the basis for estimating future mortalities.

2.3.2 In assessing the claim for price depreciation, Fishermen's Surveyor used the average drop in market price in the Yosu area over the four months following the spill. They attributed all of the price drop to the spill, although the greatest reduction in price occurred in October when much of the clean-up was completed and the red tides were at their peak. The assessed claims, which totalled Won 36,642,077,710 are summarised in Table 6A for each VFA.

VFA	Mortality losses Won	Future mortality Won	Facility damage Won	Market depreciation Won	Total
Shinhung	950,455,000	111,249,900	120,411,500	556,553,000	1,738,669,400
Hwasan	1,419,387,500	132,665,700	149,411,500	727,273,000	2,428,794,400
Jedo	799,040,000	41,211,900	92,004,000	201,012,500	1,133,268,400
Chabong	1,160,658,000	92,060,800	124,593,500	390,103,000	1,767,415,300
Yosuk	34,283,000	10,380,900	17,036,200	46,449,000	108,149,100
Nangdo	55,430,000	8,123,100	9,172,600	25,570,000	98,295,700
Chokgum	20,900,000	3,759,300	3,335,600	30,750,000	58,744,900
Kunnae	352,200,000	37,045,000	66,509,300	319,248,500	775,002,800
Tura	1,589,617,000	274,690,100	188,499,500	288,584,000	2,341,390,600
Hoenggan	934,274,000	162,394,100	97,202,300	462,002,750	1,655,873,150
Nabal	1,123,020,000	212,865,300	128,333,100	629,817,500	2,094,035,900
Woohak	36,800,000	6,608,000	3,034,000	23,600,000	70,042,000
Songgo	149,422,000	14,147,300	12,378,000	42,605,000	218,552,300
Shinbok	199,304,000	29,676,900	41,221,500	78,455,500	348,657,900
Wolho	1,910,955,500	304,140,900	241,371,700	1,037,219,380	3,493,687,480
Hwatae	4,796,540,000	781,917,200	569,560,400	2,941,420,750	9,089,438,350
Songdo	1,356,459,500	238,542,300	183,219,300	1,041,805,000	2,820,026,100

Wolhang	700,427,000	173,275,700	115,430,700	481,793,000	1,470,926,400
Yondo	143,856,000	8,310,400	7,071,000	20,776,000	180,013,400
Ando	1,045,146,000	80,594,100	60,103,700	142,084,500	1,327,928,300
Seogoji	2,033,596,500	244,399,600	117,701,700	573,469,880	2,969,167,780
Shinmi	132,013,000	55,075,600	20,741,700	169,274,250	377,104,550
Changji	49,515,000	6,234,300	8,189,200	12,955,000	76,893,500
Totals	20,993,299,000	3,029,368,400	2,376,588,800	10,242,821,510	36,642,077,710

Table 6a. Caged Fish Summary of Claims as Assessed by Fishermen's Surveyor

2.4 ITOPF's assessment of Yosu District caged fish claims

2.4.1 With such a large concentration of caged fish in the polluted areas the decision was made to conduct joint surveys to record the number of cages affected and the level of contamination of the structures. It was also decided to collect samples of fish from oiled cages for the purpose of determining levels of hydrocarbons in their tissue and to undertake taste testing of selected samples to ascertain whether the fish had acquired an oily taint as a result of the oil spill. The initial surveys were undertaken between 9th and 15th August, 1995, with the involvement of various local fishing representatives, including their appointed surveyors and experts, marine scientists working with ITOPF and local surveyors. Besides collecting fish samples from polluted areas, samples were also obtained from non-polluted areas, including Yosu fish market.

2.4.2 Unfortunately, after the samples were collected and taken to Yosu for storage, the fisheries representatives refused to participate in a joint taint testing programme. It had been hoped to undertake chemical analyses of the samples jointly with the chemistry department of Yosu Fisheries University. The *Sea Prince* owners, their P&I insurers and the IOPC Fund arranged for a chemist from the UK, with expertise in measuring hydrocarbons in marine products, to travel to Yosu to assist with the analyses. However, this proposal had to be abandoned due to difficulties in obtaining sufficiently pure chemical reagents for treating the fish prior to analysis. After some further difficulties and delays the YFCU agreed to allow one set of samples to be taken to a laboratory in the UK for chemical analysis only.

2.4.3 The Environment and Resource Technology (ERT) laboratory in Port Edgar, Scotland measured aliphatic and aromatic hydrocarbon concentrations in all of the samples. The measured concentrations of hydrocarbons in parts per million (PPM) wet weight and the hydrocarbon 'fingerprints' are contained in Appendix III.

2.4.4 Although most of the caged fish samples collected from polluted areas were found to contain some petroleum hydrocarbons in their tissues, the concentrations were very low and comparable to those found in control samples collected from outside the polluted area. During the sampling surveys undertaken in August, 1995 a small number of dead fish were observed at some facilities. The cause of death is not known, but the numbers involved were typical of those associated with diseases and stress which are common occurrences with caged fish. Given the lack of significant hydrocarbon contamination in the fish, it is extremely unlikely that there were any mortalities caused by the oil spill. This conclusion is supported by observations following the BRAER incident in Shetland (United Kingdom) in 1993. The tissues of caged salmon close to the wreck were very heavily contaminated with

hydrocarbons as a result of the high rate of natural dispersion which took place. Despite the very high levels of contamination of these fish (several orders of magnitude greater than samples taken following the *Sea Prince* oil spill), which lasted over several months, no mortalities were recorded.

2.4.5 Total concentrations of low molecular weight polycyclic aromatic hydrocarbons (PAHs) were well below (by a factor of 10) concentrations considered by the US Food and Drug Administration (FDA) to cause an objectionable odour or taste (1 ppm). Whilst low molecular weight PAHs are not the only petroleum compounds which can cause tainting, given the overall low concentrations of petroleum hydrocarbons measured, it is unlikely that the caged fish were tainted at the time the samples were taken.

2.4.6 Total concentrations of high molecular weight PAHs were found to be well below (by a factor of 100) typical concentrations of benzo[a]pyrene, a PAH known to be a carcinogen, in smoked fish. The levels of aromatics found in the caged fish did not therefore present a hazard to human health.

2.4.7 For the reasons described above, ITOPF does not consider that the claims for alleged mortality and anticipated future mortality are admissible and has therefore not assessed claims for such losses. Instead, the Federation has assessed compensation for damage to fish cages and structures, including clean-up costs, and has also estimated the management and feeding costs incurred by the fishermen due to business interruption. In view of the doubts about whether or not the fish were contaminated, ITOPF proposes using 3rd November, 1995 (i.e. after 3.5 months) as the cut-off date for business interruption, which was when the analytical results showing all fish to be free of contamination were made available to Fishermen's Surveyor. A further 0.5 months (i.e. total of 120 days) is proposed to allow time for Fishermen's Surveyor to disseminate the information to the fishermen. This should have allowed sufficient time for market confidence in caged fish to have been restored.

2.4.8 ITOPF does not accept the claim by Fishermen's Surveyor for the alleged drop in market price of caged fish as a result of the oil spill, said to have been corrected to allow for price reduction due to red tides in the area. Analysis of fish prices in previous years indicates the price reductions in 1995 were consistent with normal seasonal trends.

2.4.9 In assessing claims for facility damage, ITOPF has taken into account the level of contamination of each facility as well as claims already filed by fishermen for facility damage caused by the typhoon 'Faye'

Heavily polluted facilities

2.4.10 In the case of heavily polluted areas ITOPF has allowed for the replacement of nets, buoys and ropes, taking into account depreciation of the various components which have a typical life expectancy of 30 months. Allowances were also made for transportation and labour costs. Two kinds of net were identified, those used to rear adult fish, and those used for juveniles.

2.4.11 Details of cages used for adult fish are as follows.

Size	Purchase price (Won)	Depreciation	Renewal cost (Won)
5.4 m x 5.4 m	300,000	50% (1994)	150,000
		70% (1993)	90,000
6.0 m x 6.0 m	350,000	50% (1994)	175,000
		70% (1994)	105,000

2.4.12 Details of cages used for juvenile fish are as follows:

Size	Purchase price (Won)	Depreciation	Renewal cost (Won)
5.4 m x 5.4 m	200,000	10% (1995)	180,000
6.0 m x 6.0 m	240,000	10% (1995)	216,000

2.4.13 Details of buoys, including transportation are as follows:

Size	Purchase price (Won)	Depreciation	Renewal cost (Won)
400 litres	13,000	10% (1995)	11,700
		50% (1994)	6,500
		70% (1993)	3,900

2.4.14 Details of polyethylene rope, including transportation are as follows:

Length per buoy	Purchase price (Won)	Depreciation	Renewal cost Won
18 m	1,680	10% (1995)	1,512
		50% (1994)	840
		70% (1993)	504

2.4.15 Transportation costs for delivering new nets from the manufacturer to the affected islands were assessed at Won 10,000 per net.

2.4.16 Labour costs associated with replacing oiled nets with new ones were estimated by assuming that eight nets can be replaced in 2 man-days (Won 50,000 x 2/8 = Won 12,500 per net). Labour for replacing buoys was estimated on the basis of ten buoys being replaced in 1 man-day (Won 50,000 x 1/10 = Won 5,000 per buoy).

Moderately polluted facilities

2.4.17 In the case of moderately oiled facilities, the claims were assessed on the basis of cleaning costs for the nets and replacement of buoys and ropes.

2.4.18 Cleaning costs associated with net cleaning were assessed by assuming that two nets could be dismantled, cleaned and reassembled in 2 man days:

Labour costs	2 men x Won 50,000	Won 100,000
Dispersant	1 x 18 litre can x Won 26,500	Won 26,500
300 litre container	1 x Won 18,000	Won 18,000
Disposal of oil water	Won 39,000	Won 39,000
Consumables	Won 14,500	Won 14,500
<hr/>		
Total:		Won 198,000

2.4.19 Replacement costs for buoys and ropes were assessed in the same way as heavily oiled facilities.

Lightly oiled facilities

2.4.20 These facilities were assessed on the basis of cleaning costs of nets and buoys only, without the need for any replacement of components. The cleaning costs for nets was assessed in the same way as nets for moderately oiled facilities.

2.4.21 The costs associated with cleaning buoys was estimated by assuming that 20 buoys could be cleaned by one woman in one day.

Labour	1 x Won 40,000	Won 40,000
Consumables	Won 20,000	Won 20,000
<hr/>		
Total:		Won 60,000

2.4.22 Of the 7,550 cages affected by the oil spill, some 2,063 were being used to rear bastard halibut and flounder and the remaining 5,487 cages were used to rear jacobever, rock fish and yellow tail. The recommended stocking densities for these two groups of fish are very different. In the case of flounder (bastard halibut), the Fishery Technical Publication No. 34, published by the National Fisheries Research and Development Agency (NFRDA) in December, 1993, reported that good growth rates were achieved when the stocking density was such that the ratio of total non-ocular side body surface area to cage

bottom area was between 1.5 and 2.0. ITOFF proposes using a ratio of 1.5 which corresponds to the following stocking densities:

Body length cm	Body area sq cm	Body weight g	Stocking density	
			No. of fish/sq m	Fish wt. kg/sq m
5	6.43	1.5	2,332	3.50
10	26.18	10.0	573	5.73
15	59.49	60.0	252	15.13
20	106.52	85.0	141	11.97
25	167.35	140.0	90	12.55
30	242.08	320.0	62	19.83
35	330.75	460.0	45	20.86
40	433.43	800.0	35	27.69

2.4.23 Although the Economic Analysis of Fish Culture (Bastard Halibut) published by the NFRDA in 1994 indicates that cage culturists in the Yosu area exceeded these densities in the years 1992 to 1993, various educational publications have since been produced recommending the densities published in the above Technical Publication No.34. Surveys conducted by Hyopsung Surveyors and Adjusters Corporation, confirmed that the majority of flounder stocked in cages were between 25 cm and 35 cm in length and the recommended stocking densities of between 12.55 kg/sq m and 20.86 kg/sq m were therefore applied when determining management and feed costs.

2.4.24 In the case of the other species of fish (jacopever, rock fish and yellow tail), the Mongraph No.39 published by the NFRDA in 1995, recommending stocking densities for such species of around 7 - 10 kg/cubic metre, although higher densities (20 - 40 kg/cubic metre) have been reported in shore tank culture. For the purpose of determining management and feed costs, a stocking density was of 8.5 kg/cubic metre was applied.

2.4.25 The following business model for jacopever culture, from 'An Economical Analysis of Jacopever Culture in Mid-water Column by Fishermen assisted by the NFRDA' published by Kyung-buk Province, was used to determine management, including feeding, costs:

Item	Quantity	Unit	Unit price (Won)	Amount (Won)
Gross income	16,800	kg	12,500	210,000,000
Production and management costs				140,471,000
Owner labour costs	24	months	1,000,000	24,000,000
Facility costs				10,333,000
Maintenance	24	months	50,000	1,200,000
Juvenile fish	30,000	no. of fish	500	15,000,000
Oil cost	24	month	500	1,200,000
Feed cost	108,800	kg	600	60,480,000
Feed storage cost	6,700	pans	450	3,015,000
Drugs	24	month	100,000	2,400,000
Electricity	24	month	200,000	4,800,000

Labour	24	month	700,000	16,800,000
	30	man-days	41,423	1,243,000

Notes:

Gross income	30,000 fish x 80% (survival rate) x 700 g x Won 12,500
Facility cost	Won 31,000,000 @ 3 years depreciation
Feed cost	30,000 fish x 80% (survival rate) x 700 g x 6 (feed coefficient)
Feed storage cost	6,700 pans (100,800 kg/15 kg) x Won 15/day x 30 days (average storage period)
Labour cost	Fixed labour (monthly) plus daily labour for net change and fish sorting

On the basis of the above costs, the daily fish management costs for 16,800 kg of fish is:

Culture production expenses	Won 140,471,000
Less facility cost	Won 10,333,000
Less juvenile fish costs	Won 15,000,000

$$\begin{aligned} & \text{Won } 115,138,000 / 16,800 \text{ kg} / 24 \text{ months} / 30 \text{ days} \\ & = \text{Won } 9.5 \text{ per kg per day} \end{aligned}$$

2.4.26 The above management costs were applied to all cages using the appropriate stocking densities of the species involved.

2.4.27 In the case of bastard halibut/flounder, prior to the assessment, Hyopsung surveyors checked the size of the net and the size of the fish at each facility in order to apply the relevant stocking density. The management costs were then calculated as follows:

$$\text{Management costs} = \text{Number of cages} \times \text{area sq m} \times \text{Won } 9.5/\text{day} \times \text{stocking density} \times 120 \text{ days}$$

2.4.28 In the case of mid-water species a standard volumetric stocking density was applied after confirming the size of each cage. The management costs were then calculated as follows:

$$\text{Management costs} = \text{Number of cages} \times 80\% \times \text{Won } 9.5/\text{day} \times 8.5 \text{ kg/cu m} \times 120 \text{ days}$$

2.4.29 The assessed claims for facility damage and management costs are summarised by VFA in Table 6B. The assessed claims of individual fishermen are contained in Appendix II.

Fishing village	Facility damage (Won)	Management cost (Won)	Total (Won)
Kunnae	27,930,000	175,639,545	203,569,545
Songdo	141,770,680	507,252,098	649,022,778
Shinbok	28,302,396	55,982,664	84,285,060
Wolho	163,319,872	719,540,959	882,860,831
Chabong	48,231,000	321,502,928	369,733,928
Hwasan	67,638,000	335,540,807	403,178,807
Shinheung	48,006,000	315,469,555	363,475,555
Yeoseuk	6,288,000	47,721,175	54,009,175
Wolhang	76,432,112	445,989,113	522,421,225
Jedo	36,606,000	297,118,588	333,724,588
Nangdo	3,588,000	33,488,640	37,076,640
Jeokkeum	2,091,000	18,976,896	21,067,896
Woohak	2,224,000	7,911,691	10,135,691
Songgo	8,725,944	39,070,080	47,796,024
Jangji	4,986,824	11,119,624	16,106,448
Shimmi	20,905,352	56,964,177	77,869,529
Doora	127,785,360	609,254,163	737,039,523
Nabal	88,973,552	506,232,613	595,206,165
Heonggan	68,290,952	274,161,708	342,452,660
Sougoji	111,304,644	315,479,733	426,784,377
Hwatae	398,856,352	1,596,029,431	1,994,885,783
Ando	56,575,964	145,650,385	202,226,349
Yondo	6,451,020	25,631,415	32,082,435
Total	1,545,283,024	6,861,727,987	8,407,011,011

Table 6b. Caged Fish – Summary of Assessed Claims

3.0 COMMON FISHING GROUNDS (CFG)

3.1 Nature of CFG

3.1.1 Common fishing is one of four categories of licensed fisheries designated under Article 8 of the Korean Fisheries Act, which was amended by Law No. 4365 in March, 1991. It comprises the inter-tidal and sub-tidal zones to depths of 10 metres, at the time of the lowest ebb tide, of specified coastal regions. Co-operative areas are controlled and managed by individual village fishery associations (VFA). Although CFGs yield a wide variety of species of mollusca, seaweed and sedentary animals, only a relatively small number tend to be harvested from a particular licensed area according to the nature of the shoreline and the adjacent seabed.

3.1.2 The greatest impact of oil spills on CFGs arises from the stranding of oil on inter-tidal areas from where species such as short-necked clams are harvested. Damage to stocks can occur either due direct contamination by oil or as a result of clean-up measures.

3.1.3 In contrast, sub-tidal species such as abalone, which are normally harvested by divers, do not come into contact with oil and the main impact of a spill is a disruption of normal fishing activities caused by the presence of oil on the water or on nearby shorelines.

3.1.4 Although oil spills can lead to a suspension of the gathering of plants and animals within a CFG affected by an oil spill, it is normal practice for the members of the VFAs and their families to be engaged in the shoreline clean-up operations, thereby supplementing their earnings. A basic premise of the compensation is that those affected by a spill are neither worse nor better off than if the incident had not taken place. Fishermen claiming for loss of earnings should therefore allow a reduction for any clean-up wages which have offset their losses due to a suspension of fishing.

3.2 Yosu District CFG claims

3.2.1 A total of 37 VFAs in the Yosu district have filed claims for compensation for damage to their common fishing grounds. Although there is some variation in the species of marine products harvested from each VFA, the principal catches listed in the claims documents are: abalone; topshell; sea urchin; sea cucumber; sea squirt; octopus; poulp squid; crab; lug worm; urechis; fusiforme; sea mustard; agar agar; and, laver. All these products are found in the sub-tidal zone. The total claims filed by the above VFAs amounted to Won 47,842,386,000 (see Table 1A)

3.3 Fishermen's Surveyor assessment of Yosu District CFG claims

3.3.1 Fishermen's Surveyor stated that they evaluated CFG losses by referring to annual production data provided by the respective VFAs and compared these with data contained in the Yearbook of Fisheries published by the Ministry of Agriculture, Forestry and Fisheries, Republic of Korea. Although none of the data is presented by Fishermen's Surveyor in their report, their analysis was said to indicate that as little as 10% of CFG production is sold through the Yosu Fishery Co-operative Union, the balance of 90% being sold privately.

3.3.2 Fishermen's Surveyor made a subjective assessment of damages on the basis of the level of pollution of the shorelines in close proximity to the common fishing grounds and the findings of a joint underwater diving survey undertaken in November, 1995. They arbitrarily assigned recovery periods of between 9 and 15 months, except in the case of the CFG at Duckpo, close to the grounding location of the *Sea Prince*, where they assigned a recovery period of 2 years. In calculating loss of earnings, Fishermen's Surveyor made a deduction of 17% to allow for saved operating costs incurred by claimants through the supposed suspension of fishing. The losses estimated by Fishermen's Surveyor are summarised in Table 1A.

3.4 ITOPF's assessment of Yosu District CFG claims

3.4.1 It has been the practice of ITOPF in the past to assess claims on the basis of average CFG production levels determined from data published in the Statistical Yearbook of

Agriculture, Forestry and Fisheries, Republic of Korea. For each province the Yearbook provides data on normal catches of adjacent waters fisheries by species and type of sale (co-operative and private). Table 1B summarises the data for Chonnam Province for the years 1992 - 1994 for those species which are generally harvested from CFGs. Unfortunately, the Yearbook does not include information on the areas of CFGs within the province. Although the National Federation of Fisheries Co-operatives provides total areas of CFGs for each province in its 'Status of Fishing Villages' Reports, there is no break-down by individual species. Consequently, average CFG production levels based upon national statistics have to take into account all species. On the basis of the data presented in Table 1B, the average CFG production in Chonnam Province for the years 1992 - 1994 was Won 1,912,282 per hectare. In most cases this average production is unlikely to be representative of a particular CFG which may only yield a few of the species listed in Table 1B. Since there is considerable variation in the unit prices of different species, the use of average provincial data could lead to some claimants being over-compensated and others under-compensated.

3.4.2 In November, 1996 ITOPF obtained from the Yosu Fishery Co-operative Union commission sales records for the years 1992 to 1995 in respect of the VFAs claiming for damage to their CFGs. The data is presented in Table 1C in order to compare the three years average (1992 to 1994) commission sales with those for 1995, the year of the spill. Of the 37 VFAs which were affected by the oil spill from the *Sea Prince*, complete records for the years 1992 - 1995 were provided in respect of 16 VFAs. Records for 1994 and 1995 were provided for 7 VFAs and for 1995 only in respect of a further 6 VFAs. No records were obtained in respect of the remaining 8 VFAs.

3.4.3 Of the 23 VFAs for which complete or partial sales commission sales data was provided, 12 appear to have made greater sales of marine products in 1995, the year of the spill, than the previous three years average. Four of these villages are located in the areas of heaviest pollution (see Introduction). Of the 11 VFAs whose records indicate a decrease in commission sales in 1995 compared with the previous three years average, the differences are negligible in the case of 3 VFAs (less than Won 1,000). Of the remaining 8 villages, the reductions vary from Won 268,869 to Won 42,656,620. However, as can be seen from the national statistics (see Table 1B) these reductions are well within the range of normal fluctuations in productivity which can occur from year to year.

3.4.4 Commission sales records only account for that portion of each VFA's annual CFG production which is sold through the YFCU. Each VFA is free to choose whether to sell its products through its FCU or through private outlets, and it is normal practice for a portion to be sold through each. The FCUs are required to report details of all transactions to the tax office. Therefore, the attraction of selling products privately is that besides avoiding any sales commission, tax levies can also be evaded.

3.4.5 In order to make a fair assessment of the economic losses incurred by the VFAs it is necessary to take the private sales element into account. However, past experience has shown that detailed private sales records are rarely kept by VFAs and when they are, they cannot always be relied upon. ITOPF has therefore resorted to the Statistical Yearbook of Agriculture, Forestry and Fisheries, Republic of Korea, which provides data by province on co-operative and non-co-operative sales for different species of marine products. In the case of Chonnam Province, the following data for the years 1992 to 1994 was obtained in respect of the principal species harvested from the CFGs affected by the spill.

Year		Seaweed M/T	Abalone, Topshell, Sea Urchin M/T	Total M/T
1992	Total	4,015	958	4,973
	Co-op	2,007	91	2,098
	Non-co-op	2,008	867	2,875
1993	Total	2,869	2,323	5,192
	Co-op	2,037	219	2,256
	Non-co-op	832	2,104	2,936
1994	Total	3,560	1,257	4,817
	Co-op	2,614	235	2,849
	Non-co-op	946	1,022	1,968

3.4.6 The above data enables the ratio between total annual sales and the co-operative (commission) sales to be determined for each year:

$$1992 \quad 4,973/2,098 = 2.37$$

$$1993 \quad 5,192/2,256 = 2.30$$

$$1994 \quad 4,817/2,849 = 1.69$$

3.4.7 Table 1D shows the converted total annual sales after applying these ratios to the respective annual commission sales data. These total sales amounts have been converted into production rates (Won per licensed hectare) for each of the VFAs for which complete or partial sales records were obtained. The licensed areas used in the calculations are those which have been confirmed after inspection of the license documents for each VFA. In some cases these areas are different to those used by Fishermen's Surveyor in their assessments. It can be seen from Table 1D that the production per hectare values range from Won 85,197 to Won 6,660,308 per hectare. It is not known whether the reason for some VFAs having low or no commission sales is due to their CFGs being relatively impoverished, or if they simply sell more or all of their products through private channels. Similar uncertainties exist in the case of VFAs which demonstrate high commission sales, since this could reflect highly productive CFGs or a preference on their part to sell more products through the FCU than privately.

3.4.8 ITOPF has assessed the claims of those VFAs with little or no commission sales records separately from those which have complete records for the years 1992 to 1995. The loss of earnings of VFAs in the latter group have been determined on the basis of their individual average commission sales for the three years prior to the spill, with the uplift for private sales included. The other group of VFAs have been assessed using the overall average productivity per hectare based upon the total sales of VFAs with complete records. However, since these VFAs sold little or nothing through the YFCU, their claims have been assessed on the basis of private sales only by deducting the commission sales component from the total sales average. This gives an average production for these VFAs of Won 1,419,356 per hectare.

3.4.9 In order to determine economic losses as a result of business interruption, these annual production levels are multiplied by the duration of the suspension of harvesting of marine products. The periods recommended by Fishermen's Surveyor of between 9 months and 2 years cannot be supported on the basis of the commission sales data for 1995 (see Table 1C). In the case of lightly polluted areas ITOPF recommends that the period of interruption should be from the time that a particular area was polluted until clean-up of adjacent shorelines was completed (approximately 1 month). In the case of heavily and moderately polluted areas ITOPF suggests that the business interruption period should be 4 months. This corresponds to the time between the first occurrence of pollution and the time when the results of the hydrocarbon analyses of marine products, showing that they were not contaminated, were given to the VFAs. The latter date also corresponds to the time when Maritime Police measurements of hydrocarbon levels in surface waters in the affected areas were found to have returned to background levels. The assessed loss of earnings for each VFA are shown in Table 1E.

VFU	Area Ha	Claim Won	Fishermen's Surveyor Assessed Production (Won/Ha)	Loss Ratio	Loss of Earnings Won
Yondo	130	14,392,160,000	5,712,000	15/12	910,314,950
Yokpo	59	1,465,880,000	5,448,000	15/12	333,485,700
Ando	173	5,789,931,000	5,540,000	15/12	994,360,750
Seogoji	25	908,160,000	5,078,000	15/12	131,710,625
Daesayo	101	624,613,000	4,758,000	15/12	498,578,925
Chikwonpo	49.5	1,061,300,000	3,693,000	14/12	177,014,723
Shimmi	60	2,374,336,500	4,406,000	14/12	255,988,600
Changji	58	3,263,387,500	4,489,000	14/12	252,117,203
Tumo	91	1,068,750,000	3,562,000	14/12	313,877,503
Tura	32	1,107,200,000	3,650,000	13/12	105,022,667
Hoenggan	73	808,700,000	3,645,000	13/12	239,254,763
Nabal	28.5	426,650,000	3,434,000	13/12	88,000,543
Woohak*	60	2,192,680,000	4,131,000	13/12	222,867,450
Songgo	23	164,188,000	3,596,000	13/12	74,368,277
Shinbok*	60	472,470,000	3,445,000	12/12	171,561,000
Chakum*	30	361,950,000	3,619,000	12/12	90,113,100
Songdu	23.8	123,700,000	3,638,000	12/12	71,865,052
Hamgumi	42.1	183,530,000	3,532,000	12/12	123,418,676
Wolho	72	515,400,000	3,579,000	12/12	213,861,040
Hwatae	80	1,141,300,000	3,562,000	12/12	236,516,800
Songdo	25	473,000,000	2,934,000	12/12	60,880,500
Wolhong*	40.7	750,450,000	3,506,000	11/12	108,566,504
Hojon	50	1,958,800,000	3,653,000	11/12	138,966,208
Shinhung*	50	875,380,000	2,746,000	11/12	104,462,417
Hwasan	85	591,230,000	2,784,000	11/12	180,043,600
Jedo	81.6	436,300,000	3,386,000	11/12	210,216,424
Chabong	40	601,200,000	2,705,000	11/12	82,322,167
Yosuk*	10	33,100,000	2,648,000	11/12	20,146,867
Tunbyong	65	118,950,000	2,312,000	10/12	103,943,667
Chobal	50	325,100,000	2,271,000	10/12	78,538,750
Nangdo	170	1,221,000,000	2,331,000	10/12	274,086,750
Kunnae	114	462,990,000	3,240,000	10/12	255,474,000
Kuljon	149	220,500,000	2,656,000	9/12	246,350,640
Taepo	50	280,500,000	3,535,000	9/12	110,026,875
Yulrim	55	219,600,000	3,476,000	9/12	119,009,550
Impo	36	364,500,000	3,543,000	9/12	79,398,630
Hahwa	86.2	463,500,000	2,419,000	9/12	129,802,331
TOTAL	2428.4	47,842,386,000			7,806,554,227

*Denotes that the licenses for the fishing village have yet to be confirmed.

**Only 1994 sales commission records submitted.

TABLE 1A SEA PRINCE - COMMON FISHING GROUNDS - FILED CLAIMS AND FISHERMEN'S SURVEYOR ASSESSMENTS

Species	1992 (kg)	1993 (kg)	1993 (kg)	3-year average	Unit price (Won)	Amount (Won)
Abalone	16,000	73,000	22,000	37,000	58,980	2,182,260,000
Topshell	924,000	2,215,000	1,024,000	1,387,667	3,445	4,780,511,667
Bai Topshell	3,000	1,000	-	1,333	4,674	6,232,000
Oyster	3,379,000	374,000	966,000	1,573,000	642	1,009,866,000
Short-necked Clam	2,700,000	19,298,000	1,573,000	8,068,667	1,328	11,522,056,000
Hard Clam	4,000	55,000	28,000	29,000	1,079	31,291,000
Venus Clam	7,000	53,000	13,000	24,333	1,204	29,297,333
Ark Shell	18,000	54,000	64,000	45,333	5,012	227,210,667
Egg Cockle	2,751,000	794,000	291,000	1,278,667	2,500	3,196,666,667
Hen Cockle	636,000	1,818,000	3,312,000	1,922,000	2,344	4,505,168,000
Sea Mussel	377,000	10,000	97,000	161,333	312	50,336,000
Cockle	174,000	3,014,000	881,000	1,365,333	961	1,303,436,333
Pen Shell	5,238,000	3,071,000	2,113,000	3,474,000	2,832	9,838,368,000
Jack Knife Clam	39,000	732,000	399,000	390,000	500	585,000,000
Other shellfish	1,040,000	698,000	1,046,000	928,000	8,936	8,292,608,000
Octopus	129,929	48,705	80,586	86,407	3,600	311,064,000
Other Octopus	270,360	223,160	165,264	219,595	4,390	964,020,587
Roupe Squid	1,090,953	1,223,057	1,365,374	1,226,461	9,753	11,961,677,384
Other Mollusc	17,000	34,000	577,000	209,333	7,474	1,564,557,333
Sea Cucumber	35,000	110,000	118,000	87,667	9,236	809,689,333
Sea Urchin	18,000	35,000	31,000	28,000	4,418	123,704,000
Lug Worm	328,000	-	-	109,333	4,100	448,266,667
Sea Squirt (small)	7,000	5,000	-	4,000	648	2,592,000
Other Animals	128,000	365,000	376,000	289,667	33,631	9,741,779,667
Crab	2,106,000	2,932,000	4,071,000	3,036,333	2,011	6,106,066,333
Sea Mustard	444,000	133,000	17,000	198,000	108	21,384,000
Typicus & Irish Mo	146,000	-	-	48,667	390	18,980,000
Sea Staghorn	1,092,000	414,000	480,000	662,000	645	426,990,000
Laver	5,000	7,000	-	4,000	1,036	4,144,000
Sea Duck Weed	7,000	-	86,000	31,000	1,970	61,070,000
Fusiforme	1,014,000	1,816,000	2,057,000	1,629,000	934	1,032,786,000
Agar-agar	598,000	205,000	319,000	374,000	589	220,285,000
Other Agar-agar	376,000	144,000	213,000	244,333	6,197	1,514,133,667
Green Laver	328,000	104,000	272,000	234,667	681	159,808,000
Sea String	-	12,000	5,000	5,667	2,000	11,333,333
Other Seaweeds	-	34,000	111,000	48,333	180	8,700,000
TOTAL						83,073,339,971

According to the 'Status of Fishing Villages' published by the National Federation of Fisheries Cooperatives the total area of CFG in Chonnam Province in the years 1992 - 1994 was:

1992	1993	1994	Average
45087 Ha	40749 Ha	44491 Ha	43442 Ha

Average CFG production per Ha (1992 - 1994) = Won 1,912,282

**TABLE 1B CATCHES OF ADJACENT WATER FISHERIES
BY SPECIES AND YEAR (1992-1994) IN CHONNAM PROVINCE**

VFA	Area Ha	Average Annual Commission Sales 1992- 1994	Commission Sales 1995	Difference between 1995 Sales and previous three years average
Yondo	110.40	295,983,037	297,983,889	+2,140,852
Yokpo	59.00	45,382,066	40,001,142	-5,380,924
Ando	163.40	369,659,598	503,274,650	+133,615,052
Seogoji	20.00	42,250,273	26,892,900	-15,357,373
Daesayo	20.00	28,225,700	34,285,714	+6,060,014
Chikwonpo	49.50	37,423,266	33,251,188	-4,172,078
Shimmi	60.00	33,331,023	11,730,208	-21,600,815
Changji	58.00	152,485,537	155,967,490	+3,471,953
Tumo	60.00	57,698,384	20,009,400	-37,688,984
Tura	16.00	27,859,666	42,857,142	+14,997,476
Hoenggan	17.00	31,535,016	62,055,400	+30,520,384
Nabal	28.50	20,652,883	20,284,014	-268,869
Woohak*	60.00	29,642,246	1,440,000	-28,202,246
Songgo	23.00	27,368,083	40,219,360	+17,386,610
Shinbok*	60.00	NO DATA	NO DATA	NO DATA
Chakum*	30.00	NO DATA	7,141,500	NO DATA
Songdu	23.80	6,758,700*	14,287,500	+7,528,800
Hamgum	42.10	29,633,326	37,720,616	+8,087,290
Wolho	72.00	NO DATA	19,998,900	NO DATA
Hwatae	10.00	33,069,216	85,714,285	+52,645,069
Songdo	41.00	NO DATA	NO DATA	NO DATA
Wolhong*	40.70	NO DATA	11,428,050	NO DATA
Hojon	50.00	8,570,100*	14,285,700	+5,715,600
Shinhung*	50.00	NO DATA	NO DATA	NO DATA
Hwasan	20.00	NO DATA	NO DATA	NO DATA
Jedo	81.60	NO DATA	7,141,500	NO DATA
Chabong	40.00	NO DATA	11,400,000	NO DATA
Yosuk*	10.00	NO DATA	NO DATA	NO DATA
Tunbyong	65.00	NO DATA	5,713,200	NO DATA
Chobal	50.00	10,000,200*	9,999,250	-950
Nangdo	170.00	8,570,100	8,570,000	-100
Kunnae	76.00	NO DATA	NO DATA	NO DATA
Kuljon	149.00	NO DATA	NO DATA	NO DATA
Taepo	50.00	NO DATA	NO DATA	NO DATA
Yulnim	19.50	54,084,940*	11,428,320	-42,656,620
Impo	36.00	5,800,000*	11,428,320	+5,628,320
Hahwa	78.00	8,570,100*	8,569,800	-300
TOTAL	2,029.50			

*Denotes that the licenses for the fishing village have yet to be confirmed

**Only 1994 sales commission records submitted

TABLE 1C SEA PRINCE - COMMON FISHING GROUNDS
- YFCU COMMISSION SALES RECORDS

VFA	Total sales 1992 (Won)	Total sales 1993 (Won)	Total sales 1994 (Won)	Average total sales (Won)	Licensed Ha	Production (Won/Ha)
Yondo	571,269,516	768,507,862	527,877,026	622,551,468	110.40	5,639.053
Yakpo	96,553,800	88,859,580	95,944,004	93,785,795	59.00	1,589.590
Ando	561,965,110	946,681,725	777,792,019	762,146,285	163.40	4,664.298
Seogoji	123,844,350	70,040,175	74,434,056	89,439,527	20.00	4,471.976
Daesayo	54,794,400	58,313,280	61,183,915	58,097,198	40.00	1,452.430
Chikwonpo	70,830,294	110,753,280	57,848,700	79,810,758	49.50	1,612.339
Shimmi	63,790,659	34,790,621	97,936,893	65,506,058	60.00	1,091.768
Changji	131,041,850	327,798,438	438,797,789	299,212,692	58.00	5,158.840
Tumo	93,367,529	100,160,400	152,356,153	115,294,694	60.00	1,921.578
Tura	63,681,900	49,293,600	59,618,130	57,531,210	16.00	3,595.701
Hoenggan	54,794,400	74,445,136	66,108,744	65,116,093	17.00	3,830.358
Nabal	32,587,500	36,753,080	53,960,095	41,100,225	28.50	1,442.113
Woohak*	52,432,695	54,819,465	72,617,086	59,956,415	60.00	999.274
Songgo	37,209,000	61,715,325	66,875,835	55,266,720	23.00	2,402.901
Shinbok*	-	-	-	-	60.00	-
Chakum*	-	-	-	-	30.00	-
Songdu	-	-	11,422,203	11,422,203	23.80	479.924
Hamgumi	80,401,729	57,116,360	50,939,980	62,819,356	42.10	1,492.146
Walho	-	-	-	-	72.00	-
Hwatae	63,681,900	52,322,010	83,805,326	66,603,079	10.00	6,660.308
Songdo	-	-	-	-	41.00	-
Wolhong*	-	-	-	-	40.70	-
Hojon	-	-	14,483,469	14,483,469	50.00	289.669
Shinhung*	-	-	-	-	50.00	-
Hwasan	-	-	-	-	20.00	-
Jedo	-	-	-	-	81.60	-
Chabong	-	-	-	-	40.00	-
Yosuk*	-	-	-	-	10.00	-
Tunbyong	-	-	-	-	65.00	-
Chobal	-	-	16,900,338	16,900,338	50.00	338.007
Nangdo	-	-	14,483,469	14,483,469	170.00	85.197
Kunnae	-	-	-	-	76.00	-
Kuljon	-	-	-	-	149.00	-
Taepo	-	-	-	-	50.00	-
Yulrim	-	-	91,403,549	91,403,549	19.50	4,687.361
Impo	-	-	9,802,000	9,802,000	36.00	272.278
Hahwa	-	-	14,483,469	14,483,469	78.00	185.686
TOTAL	2,152,246,632	2,892,370,336	2,911,074,248	2,767,216,070	2029.50	

- No data

* Denotes that the licenses for the fishing village have yet to be confirmed

TABLE 1D SEA PRINCE - COMMON FISHING GROUNDS - TOTAL SALES BASED ON YFCU COMMISSION SALES RECORDS AND COMPUTED PRIVATE SALES

VFA	Licensed Ha	ITOPF Assessed Production (Won/Ha)	Period of interruption months	Loss of earnings (Won)
Yondo	110.40	5,639,053	4.5	233,456,794
Yokpo	59.00	1,589,590	4.5	35,169,679
Ando	163.40	4,664,298	4.5	285,804,860
Seogoji	20.00	4,471,976	4.5	33,539,820
Daesayo	40.00	1,452,430	4.5	21,786,450
Chikwonpo	49.50	1,612,339	4.5	29,929,043
Shimmi	60.00	1,419,356	4.5	31,935,510
Changji	58.00	5,158,840	4.5	112,204,770
Tumo	60.00	1,921,578	4.5	43,235,505
Tura	16.00	3,595,701	4.5	21,574,206
Hoenggan	17.00	3,830,358	4.5	24,418,532
Nabal	28.50	1,442,113	4.5	15,412,583
Woohak*	60.00	1,419,356	4.5	31,935,510
Songgo	23.00	2,402,901	4.5	20,725,021
Shinbok*	60.00	1,419,356	4.5	31,935,510
Chakum*	30.00	1,419,356	4.5	15,967,755
Songdu	23.80	1,419,356	4.5	12,667,752
Hamgumi	42.10	1,492,146	4.5	23,557,255
Wolho	72.00	1,419,356	4.5	38,322,612
Hwatae	10.00	6,660,308	4.5	24,976,155
Songce	25.00	1,419,356	4.5	13,306,463
Wolhang*	40.70	1,419,356	4.5	21,662,921
Hojon	50.00	1,419,356	4.5	26,612,925
Shinhung*	50.00	1,419,356	4.5	26,612,925
Hwasan	20.00	1,419,356	4.5	10,645,170
Yosuk*	10.00	1,419,356	4.5	5,322,585
Jedo	81.60	1,419,356	1.5	14,477,431
Chabong	40.00	1,419,356	1.5	7,096,780
Tunbyong	65.00	1,419,356	1.5	11,532,268
Chobal	50.00	1,419,356	1.5	8,870,975
Nangdo	170.00	1,419,356	1.5	30,161,315
Kunnae	76.00	1,419,356	1.5	13,483,882
	16.00	1,419,356	4.5	8,516,136
Kulion	149.00	1,419,356	1.5	26,435,506
Taepo	50.00	1,419,356	1.5	8,870,975
Yulrim	19.50	4,687,361	1.5	11,425,442
Impo	36.00	1,419,356	1.5	6,387,102
Hahwa	78.00	1,419,356	1.5	13,838,721
TOTAL	2029.50			1,353,814,843

* Denotes that the licenses have yet to be confirmed

TABLE 1E SEA PRINCE - COMMON FISHING GROUNDS
- CLAIMS ASSESSED BY ITOPF