

World Maritime University

# The Maritime Commons: Digital Repository of the World Maritime University

---

World Maritime University Dissertations

Dissertations

---

1990

## Marine and onshore oil insurance

Maleeh Mohamed Masha  
*WMU*

Follow this and additional works at: [https://commons.wmu.se/all\\_dissertations](https://commons.wmu.se/all_dissertations)

---

### Recommended Citation

Masha, Maleeh Mohamed, "Marine and onshore oil insurance" (1990). *World Maritime University Dissertations*. 876.

[https://commons.wmu.se/all\\_dissertations/876](https://commons.wmu.se/all_dissertations/876)

This Dissertation is brought to you courtesy of Maritime Commons. Open Access items may be downloaded for non-commercial, fair use academic purposes. No items may be hosted on another server or web site without express written permission from the World Maritime University. For more information, please contact [library@wmu.se](mailto:library@wmu.se).

WORLD MARITIME UNIVERSITY  
MALMOE-SWEDEN

MARINE AND ONSHORE OIL  
INSURANCE

By

MALEEH MOHAMED MASHA

SUDAN

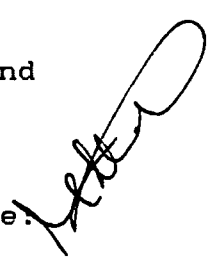
A paper submitted to the Faculty of the World Maritime  
University in partial satisfaction of the requirements  
for the award of a

MASTER OF SCIENCE DEGREE

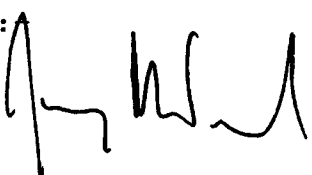
in

GENERAL MARITIME ADMINISTRATION

The contents of this paper reflect my personal views and  
are not necessarily endorsed by the University.

Signature: 

Supervised and assessed by:  
Professor Jerzy Mlynarczyk  
World Maritime University

 Date: 10/23/90

Co-assessed by:-

Professor Edgar Gold

Dalhousie University, Halifax, Canada

WMU LIBRARY

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

In the Name of Allah, the  
Beneficent, The Merciful

To my wife and my family

## TABLES OF CONTENTS

Acknowledgement -----	i
Table of contents -----	ii
List of tables and figures -----	vi
List of Appendices-----	vii

## ACKNOWLEDGEMENT

I sincerely thank all of those permanent and visiting professors of the World Maritime University, people of different institutions we visited during our various "Field Trips" and during "On-The-Job-Training".

I would like to thank my colleagues in GPC and Bashayer shipping who gave me this opportunity.

I also sincerely thank my dear wife for her valuable help and for typing this paper.

I would like to thank my professor J. Mlynarczyk for his valuable supervision and assistance.

My thanks to my colleagues of GMA for their valuable discussions.

## TABLES OF CONTENTS

### BRIEF OUTLINE OF SUDAN

1. Geographical Location	1
2. Insurance Market	1
3. Oil Industry	4

### CHAPTER 1 :- OIL INSURANCE

1. Introduction to Oil Insurance	9
1.1 The nature of Crude Oils	9
1.2 The feature of risks in oil insurance	11
1.3 The buyers of oil insurance	14
1.4 The portfolio	15
2. Oil Insurance Market	18
2.1 The features of the market	18
2.2 Marine insurance market	20
2.3 Non-marine market	21
2.4 IOI Association	22
3. Introduction to Marine Oil Insurance	24
3.1 Marine cargo insurance	24
3.2 Main clients of oil cargoes	26
3.3 Major factors of marine oil insurance	27
4. Introduction To Onshore Oil Insurance	29
4.1 Origin of petroleum	29
4.2 Finding oil	31
4.3 Major operation phases of the industry	33

4.3.1 Exploration and production activities	33
4.3.2 Refinery	34
4.3.3 Loading facilities	34
4.3.4 Storage / Terminals	35
4.3.5 Marketing	35
4.3.6 Incidental property	35
4.4 Special hazard of the industry and insured's philosophy	36
4.4.1 Technical risk management	36
4.4.2 Estimated maximum loss (E.M.L.)	37
4.4.3 Deductibles	38
4.4.4 Perils	39
4.4.5 Policy Wordings	39

## **CHAPTER 2 : - MARINE OIL INSURANCE**

1. The Transit Of Oil	41
1.1 Types of loss in oil transit	41
1.2 Main causes of loss in oil transit	50
2. Actual Determination of Oil Loss	57
2.1 Measurement of volume oil loaded	59
2.2 Description of the oil loaded	59
3. Documentation in Oil Shortages /Damages	60
3.1 Load-port	61
3.2 Discharge port	63
4. Basic Insuring Conditions	64
4.1 American Bulk Oil Clauses	65



4.2 Institute Bulk Oil Clauses	65
5. Kinds of Cover Available	66
5.1 I.C.C. All Risks and Institute cargo clause (A)	67
5.2 Bulk oil Clause SP13C	69
6. Claims Settlements	72
6.1 Claims documents required	73
6.2 Claims Adjustments	75

### **CHAPTER 3 : - ONSHORE OIL INSURANCE**

1. General Introductio to Onshore Oil Operation	77
2. Oil Industry Contracts	81
2.1 Contracting parties	81
2.2 Industry contracts	82
2.2.1 Surface lease agreements	83
2.2.2 Operating agreements	85
2.2.3 Drilling contracts	86
3. Major Hazard of the Industry	88
3.1 Well Belowout	88
3.2 Well out of control	90
3.3 Machinery Breakdown	92
3.4 Pollution and Clean-up	93
4. Majors Classes of Onshore Oil Insurance	95
4.1 General introduction	95
4.2 Physical damage insurance	100
4.3 Machinery Breakdown Insurance	105

4.4 Business Interruption Insurance	108
4.5 Third Party Liability Insurance	111
5. Claims Procedures	113

## **CHAPTER 4 : - SUMMARY AND CONCLUSION**

GLOSSARY	133
BIBLIOGRAPHY	137

## LIST OF TABLES AND FIGURES

### TABLES :

1. Insurance Companies Consolidated Balance Sheet  
31st Dec. 1986.....3
2. Imports During 1986-1988 .....8

### FIGURES:

1. Sudan- Location and Oil Field.....5
2. Contractual Framework of Typical Oil  
and Gas Venture .....115
3. Contractual Spheres of Responsibility  
in Typical Oil & Gas Venture .....116
4. Drilling And Production Activities .....117

## APPENDICES

1. Allocation of risk of loss between operator and drilling contractor under IADC Daywork Contract Land (Revised January, 1982).
2. Factors affecting total loss potentials.
3. Institute bulk oil clauses.
4. Bulk oil clauses.
5. How the price of oil affects the insurable risk of loss.

## BRIEF OUTLINE OF SUDAN

### 1. GEOGRAPHICAL LOCATION

Sudan is the largest African state, covering an area of nearly one million square miles (967,500 square miles- 2,505,813 square kilometres). It shares borders with eight neighbouring states Egypt and Libya to the north, Red Sea and Ethiopia to the east, Kenya, Uganda and Zaire to the south, Chad and the Central Africa Republic to the west.

Sudan has a population of about 23.2 million according to the World Bank Atlas.

### 2. INSURANCE MARKET

In these lines, I attempt to highlight, the role of the insurance market in the Sudanese economy. Insurance companies are important financial intermediaries which provide a unique set of financial services. Insurance companies accumulate substantial reserves in the form of premium installments which are in turn invested in a wide range of assets, both real and financial.

*In Sudan*

- At present there are 15 direct insurance companies, 12 of them are privately owned, 2 publically owned, 2 publically owned and one publically and privately owned, out of these 15 companies 10 are transacting general business (marine, fire, car, etc.), one is a life insurance company and 4 are engaged in both life and general business. Two of the 12 privately owned companies

are Islamic insurance companies practicing the profit sharing system. In addition, there is a 52% government controlled reinsurance company (The National Reinsurance Company).

The insurance companies are regulated under the Insurance Control Act of 1960 and the Insurance Amendment Act of 1964. The insurance regulations prescribe that insurers transacting general insurance business should hold 60% of their general insurance fund receipts in the form of post office savings deposits, 30% in either bank deposits or in government securities and 10% in cash. Secondly, every insurer transacting long term insurance business is required to invest 90% of long-term insurance premiums in government securities and/or in the post office savings bank.

قبر  
The insurance fund is composed of net premium installments plus the share of premiums reinsured overseas or locally that the insurer is permitted to retain. This share is normally 90% of life insurance funds, 40% of general and 30% of marine insurance premiums.

The Controller of Insurance has to give consent for the release of amounts deposited in blocked accounts at the post office or the banks.

The investment strategies of insurance companies vary widely in developing countries. In the Sudan, the total assets of those insurance companies for which data is available stood at LS.123.347 million at the end of December 1986.

TABLE (1)  
 INSURANCE COMPANIES CONSOLIDATED BALANCE SHEET  
 31st. Dec. 1986  
 (1\$=12 LS.)

LIABILITIES	(LS.000)	ASSETS	(LS.000)
Paid-up capital	11,606	Mortgages on property	28
Life Insurance Fund	3,599	Private Loans	1,883
Other Insurance Funds	18,565	Government Securities	350
Reserves Fund	11,944	Other Investment	33,125
Claims Admitted but not paid	20,196	O/W. Shares	(6,867)
O/W. Life Insurance	(3,956)	Land & Properties	(20,438)
Other Classes of Insurance	(16,240)	Musharakah	(15,820)
Due to Reinsurance	27,907	Cash Items	21,452
Profit/Loss Account	6,380	O/W. Cash in hand	(11,126)
Other Liabilities	23,150	Deposit Accounts	(10,326)
		Outstanding Premiums	57,031
		Fixed assets	5,138
<b>TOTAL</b>	<b>123,347</b>	<b>TOTAL</b>	<b>123,347</b>

1. Based on 12, of the 15, Insurance companies for which data are available.

The data in TABLE (1) show that investment in land, buildings and properties accounted for LS. 20.4 million or 16.6% of total assets; total share holdings, including shares in the National Reinsurance Company, were LS. 6.9 million; private loans and advances were LS.1.9 million, and government securities, LS. 0.4 million. However, the bulk of insurance companies' assets are held on deposit or for financing short-term credit in the form of outstanding, or overdue, premiums. Post office and bank deposits amounted to LS. 21.5 million, representing 17% of total assets.

Total outstanding premiums amounted to LS. 57.0 million or 46% of total assets, of which approximately 30% were due from government units and 60% from the private sector, (including co-insurance debts and indirect business from ceding companies).

Total premium installments, shown in table (1), have more than doubled during the period 1982 to 1986, increasing by 125% while total claims have risen by 75%. The average ratio of claims to premiums was 75% during the period.

### 3. OIL INDUSTRY

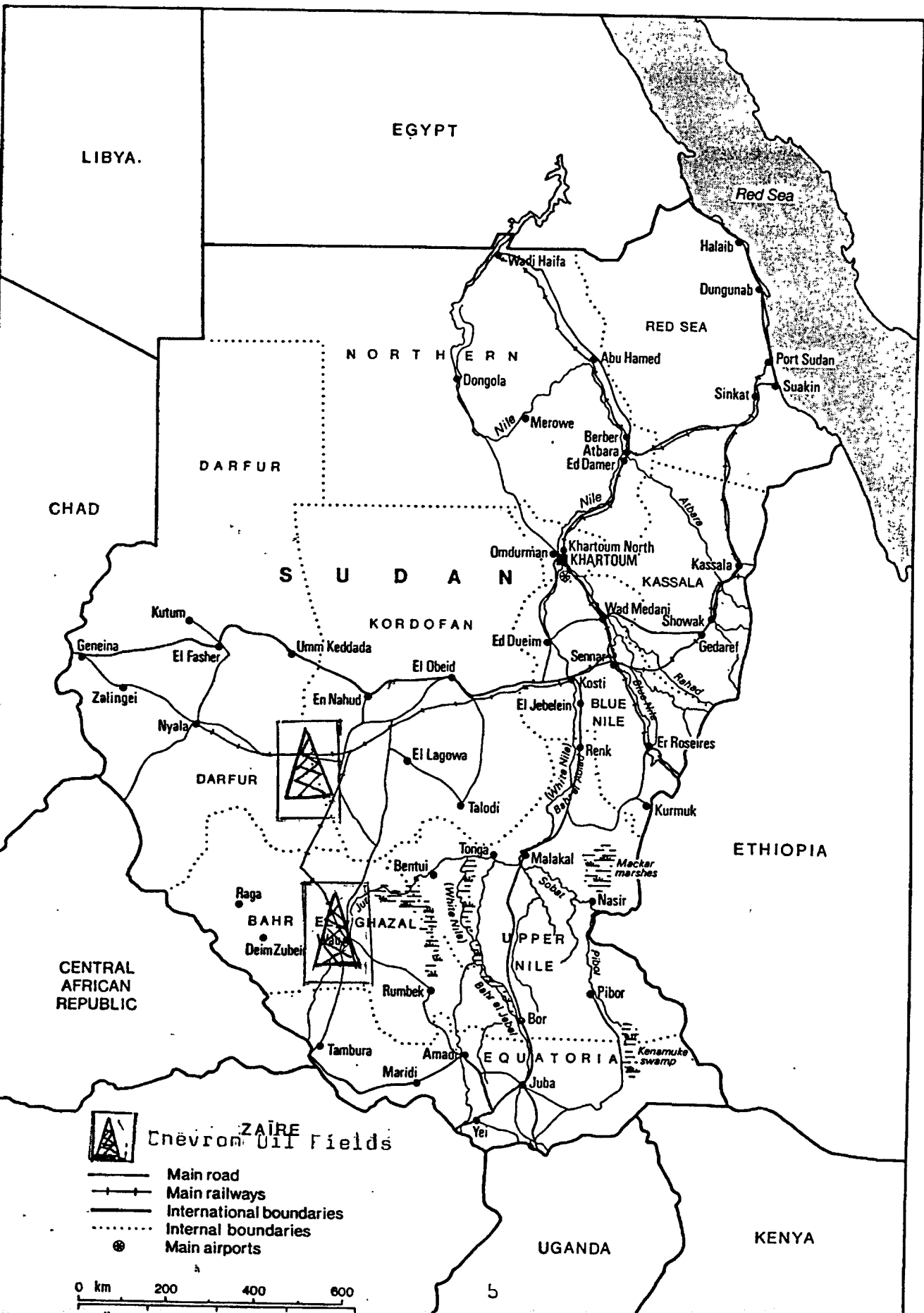
Oil exploration in Sudan began in 1973 and by 1983 a number of international oil companies were active, among them: Standard Oil, Chevron, Phillips, Total, Texas Eastern, Union Texas and Sun Oil.

The extent of Sudan's crude oil and gas reserves is unknown.



FIGURE (I)

**Sudan - LOCATION & OIL FIELDS**



The US company, Chevron, first discovered commercial quantities of oil in August 1980 after three years of exploratory drilling. There are officially estimated to be 844 mn barrels of oil in place in the Unity and Heglig fields with a 28% recovery rate, implying that about 236 mn barrels of proved and probable reserves are available. This could sustain production of 50,000 b/d for more than a decade. Until the project was finally cancelled in 1987 a 1,405 km pipeline of between 22 and 24 inch diameter had been commissioned to transport 50,000 b/d of crude from the production area near Bentiu in Upper Nile Province to Port Sudan. A parallel pipeline was also to be built to carry naphtha to facilitate pumping the crude to the export terminal. The total cost of the project was estimated at nearly \$ 1 bn and it could be completed in two to three years. In February 1984, Chevron withdrew from the Unity field following an attack on their installation.

In the meantime exploration will remain confined to those companies operating in the north, where the French exploration company Total has found major reserves in its concession area adjacent to Chevron. When the Shell and Marathon oil companies bought into the Chevron and Total operations respectively, and other companies began exploration work in the north, it appeared that the government and the oil company were both confident that further reserves would be located in the country. There are signs that the Red Sea could contain significant offshore natural gas reserves.

Unfortunately, the oil industry's interest in Sudan has waned in recent years as other non-Opec production has come on stream.

At present Sudan has only one oil refinery, situated at Port Sudan on the Red Sea coast. It was built by Shell and BP, came on stream in 1964, and has a capacity of 24,000 b/d. In July 1976 the government acquired a half share in the refinery and, in 1978, it also took a 75 percent stake in the local French oil marketing company, Total. Until the end of 1977 petroleum products were almost all carried by train from Port Sudan to Khartoum, but now there is a 1 mn tons/year capacity 800 km oil pipeline between the two cities. The Port-Sudan-Khartoum highway has also considerably eased the problems of oil product supply to the country's cities. Indeed, because of the inefficiencies of Sudan Railways (now being ironed out by a rehabilitation programme), the road carries about 44 percent of the total petroleum products traffic.

Petroleum products continued to account for a high proportion of imports, increasing by LS. 595.2 million in 1988. Petroleum's share of total imports was 22% in 1988, against 19% and 12% in 1987 and 1986, respectively as shown in TABLE (2).

TABLE (2)

## IMPORTS DURING 1986-1988

(VALUE IN LS. MILLIONS)

COMMODITY	1986	1987	1988
Petroleum Products	292.3	497.9	1093.1
Manufactured Goods	481.4	501.0	930.1
Machinery & Equip- ment	405.7	484.9	776.6
Transport Equipment	434.1	368.9	509.3
Chemicals	341.2	248.1	475.8
Wheat & Flour	120.5	199.6	649.1
Tea	71.9	39.8	68.6
Coffee	12.2	4.0	24.7
Sugar	-	52.7	10.3
Other Food	155.5	117.5	172.4
Drinks & Tobacco	14.3	13.6	56.9
Textiles	71.1	84.9	125.9
<b>TOTAL</b>	<b>2400.2</b>	<b>2612.9</b>	<b>4892.8</b>

\* Source:- Bank of Sudan 29th. Annual Report (1988).

## CHAPTER - ONE -

### OIL INSURANCE

#### 1. INTRODUCTION TO OIL INSURANCE

##### 1.1 The Nature Of Crude Oils

Crude Oil is composed largely of just two elements- hydrogen and carbon, which combine to form hydrocarbons. It is of little practical use until it has been refined. These hydrocarbons can range from very simple compounds to very complex ones. They range from very light gases (with a very low melting point when changing from liquid to gas) to very complex tars and waxes which are solid at temperatures usually experienced. All are present in most Crude Oils. The gases dissolve in the liquids as do the solids.

Crudes are generally known by the names of the regions where they are produced and are divided into groups with similar characteristics, which broadly speaking are classified as "light" "medium" and "heavy". The heavy Crudes will, after refining, have a higher proportion of residuals (which become fuel oil and even heavier fractions down to betumen) than the lighter crudes.

For examples:- Arabian "heavy" will produce 52.5% fuel oil, 18% gas oil, 29.5% gasoline etc.. .

- Arabian "light" will produce 43.0% fuel

oil, 21% gas oil, 36% gasoline etc.. .

- Iranian "heavy" will produce 46.0% fuel oil, 20% gas oil, 34.0% gasoline etc.. .

- North Sea crude will produce 38.0% fuel oil, 24% gas oil, 38.0% gasoline etc.. .

Crude oil in bulk can be expressed as a volume or as a weight. Weight and volume are interrelated and vary with temperature. There is no easy way of directly weighing a shipment, therefore, all measurements have to start with volume. Volume varies with temperature,

and the extent of this variation is determined by the density of the oil. This means that two factors have to be accurately measured in addition to the initial volume: a good average temperature and a density and/or specific gravity from a good representative sample.

There are two International systems in use, the Metric system which works from a standard temperature of 15<sup>o</sup> C (59<sup>o</sup> F) and the British/American system which has 60<sup>o</sup> F as its standard temperature. In recent years, new tables have been computed after International co-operation to reconcile the differences.

The features which distinguish the underwriting of oil and petrochemical risks are perhaps, individually, not unique to this class but it is difficult to conceive of another area where these one all present to such a degree. For convenience, I have here grouped them

under four headings: the risk, the buyer, the

portfolio and the market.

## 1.2 The Features Of Risks In Oil Insurance

Oil and petrochemical installation are capital intensive operations combining high-hazard technology with a high concentration of values. The process usually involve highly flammable or explosive substances at high temperatures and pressures, while storage risks include products such as liquefied flammable gases under pressure or under cryogenic conditions. It is clear that small failure of containment of inventory, whether in the process or storage areas, can lead to a serious fire or explosion.

It is probably the rule rather than the exception nowadays to underwrite large risks on the basis of an assumed estimated maximum loss (EML) factor. In many industries, it may be possible to contain the fire and explosion within certain bounds by means of adequate separations or blast protections and to calculate with a degree of confidence an appropriate EML factor. The underwriting of oil and petrochemical risks, however, requires a more sophisticated approach, which takes into account where appropriate, the destruction potential of a build-up of explosive vapours released as a result of even small containment failure.

Vapour clouds can and do drift away from the immediate place of escape and, given the right conditions for

ignition of clouds, result in disastrous explosions

affecting a wide area, without regard to any physical separation within the property insured. The composition of Crude Oil and its variables giving rise to

variety of toxicity, contamination and pollution problems, the levels of those problems are strongly influenced by demographic and socio-economic considerations. The problems associated with availability and affordability of insurance against pollution losses have developed in step with the occurrence and publicity given to major pollution incidents, notably the Minamata Bay mercury poisoning in 1956, the Torrey Canyon oil pollution in 1967, the Santa Barbara oil spill in 1969, Seveso in 1976, Bhopal in 1984 and Exxon Valdez in Alaska in 1989. After each event members of the public, governments and insurers world-wide became more aware of the dangers of environmental impairment. Governments (including those of the European Community through its environmental programme initiated in 1972) have responded mainly by adopting a "polluter pays" approach to pollution control. Through international conventions and national legislation, governments have imposed more stringent loss prevention measures on the producers, stores, transporters, and users of pollutants, introduced strict liability for some types of pollution, and obliged polluters to pay the costs of cleaning-up polluted land and water.

The rating of oil risks is fraught with difficulties: broadly speaking, rating this type of risk is hardly

an exact science, the only way to write oil risks is



from a position of knowledge- knowledge of the process hazards and the particular risk afford. Regular on-site inspections by qualified engineers are essential, together with full disclosure of technical data by placing broker.

Everyone with close experience of energy- related risks knows that underwriting them without complete technical information can be a "recipe for disaster". Another important aspect is the Location of the Risk. Oil installations are increasingly located in remote situations and this tends to increase the cost of repairing or replacing damage equipment, a feature that is all too frequently not given due weight.

Refineries, tank farms and terminals are also often built on alluvial soil or reclaimed land in coastal areas or estuaries. Where this is within an earthquake belt the nature of such ground increases hazard and it is necessary to evaluate the a seismic standards incorporated into design and construction, remembering that in relation to oil, gas and petrochemicals, we are concerned not merely with the structural damage but also the potential fire and explosion from released flammables.

There is one aspect of risk, for the last 3 years has been in the oil industry a very high profile subject, and that is war risk. Since the Iranians and the Iraq is started their current round of Turmoil, there has

been a declared exclusion zone in the Iranian Gulf

declared by Iraqis where all vessels would be legitimate target. There have been vessel hit, not only at the northern port of Bandahoumani, but also at south of Kharge Island. This potential immediate exposure has been a great cause of concern to brokers and underwriters alike.

War and strikes coverage is purchased by all prudent shippers of crude oil and the recent problems in Iranian Gulf had only served to highlight the importance of this coverage. Theft probably was not even considered to be a feasible loss, oil was a very low value commodity and to steal enough to make it a worthwhile operation would probably have caused problems of disposal. However, since then we have seen an increasing number of losses by theft, notably THE SALEM, where effectively a whole tanker full was stolen. Additionally we know of cases of the installation of naughty pipe work to the vessel's bunkers and even the switching of incoming cargoes in tank farms to tanks other than that allegedly being filled, so in recent year theft appeared one of the oil risks.

### 1.3 The Buyers Of Oil Insurance

The buyers of insurance cover on oil consist of giant oil companies, national government enterprises, in addition to oil refining, a large number of smaller independent firms. However in this context, smaller is very much a relative term since a small refinery (eg. 50,000 barrels aday) could account for a total hard ware investment of over one hundred million English

Pounds. It is true that the trend is set by the

larger operator, but whatever their structure, size or ownership status, they all have certain traits in common. They are able to identify the risks and to determine which they will bear themselves and which they will seek to insure. Many companies are extremely wealthy and approach insurance not as a means of protecting valuable assets but only as a means of ensuring that long-term investment planning is not interrupted by unforeseen loss of assets which will require replacing.

The larger operators are often active on a worldwide scale and are able to buy insurance in very many different markets. Being large buyers they are also in a position to seek covers failed to meet their specific requirements. Frequently they have formed an insurance captive which plans and co-ordinates their insurance buying.

It would be misleading to give the impression that the buyers of insurance cover on oil consist entirely of giant oil companies or of national government enterprises. Therefore, private cargo owners (oil traders) and shipowner cover themselves against oil pollution damage to both hull and cargo under insurance written on all risks basis.

#### 1.4 The Portfolio

Measured in terms of the value of assets employed, the oil probably constitute one of the largest fire insurance occupational classes, but this masks the fact that because of a very high concentration of values

per location. The risk distribution is in fact quite

small.

Furthermore, given the size of the Estimated Maximum Loss (EMLS) involved, the ratio of the "single-risk-exposure" to the overall premium base developed is very much worse than in industries with smaller units. This inherent imbalance means that the result of the account are likely to fluctuate widely from year to year and this in turn calls for a somewhat different underwriting philosophy from that needed for the writing of a broad-mix industrial fire account. With the latter, one relies mainly upon a balance between types of risk combined with a geographic spread- to even out the overall result. On the other hand, with a single class account, the scope for a balanced mix risks is obviously much more limited and a geographic spread, useful though it may be for other reason (e.g. climatic, economic, political etc.) does nothing to relieve the main problem which stems from the small number of risks in the account.

Any underwriter, however broadly-based his account, needs to pay attention to the risk of a catastrophe. By this the event which falls outside the range of events normally contemplated when formulating an underwriting policy. An underwriter whose account is inherently imbalanced and the results of which fluctuate year by year between two extremes of surpluses of embarrassing size and deficits of equally devastating proportions, lives with the spectres of catastrophe in his daily work. He must aim to judicious use of excess of loss reinsurance and always remember that

every premium charged should have within it a catastro-

ophe- risk element. He must also be capable of taking along view, resisting demands for rate reductions when the account is, in the short term, in profit but equally resisting the temptation to over-react the other way when result are not so good.

The rating of oil and petrochemical risks is fraught with difficulties inherent in the characteristics of the class. In the first place, there is a complete lack of statistical homogeneity in the portfolio. There are so many variable that no two risks can ever be identical. Even if the plants are of indential design, layout, construction, throughout, fire, protection, etc.. there can be subtle differences stemming from their location e.g. orientation, topography and geology. Above all there is the importance of management, which is perhaps of greater consequence than all the physical features combined.

Furthermore, even if one had a number of statistically homogeneous groups, it is probable that these would not be large enough to enable one to draw valid conclusions in the short term. It would be necessary to monitor the results over a lengthy period to achieve acceptable statistics. Unfortunately, the pace of technological advance in the industry is such that this is not really feasible since iteself constantly introduces further variables.

The lack of reliable statistics makes the compilation of any tarrif or rating manual very difficult and if this is so far an insurer writing a substantial volume

of the class worldwide, it is obviously even more

difficult for a small domestic market which may have only one or two such risks.

Most insurers and reinsurers who have specialised in this class have developed a point system which in-corporates all the relevant physical features but which leaves the fine-tuning to experienced under-writers assisted by qualified engineers who are able to gauge the quality of the management. It is probably truer in this class than in any other that "Selection" (in the sense of which risk to accept and which to decline) will have a greater bearing upon the ultimate success or otherwise of the underwriting than the accuracy, within a few percentage points of the bench-mark, of the rate charged.

## 2. OIL INSURANCE MARKET

### 2.1 The Features Of The Market

For many years Crude Oil has been insured in the World's Insurance Markets. Many of the major oil companies (headed by so called "seven sisters"). They consist of Exxon, Royal Dutch/Shell, Mobil, standard oil of California, Texaco, Gulf Oil, and British petroleum) have tended to rely upon their captive insurance companies which have been content to run the ordinary day to day losses but have sought the facilities of the traditional insurance market for the purposes of reducing potential losses of a catastrophic nature. However considerable quantities of Crude Oil are also insured in the traditional market because of sale and purchase transactions by parties other than the major companies.

With the rapid insurance in the price of oil in 1973

small losses soon became very significant in monetary terms and in the case of shortage the sums involved became items which had to be taken into account by an oil company or an independent operator.

At the same time there was growth in the number of independent companies engaged in the movement and sale of oil, these parties naturally had different interests during the movement of oil than the interests of the major oil companies who had previously been buying and selling oil amongst themselves frequently to and from their own subsidiary companies where a loss of oil carried on a vessel could be adjusted by a financial transfer between group companies rather than resort to an insurance claim.

The World thus began to feel the effects of the rise in oil prices and the oil industry became more concerned in recouping losses. The coincidence of the use of VLCC'S and ULCC'S with their much larger cargo-carrying capacity, where small mistake in measurement could multiply into very large monetary sum only served to magnify the problem.

The market for oil is truly became international. While at first sight many national markets appear to handle all their own domestic business, it will be found on closer acquaintance that substantial reinsurances spread the load around the World, both on the treaties and by facultative placings.

Given the size of the risks and the EML'S involved and also the sophistication on the buyers. It is not surprising to find that a great deal of specialisation and polarisation has occurred in the market.

The position today is that a small number of relatively large operations, both of direct insurers and of professional reinsurers, have achieved commanding positions, having developed the capacity and expertise to provide a lead in a difficult class and collectively handle a major share of the available business. Even in these days of market over-capacity it is rare for a very large risk to be placed without the support of one or more of these insurers.

The emergence of a small number of large units in the broking World is well-known but what is perhaps less appreciated is the extent to which brokers handling a fair volume of oil insurance have themselves developed separate divisions for the purpose, mirroring the development of specialist insurers.

## 2.2 Marine Insurance Market

From historical origins, the market is basically in two principal sectors, the marine and non-marine, with both LLOYD'S underwriters and insurance companies participating in each sector. In recent times, the divisions between the sectors have become blurred, but the die-hard habits of certain sector underwriters remain. For example, marine underwriters very often deal only with hull insurance. Cargo is left to others and unless the cargo has political significance, as for example oil in the Arabian Gulf.

The Marine Market, covers hulls and cargo, but there are various ways in which the liabilities can be



covered.

In some cases there are specialist areas of market which deal with these covers and in others, a form of self-insurance also exists. For example, hull owners provide their own protection in the form of mutual aid known as "protection and indemnity" or "P&I Club".

This is done because the capacity of certain sectors of the market may not be large enough to give adequate protection against the consequences of a major disaster. The sums of money/ or potential loss are enormous.

Whereas the marine market will not provide demurrage cover, it is often possible for charterer or cargo-owner to obtain demurrage protection through a P&I Club.

In some cases composite companies may include overall protection of various facets of the insurable interest scene in a general package.

### 2.3 Non-marine Market

The non-marine market will provide cover for the on-shore properties and also the accidental financial loss which can be described better as business interruption or consequential loss or even loss of profits insurance cover, depending on your nationality and experience.

The material damage cover provided normally gives protection against fire, explosion, earthquake and what is known as extended perils. However, following

modern trends some covers may be provided on an all risks basis, which has certain significant differences for both insurers and insured.

A change in emphasis arises from the conversion from "named peril" cover to all risks cover. When the former type of cover is provided, insurers' liability arises as soon as the operation of a named peril is confirmed. All risks covers all risks, but with listed exceptions or exclusions.

Business interruption cover normally means protection against the inability to earn net profit and basic overheads, but such protection is dependent upon there having been insured-material damage loss preceding it, and the two must be connected directly.

#### 2.4 IOI Association

International Oil Insurers (IOI) is an association of insurers who have voluntarily agreed to underwrite oil and petrochemical insurances (IOI's Scope of operations is for the present limited to material damage and consequential loss covers in respect of oil, gas and petrochemical plants World-wide (excluding USA) ), on a pooled basis through a central body. Membership by individual subscribers is organized through national pools.

When it was formed IOI consisted of 20 insurers in two national pools, one in the UK the other in France. Five years on, there are now 35 insurers overall insurers overall, with a Norwegian pool bringing the

national make-up to three. In each case the membership reflects a good cross section of the national market: For example, all the large composites one members of the UK pool which also includes small and medium-size companies and, as one entity, a grouping of 27 important LLOYD'S syndicates. Taken in the context of a World-wide market, and with oil insurance this is truer than any other class except marine and aviation, IOI is by no means a monopoly. Its aim is to underwrite knowledgeably and economically; to combine expertise with capacity; to meet as far as possible the specific need of the insured, and to inject into the market a measure of stability without destroying competition.

International oil insurers never insure risks "blindly" and hence engages facultative schemes rather than treaty. The extent to which risks find their way to the facultative reinsurance market depends largely on where they are located. In Western Europe direct writing insurers have extensive facilities already at their disposal automatically, and so will not want much facultative aid.

IOI was welcomed as a specialized market, that should promote stability and conditions conducive to the achievement of underwriting profit, the building up of reserves and, in the longer term, the development of capacity to keep pace with the immense investment in the oil and petrochemical industries. It could be argued that the narrowing of the market through the emergence of a small number of large underwriting

units tends to reduce competitions. There is as yet no evidence of this, perhaps because of the counterbalancing muscle developed by large broking houses and the fact that in this specialized field the insured themselves are very powerful. It has also been argued that, by and large, a small number of larger underwriting units develop less capacity than a correspondingly large number of smaller units. It is probably true, for example, that the capacity that could be generated in the aggregate, by each of the subscribers in IOI, with the full use of their treaty facilities, would exceed the capacity of IOI, as a separate organisation.

### 3. INTRODUCTION TO MARINE OIL INSURANCE

#### 3.1 Marine Cargo Insurance

Marine Insurance is a legal relationship created by a contract where-under one party (The Insurer) in consideration of a promise by the other party (The Insured) to pay a premium, undertakes to make good the loss of an interest in a carriage venture caused during such venture by an agreed circumstance. Marine policies cover the property or interest insured against perils of the sea such as bad weather, stranding, collision, fire seizure and the like.

There are three main classes of interest, the ship, which includes hull and machinery of the ship, the cargo, and the freight which is the charterer fee or charge for transporting goods.

Hull policies are usually issued for a period of twelve months and cover certain liabilities in addition to damage to the ship. Cargo is often insured on an all risks basis and can be covered for period of the voyage, from warehouse of departure to warehouse of arrival, or on an "open cover" basis which is continuously available to a shipper of goods on pre-arranged terms.

Freight is insured by shipowners if it is at their risk, and is included in the value of the cargo if it has been pre paid.

Cargo insurance may be regarded as one of the oldest forms of insurance where cargo owners insured the success of the venture in a coffee house in the city of London, 250 years ago, where the losses of the few were spread amongst the many. When we talk about the marine perils insured by both the oil company and the oil trader this is still true today. The only thing that is really changed is the type of vessel and the type of cargo. This pure form of marine insurance has stood for so long the test of time. Insurance is designed to spread the risk, the very real risk of the perils of the sea, and acts of war are by and large beyond the control of the cargo owner and the basis of spreading these unforeseeable losses amongst the many will continue.

With the ever-increasing World-wide demanded for petroleum and its products, transportation of oil by sea has become a vital part of the industry, and it is here that the bulk oil carrier- or tanker, has assumed such immense importance, not only to the oil industry,

but to the World's shipping industry as a whole.

### 3.2 Main Clients Of Oil Cargoes

With oil cargo there are basically two types of client with two distinct and separate requirements. The first being the oil company, who is transporting its own oil probably in its own vessel to its own terminal for refining. The other type of client is the oil trader to whom the transportation of oil is primarily a financial transaction, in simple terms buying a cargo, delivered to the customer at a profit.

Major oil companies, their basic requirements are to protect their assets and their main concern is to get their cargo to destination safely and intact. Their concern is mainly with catastrophe coverage and the perils of the sea. Generally speaking they are not concerned with paper differentials between loaded and landed quantities. Their requirements may be catered for by the coverage afforded by the bulk oil clauses. This form of coverage would reimburse the assured for losses primarily following an accident to the conveying vessel, although there are various other aspects to this clause. This form of coverage is available at very competitive prices due to the large volume involved, in most of the major markets of the World. The two principal markets being New York and London, the London market being in all forms of oil insurance, the most prominent.

Oil trader, his requirements are vastly different. Although the oil trader requires to protect his

assets, as the oil company does, in the broking of cargo risks for the trader there is an additional and very important element and that is the requirement of the financing bank. Oil cargoes when traded are bought and sold generally by letter of credit and the issuing banks require to see that letter of credit is adequately protected by insurance and as well as requiring the cargo to be insured for catastrophe risks and perils of the sea, they also require that the outturn of the cargo is guaranteed in terms of quality and quantity to the buyer, thereby providing adequate guarantees to the bank for the letter of credit. This additional form of coverage is known under the general heading of guaranteed outturn. This extension to coverage provides for reimbursement by insurers for irrespective of the fact there has been no casualty at sea, no notable foruity and that cause of such differentials cannot be pinpointed. This coverage when first developed was a major departure from accepted forms of marine insurance and was a classic example of the flexibility of insurance market to develop products to meet the changing face the international trade. Without the benefit of guaranteed outturn coverage, it would be true to say that many traders could not operate and that they would not be able to provide sufficient insurance to the issuing banks to safe-guard the letter of credit.

### 3.3 Major Factors Of Marine Oil Insurance

The broker having fulfilled his prime duty of ensuring that his client is adequately protected in a manner

that allows them to fulfill their obligations in the accepted manner of their trade, we now come to price, which is premium charged for these services determination of this premium depend on the following factors: As I have already stated, the basic coverage is perils of the sea and the major governing facet of this exposure is the quality of the conveying vessel. It is universally accepted that the maritime perils of shipping oil on a brand new tanker in the ownership of a well-established, well managed, well-run company is a different risk from a cargo of oil shipped in a 20 years old liberian rust bucket. These factors will be taken into account by the prudent underwriters, especially at a time of tanker over-capacity when reasonable tonnage is fairly readily available. In other words, as a general principles, if the charterer charters cheap tonnage this will reflect in the price he pays for insurance. Another governing factor is the pattern of trade, and the company shipping oil from shipment terminals in the caribbean to U.S. Gulf coast ports, would actually expected to pay somewhat less for their marine exposures than vessels that one transporting oil half way around the World, all other factors being equal.

As for the premium charged for guaranteed outturn coverage this is governed primarily by the loss experience of the assured. The worse the experience i.e. the assured consistently claiming shortage on every shipment in excess of the  $\frac{1}{2}$  of 1%, the higher the rate and obviously the converse is true. After a period of time this develops somewhat into a dollar-swapping



operation between the assured and the underwriters.

The final governing factor is the skill and experience of the broker negotiating with underwriters on behalf of the assured. It is the broker's responsibility to investigate the markets for the best possible deal for the client, and for him to be capable of doing this he must have intimate knowledge of not only the London or New York market, which may be his main base of operation, but also the other available market of the World.

#### 4. INTRODUCTION TO ONSHORE OIL INSURANCE

##### 4.1 Origin Of Petroleum

The origin of oil gave rise for many years to acute controversy and to several fantastic theories, and even today agreement does not go much beyond general acceptance of the view that original source material was organic in nature. The type of organic material cannot be stated with certainty but there is little doubt in minds of most geologists nowadays that it consisted of the bodies of lowly marine animal organism and possibly marine plant life as well, which dropped to sea-bottom and were rapidly buried by the deposition on top of them of fine-grained material such as mud and lime.

The subsequent process by which the source material was converted to petroleum are still, to a large extent, a matter of conjecture. One obvious theory is

that the oil has been "disfilled" from the organic matter by the action of heat and pressure and, indeed, general forms of "petroleum" have been so made in the laboratory under temperatures and pressures whose existence in the crust of the earth is not dispute. Another view, taking advantage of the fact that the geological calender runs into hundreds of millions of years, assigns much of the responsibility for the transformation to "time" almost irrespective of temperature and pressure conditions. Unfortunately, this cannot be investigated in the laboratory. A third view is that the change took place, possibly even at temperatures and pressures approaching atmospheric, because the source material was entombed under stagnant condition in which annerobic decomposition (incomplete, breakdown in the absence of oxygen) was promoted by some catalyst or agent of the bacteria or virus type. Such stagnant conditions are known in several places in the seas and lagoons of the present day. The Black Sea being a notable example and the pressure of support their existance gives to third view is probably responsible for the fact that it is more widely believed than other explanations.

Since the rocks which go to make up on oil field were formed in some kind of sea, lagon or lake, all the space between the solid mineral grains were filled with liquid. The case of the "Source rock" the organic material was these also and, as that material was converted into petroleum finely disseminated throughout the rock, the newly generated fluid, lighter than water, would tend to more laterally or upword through

the more permeable layers and to accumulate, displacing the heavier water as it went. This lateral or upward movement, aided by compression of the source rock as it was more and more deeply buried, would continue so long as paths, however minute, were available. In the course of its migration, the oil might traverse several successive layers of rock before finishing up in the permeable and porous layer or rock seated against some impermeable layer or cap-rocks possible for from its birth place.

#### 4.2 Finding Oil

In the process of trying to find oil, the usual procedure is to make a preliminary examination of such evidence as may be found on the surface in the areas concerned, to explore further by means of mapping some other form of geological or geophysical survey and, finally to test selected spots by actual drilling.

Drilling one well alone cannot indicate the extent of an oil accumulation and it will be necessary to drill several carefully located wells to find this out as soon as possible. It is desirable at a very early stage to get some idea of the quantity of oil (and gas) which is recoverable, so that the proper size and type of surface production plant can be obtained and installed. The characteristic of the oil itself must be determined from properly taken sample of the oil as it exists in the reservoir, since the method of raising the oil to the surface and handling it thereafter will depend very largely on the nature of the oil and

its associated gas. The crude may range from a very heavy viscous oil, almost a tar, with little or no gas dissolved in it and under very low pressures, down to an extremely light, straw coloured oil with a very considerable volume of gas, known as a condensate type crude. This is quite likely to be found at great depth and, under the conditions of high pressure and temperature which exist at these depths, is usually in gaseous phase.

Thick viscous oil will almost certainly have to be pumped to the surface and possibly will need some additional stimulus in the form of heat to keep it fluid enough, while the condensate, under high pressure initially and possessing very considerable potential energy, will flow very readily even from the great depths at which such accumulations usually occur. Between these extremes, there is an infinite variety of crude oils and the appropriate way of producing them can only be decided after observing their character and physical attributes.

Oil has to be brought to the surface from out of the spaces which it occupies in the reservoir rock. There are various ways of accomplishing this, depending on the kind of oil and what potential energy it possess by virtue of its initial pressure in the reservoir and the amount of dissolved gas it may contain. In many cases the crude may have sufficient potential energy to permit a well to flow worthwhile quantities of oil to the surface without any artificial assistance. This state of affair may continue for many years, which is

universally the case in the Middle East fields, or more usually for only a few days, or weeks, or months, until the pressure in the reservoir has decreased, as a result of taking out the oil, to the point where the well can no longer flow unaided.

#### 4.3 Major Operation Phases Of The Industry

Not all oil companies are involved with the complete range of activities encompassed within the hydrocarbon industry. However, set out below is a brief description of the various onshore operational phases for which insurance may be necessary.

##### 4.3.1 Exploration And production Activities

Exploration activities are conducted both on and off-shore and, once the initial geological studies have been carried out, involve the drilling of exploratory wells.

Normally, the only equipment which is insured, are the drilling rigs which onshore are of comparatively minor value. Because of the additional cover usually required such as seepage and pollution and associated third party liability, the physical risk of onshore rigs normally insured in the marine market.

Production fields can comprise both crude oil and natural gas wells, in addition to the wellhead equipment, there will be gathering centre installations, booster stations and pipeline, with possibly some intermediate

storage tanks.

#### 4.3.2 Refinery

Refinery operations range from basic crude oil cracking activities through to production of the more complex downstream products which would include incidental LPG.

The values of the various production units can be substantial, but there will also be important items such as control rooms, Administration buildings, workers' facilities, warehouse buildings, utilities, including power supplies, and tankage together with the stored product.

#### 4.3.3 Loading Facilities

All the above operation will include loading facilities such as Road tanker bays or Railway wagon sidings. The other category of loading/unloading operations which merits special considerations and may be either immediately on-site or some distance away are harbour facilities (including storage). These comprise jetties or piers at the shoreline and single buoy mooring some miles out to sea, including the connecting pipelines.

These items are generally included under non-marine policies as part of an insured's property.

#### 4.3.4 Storage/ Terminals

In addition to storage facilities I have mentioned within the various manufacturing areas; many companies will also have important storage capacity off-site. There are major oil terminals around the World where individual companies can either lease or own storage capacity, one example of these is the PAKTAK complex at ROTTERDAM.

#### 4.3.5 Marketing

The multi-national companies will have Worldwide distribution outlets, both wholesale and retail, an important example of this activity being the petrol service stations. These properties will generally be insured by the company's own captive insurer where available, but certain of the smaller companies will also provide these distribution facilities and this activity must be recognized for insurance purposes.

#### 4.3.6 Incidental Property

Onsite ancillary property and equipment has already been mentioned under the above headings. A further important investment for most clients will be firstly the offices comprising their corporate headquarters which are generally sited in expensive major cities and secondly, important regional offices in many capitals around the World.

One other particular facet of the Hydrocarbon industry

is obviously the remote location of many of their activities. Consequently such areas need to establish "base camps" to provide housing and amenities for personnel, these can be sophisticated townships with correspondingly high investment.

#### 4.4 Special Hazard Of The Industry And Insured's Philosophy

Because of the special hazards that exist in the hydrocarbon industry, major brokers have created specialist departments to relate to the oil companies and their potential insurers.

##### 4.4.1 Technical Risk Management

Different hazards obviously exist in the various operations enumerated in major operation phases of the industry. It is necessary to quantify the nature and extent of the risk of loss and damage to which each type of property can be exposed in order to determine the extent to which these risks and the consequence therefore can and should be insured.

Risk management is essential in today's oil industry. As an emerging science, risk management may very well prove to be valuable as many of the technological discoveries that have improved the quality of drilling and servicing over past years.

To write oil risks need regular on-site inspections by qualified engineers, together with full disclosure of technical data by the placing broker.



An accurate asset valuation system is material to any risk management exercise. There are a number of well established indices for the industry such as Engineering News Registry (E.N.R.) in the U.S.A., which have historically been used by insured to maintain up-to-date replacement values. As brokers, do not offer their services for re-valuation exercises since this important function should be carried out by one of the known independent, professional firms, who will carry their own relevant professional indemnity cover.

#### 4.4.2 Estimated Maximum Loss (E.M.L.)

The concept of the estimated maximum loss is particularly important in non-marine oil and petrochemical insurance. Underwriter will generally consider the EML to be more significant than the sum insured. Some will not wish to cover the full value, but only up to a limit of liability.

EML could be defined as "the likely maximum estimated loss that could be sustained in single fire and for explosion incident following an evaluation of hardware, software and fire fighting facilities". The evaluation is performed by applying weighting factors to various headings within these three categories.

It is possible that, under certain catastrophic conditions, a much higher loss could occur, even if its probability is almost negligible. In the oil and petrochemical industry, the most relevant condition is an Unconfined Vapour Cloud Explosion (UVCE).

The definition of a UNCE is "an explosion caused by the rapid release of a large quantity of flammable vaporising liquid or high pressure gas mixing with air to form a flammable mixture which ignites at the periphery causing a fire and increased convective mixing of the flammable vapour and air causing the fire to develop into an explosion". An underwriter will normally take this into account in addition to fire/explosion EML.

#### 4.4.3 Deductibles

Having considered their maximum exposures, an oil company will also have to consider the amount it can retain on any loss. Large companies, particularly the multi-nationals and state-owned companies, will often be prepared to self-insure a substantial amount. This will be normally be achieved by the acceptance of a deductible an amount that will be deducted from each and every loss.

An insured will wish to choose its deductible in the light of the premium credit that underwriters are prepared to give as well as its own financial resources.

#### 4.4.4 Perils

Having established a deductible, an oil company will have to take a decision on the perils to be insured. A large company will probably not wish to insure against perils such as burst pipes and impact by road-vehicles where the estimated maximum loss following

such perils could be less than their chosen deductible. They will probably select "full fire and explosion" cover to protect themselves against the most likely causes of large loss (the World "Full" indicates the elimination of all the exclusion otherwise applicable such as earthquake, fire, except for the mandatory "war risk/nuclear "exclusion).

A large company may also select certain perils which have particular application to their own operations, such as impact to jetties. If they operate in earthquake areas, they may include the peril of earthquake or seaquake shock in respect to those areas. Alternatively, the company may select "all risks" cover in the knowledge that the deductible will effectively exclude certain non-catastrophic perils. The smaller, independent company frequently decides to insure for a full range of perils including those described adequately. Such extended coverage could comprise storm and tempest, typhoon hurricane and cyclone, riot, strike and malicious damage etc. .

#### 4.4.5 Policy Wordings

There are no officially approved "Standard Policy Wordings", for non-marine insurance of the hydrocarbon industry, since the broker would be expected to negotiate an individual tailor-made policy to suit the oil company's requirements.

Nevertheless such individual policies have to have a basis for discussion and examples of basic wordings are included as Appendices later in this project.

## CHAPTER TWO

### MARINE OIL INSURANCE

At the very beginning of the oil era, its product packed in barrel, were shipped in ordinary cargo vessel, it was soon realized that pumpable liquid lent themselves to carriage in the hull of a ship.

The first vessel to carry a cargo of oil was the motor ship **VANDERLAND** in 1872. This ship was a modified general cargo ship and, therefore, cannot be fully classified as the first real tanker. This prize of the first tanker fell to the vessel **GILUCKAUF** which was trading in the later end of the 19th century, now no other form of seagoing vessel is used for any normal movement of oil, and tankers represent a fifth of total merchant tonnage of the the World.

Basically the insurance of oil cargoes and the requirements on the broker are no different from that any other cargo, in that the prudent broker adopting the the basic principles will ascertain the needs and the exposures of his client and will then advise the coverage required and then will obtain the best possible deal in the market places of the world with total regard to coverage available, price to be paid and probably the most important facet, claims payments.

The duty of procuring cargo insurance depends on the terms of the contract of sales.

Only CIF contract that the procurement of cargo insurance falls upon the seller. Besides this the buyer has to procure an insurance covers by himself.

## 1. THE TRANSIT OF OIL

Carriage of goods by sea has always played an important role in International Trade. It is still the cheapest and most convenient mode of carriage between two countries or geographical regions.

### 1.1 Types Of Loss In Oil Transit

Before one can consider or discuss a hydrocarbon fluid one must consider the meaning of each of the parameters that are more normally discussed or used when considering the problems related to the carriage of a hydrocarbon. These parameters are to set out in page ( ) in the form of a glossary.

Hydrocarbon cargoes predominately stem from crude oil and may be set out according to their densities are as follows:

- 1) Propane (C3) - gas
- 2) Butane (C4) - gas
- 3) Gas condensate (debutanised) (majority C5)- liquid  
- from gas source (LNG)
- 4) Naphtha
- 5) Avgas, Mogas
- 6) Kerosene, including Jet A-1 (ATK), Dual purpose  
Kero and Burning Kero.
- 7) Gas Oil, including DERV

- 8) Marine Diesel Oil
- 9) Fuel Oil- No 6
- 10) Vacuum Resid and Vis Breaker Fuel. (Density some-  
times in excess of 1).

This project cannot cover every aspect of the carriage of the above mentioned cargoes due to the infinite permutation and combinations that may happen to a particular cargo or a particularly designed ship between two particular ports, however, an attempt will be to discuss a transit of crude oil on the proposed 80 000 ton vessel between two fictitious ports in the hope some of the problems encountered may be recognised and discussed.

The motor tanker SILLARA of 80000 tons arrives at her load port in a ballast condition, but according to the vessel's personnel in a fit state to load a full cargo of crude oil. The proposed crude oil is described as being a medium crude, with an API gravity of 32 and a pour point of 60 F. The BS&W of this cargo is declared as being 0.1% and the vessel's characterers have ordered the vessel to carry this cargo to Greenland via the Cape of Good Hope. The vessel is to load this cargo at a temperature of 70 F and thereafter to heat the cargo during the transit to a temperature of at least 85 F and perferably 90 F prior to discharge.

Upon arriving along-side at her load port, it was discovered that the vessel had crude oil washed during the discharge of her previous cargo and that no slops

were present on board from any subsequent washing "crude oil washing is the use of crude oil, that being the vessel's cargo' to wash the tanks in which it is being carried during the discharge programme to avoid excessive, or indeed any if carried out efficiently residues remaining on board upon completion of the discharged".

With the vessel alongside at her load port, the short pipeline system is connected to the vessel's manifold and three lines have been supplied. Prior to commencement of loading of the crude oil cargo the chief officer is requested for notification of his desired rate for the main bulk loading programme. On this particular occasion the chief officer has requested a rate of 7000 tons an hour. The crude oil is to be measured on board to determine the delivered quantity by the use of flow meters.

Immediately on berthing, after a brief inspection of the water ballast as to its cleanliness, the vessel would have been given permission to commence the discharge of her ballast overboard. During this period of discharge of the ballast, shore personnel would have been preparing the cargo ready for loading and "proving" the flow meters to obtain the necessary meter factor to drive the volume delivered by that meter. For a delivery rate of the requested 7000 tons per hour it is likely that about five flow meters would have to be prepared, assuming a flow rate through the meter of some 10,000 BBLS per hour.

Having successfully discharged her ballast, the vessel should then be inspected to determine suitability of the vessel's tanks for the receipt of the cargo. This would entail an inspection of the vessel and sounding for any residues in the vessel's tanks which may then be quantified under the title of OBO (on board quantity).

Clearance for loading is then given and this is normally started at a very low rate until the chief officer is satisfied that the crude oil is going into the designated tanks and not into other system or, overboarded via leaking valves and sea valves. The loading procedure for a vessel is normally staggered such that the forward tanks are loaded first and topping procedure commence from forward to aft. It is worthwhile recalling with respect to the safety of the vessel for trim, etc.,. That the chief officer would have carried out certain calculations prior to arriving at load port to check the distribution of the cargo with respect to stress, bending moments and trim in order that the vessel may be safe in a sea way carrying the cargo. These calculations are normally carried out on what is called "Loadicator" supplied by the classification society of the vessel.

Having completed this loading programme, which includes the utilisation of the vessel's slop tanks and loading on top of any residue that may be contained therein, as well as in the vessel's main cargo tanks, the cargo is measured on board the vessel. This procedure is carried out by ullaging



(the distance between the known datum point and the top surface of the fluid), the ascertaining of the temperature in each of the vessel's cargo tanks, the sounding using water reactive paste to discover the presence of free water, and final reading of the actual drafts as distinct from those determined from vessel's loadicator.

Having quantified the cargo present on board the vessel as a net and also gross volume at a standard temperature of 60 F, and its equivalent tonnage, a bill of lading would be presented to the vessel which is derived from the addition of the difference between the opening and closing meter readings for the meters. The bill of lading is handed to the master for his signature and copies of same, together with the certificate of origin, certificate of quantity, certificate of quality and manifest, are left with the master as ship's documents. These are to be handed to, normally, the receivers representative at the discharge port upon the vessel's arrival. In addition to the above mentioned documents samples of the cargo are also given to the master for handing to the receiver to that any dispute as to the quality of the cargo can be checked. Having satisfactorily completed the documentation on board and the master satisfied that the bill of lading does represent the cargo received on board after application of the vessel's experience factor to the vessel's figure and equating same to bill of lading tonnage or volume then the vessel will sail.

The MT SILLARA departs from her load port and within

five days of departure encounters heavy weather. This continues for a period of some days, and 30 days after departure from her load ports she arrives at her discharge port in Green Land. A part from the heavy weather in transit, the ambient temperatures and the external environment to the vessel's cargo tanks has changed from cool to hot and back to cold. As the vessel has been fully loaded and due to the extended period of heavy weather, little or no work could have been carried out on deck as tankers in a loaded condition do have a reduced free board (The distance between the deck and the water line) which normally causes the environment on deck to be somewhat hazardous to any working. Furthermore, due to the danger i.e gaseous nature of the cargo, maintenance work may not be carried out for fear of spark and/or explosion. This is stated albeit that the vessel does maintain an inter gas blanket in the void space or ullage space above her cargo.

Upon the vessel's arrival, the cargo on board is yet again quantified using the same techniques as carried out upon completion of loading. It is determined as a result of the calculations carried out by representatives on board the vessel that an in-transit loss of cargo amounting to 0.8% by volume has occurred. As a result of this apparent in-transit loss, the master is presented with a letter of protest from the receiver's representatives.

Samples of the cargo on board the vessel may, or may not be obtained but the former is more likely. These, together with the documents delivered on completion of

loading, are removed to shore into the receivers. Completing the above mentioned formalities and ascertaining that the cargo does, in fact, meet the required temperature of 90 F shore pipelines are connected to the vessel's manifold and the discharge of the cargo commences.

The receivers of the cargo who have agreed with charterers of the vessel that crude oil washing is not necessary on this particular discharge, allow the vessel to continue her discharge which she does and maintains for approximately two-thirds of the discharge the required charter-party pressure at her main-fold. Towards the end of the discharge problems begin to occur where the chief officer is noting that he is unable to drain the vessel's tanks to the normal standards that he would have expected. The pump man advise the chief officer that the tanks contain a hard or sludgy material in the bottom and that even with the educator system going drainage is very slow. However, the chief officer continues the discharge without interrupting same as is required of him and upon completion of the discharge he has drained the tanks as best as possible on the premise that time is of an essence and delays are not to be incurred. The discharge is completed and the chief officer invites shore representatives on board the vessel in order to inspect the vessel's tanks and issue the necessary dry tank certificate. On quantifying the volume remaining in the vessel's tanks by a single sounding from the calibration point or the ullage hatch on each vessel's tanks, the receivers representative calculates, after

trim correcting the sounding, that the vessel has some 3,000 BBLs of residue remaining on board. Clearly the receiver is not amused. Not only has he apparently lost cargo during the transit of the crude from the load port out now he has also lost further volume as a result of the vessel being unable to pump all the cargo ashore. A suitable letter of protest is again issued to the vessel and the master, having discussed the circumstances with the chief officer, raises his hands in the air and says "what can I do ?" .

In this particular port the land tanks are calibrated in Cu.meters and, therefore, the metric method of calculation to the datum temperature of 15 C is utilised. Upon completion of the discharge the same procedure with respect to quantification of the cargo is carried out on the land tanks and thereafter the opening volume at standard temperature to drive a delivered volume. Clearly, as this volume is at 15 C it is not directly compatible with that calculated on board the vessel which was derived at 60 F and, furthermore, cannot be compared due to inaccuracies resulting in the vessel's experience factor. Upon completion of the receipt of the cargo onshore, it is discovered that there is a further 100 M3 discrepancy between the ship and shore but this is assumed to be inaccuracies inherent within the measurement system, potential pipeline losses, and within the vessel's experience factor. However, a total loss of cargo against the bill of lading volume equalling 8229 BBLs is registered and this loss is equivalent to 1.42% of the bill of lading volume. The necessary insurance

claim is submitted.

From the above clearly certain things happen on this voyage which may be considered typical of the circumstances that may be encountered in the carriage of crude oil. From the outset a 1.42% loss cannot seem to be acceptable under any circumstances. However, looking closer at the areas of loss they must be sub-divided as follows:-

- 1- In-Transit Loss 0.8% = 4,600 BBLs
- 2- Rob Loss (Retained on board) = 3,000 BBLs
- 3- Ship/ Shore measurement loss = 629 BBLs

The above three mentioned loss fall, clearly, into two areas of causation ignoring a third cause, that is the theft of cargo. In this particular voyage it is guaranteed that no theft of cargo was carried out and no cargo contamination was registered for purpose of this hypothetical transit. I will discuss the causes of these losses in the following topic.

Generally types of Bulk oil Shortages/Damages could be divided according dispute area and parties involved relationship as follows:-

#### A. Bill Of Lading Relationship

Here the Receiver/Holder of B/L vs Carrier and B/L is contract of carriage (N.B. "may also be a demise or time charterer who has issued a B/L to a 3rd party), and here could be two types of shortage:

- 1) In Transit Loss-shortage

a. Delivered amount differs from B/L quantity and for leading tallies-general description of potential sources for determining in-transit loss- shortage.

2) Contamination

a. Cargo is discharged but in contaminated state.

B. Owner/Charterer Relationship

Charterer is also the receiver/holder of B/L and charterparty is contract of carriage and the expected loss are:

1. In-Transit loss-shortage claims.

2. Cargo Retained on Board ("ROB") claims

a. Cargo Retention clauses and freights withhold.

3. Contamination

1.2 The main causes of loss in oil transit

The oil trade has recognised the existance of losses which may almost be considered inevitable by stipulating an allowance of one half of one perecent in contracts calling for shortage. It should be pointed out that because of the decline in accuracy of loading and discharge details this allowance may frequently be exceeded although there has been no physical loss of oil by reason of the operation of a marine peril. (As happend in SILLARA case 1.42% loss). These natural losses, caused by measurement inaccuracies, clingage, "remained on board" and escape of volatiles are inevitable and vary between individual crude oils and between carriers.

In case of the MT SILLARA the causes which constitute the three mentioned losses fall, clearly, into two areas of causation.

The two causes are:-

1. Measurement and accounting practices together with calibration errors.

2. The Inherent Vice of Cargo

With regard to the measurement and accounting practices attention should be drawn to the fact that in this hypothetical voyage only one rob sounding was obtained from each of the vessel's tanks and this was taken at the ullage point. Furthermore, this rob sounding was trim corrected. This practice as formulated by the industry is contrary to the O.C.I.M.F. (Oil Companies International Marine Forum) recommendation and leads to inaccurate formulation of rob volume to such an extent that additional methods are also being utilised in the industry to allow for such factors as "clingage" to the vessel's bulkheads and internal structures. In certain locations a factor of 1.5 has been applied to the derived rob volume in order to account for "clingage". This procedure does seem to be somewhat of a hit and miss affair and cannot, it is believed, have any scientific, theoretical or accurate base.

It seems the oil industry has formulated this method of determining rob volumes due to a speed requirement caused by, it is believed, high demurrage rates in charter parties of the early 1970's. The industry does not seem to have rectified this procedure and taken into consideration the dramatic drop in

demurrage rates such that if an additional, say 60 tons of cargo were to be discharged or accounted for this would pay for potentially 24 hours worth of demurrage. Speed and haste in carrying out measurement exercises do no mix. Errors must occur.

The other proposed cause of loss on the voyage of the MT SILLARA was that due to inherent vice of the carriage of liquid cargo. The first and most obvious vice of a fluid cargo is the mechanical constraint of never being able to discharge 100% of the volume received. This is due to the fact that fluid will continue to drop or run from the vessel's steelworks, bulkheads into the tank floor over a period of time after the main bulk discharge has been completed. Furthermore, obstructions such as the transverse frames in the bottom of tankers may have their drainage ways obstructed or blocked thereby causing difficulty in flow of all the cargo to the aft end of the vessel's tanks where the suction point is located. The final area obstructing or not allowing a full discharge is the oil remaining in the pipeline on the discharge side of the pump. Without any fluid to displace this volume of oil it becomes impossible to discharge this oil. A well run ship will drain these lines back and the final discharge this oil. A well run ship will drain these lines back and the final discharge will be carried out by a stripping pump utilising the stripping line which is of a very much smaller diameter direct ashore. The second vice of the carriage of hydrocarbon fluid relates predominately to the more volatile fluid and their associated



fractions. Crude oil with a high heavy fraction and wax content will suffer shortage losses by reason of higher clingage and "remained on board" factors.

The fractions in the crude oil which would causes most concern would be the methane and ethane and probably part of the propane due to their high vapour pressures which are well above the pressure setting of a vessel's p v valve. These gaseous fractions, due to their density, will cause the cargo to loose volume rather than weight. Due to the method of calculation of the received cargo on board a vessel or, indeed, that present prior to discharge and with the carrying forward of either the api gravity or the density of the cargo for these calculations results in an apparent in transit loss.

The first indications that give guidance as to the volatility of the cargo is the Reid Vapour pressure of that cargo. Reid Vapour pressure in excess of 5 PSI and dependent upon the temperature of cargo loaded would give cause for concern potential in transit loss. Crude oils, as a whole, have varying Reid vapour pressures which may vary from 2.5 psi up to as high as 11 psi. Bearing in mind that the Reid Vapour pressure is determined at 100 F and most crude oils are carried at temperatures below this test temperatures, then the actual vapour pressure of the volatile fractions in the cargo will be decreased accordingly. Taking the case of the MT SILLARA, if we consider the cargo carried as having a Reid Vapour pressure, say, of 7 and the API of 32.0 then the additional API gravity of the actual parcel loading being 32.7 would imply further lighter fractions being added to this cargo. This may cause the Reid Vapour pressure to increase to a higher pressure but without analysis this cannot be determined. The fractions causing the Reid vapour pressure are predominantly those of C1, C2, C3, C4 have their own individual Reid vapour pressures.

Looking to the dissimilarity between a Reid vapour pressure of the homogeneous blend of crude oil equality say, 7 psi and that of the ship's pv valve setting of 2 psi, it dictates the evaporation must take place and the vapourised gases allowed to escape to the atmosphere via vessel's pressure vacuum release valve.

If one accepts the theory of the evaporation and vapourisation which can only sensibly be proved by carrying out in-depth research on, using gas liquid chromatography to determine the volume loss, then this has alternative repercussions for crude cargo on board the vessel. Reverting back to the MT SILLARA and the fact that she loaded to a 98% volume cargo, then by definition the vessel has 2% of her total volume space as void above the liquid level of the cargo. In the case of MT SILLARA this volume space represents about 11,500 BBLs or 1,840 m<sup>3</sup>. Taking the molecular weight of propane as 44.1 and the pressure as set on the pv valves of about 2 psi, then the weight of the total gaseous fraction in the void space after a period of time would be equivalent to 3.78 metric tons. As can be considered, if the cargo on board the SILLARA has a Reid vapour pressure of 7 then after a 30 day voyage particularly encountering heavy weather which would upset any stratification in the cargo, then the volume loss recorded as an in transit loss could potentially take place. With this volume loss of light fraction the balance of the crude oil as a composite blend of different fractions will be upset.

Light fraction cargo are very solvents, that is they will break down the heavy asphaltenic fractions in the crude oil and hold them in solution. If these light fractions are removed and the crude oil balance upset, then these heavy fractions will have a limited amount of solvent to hold them in solution and, therefore, asphaltene or heavy fraction will precipitate from the crude oil depositing itself in lower strata of the

crude or on the tank bottom of the vessel. Thus, the next sequential step of the volumetric loss due to vapourisation evaporation is the potential increase in rob volume. This does not even take into consideration the outside ambient temperatures bearing in mind the pour point of the heavy material deposited to discover whether, indeed, it did remain pumpable. Thinking of the SILLARA she discharged her cargo in Greenland and thus, the rob or the oil volumes closest to the shell plating of the vessel would have been dramatically cooled by the external sea water probably rendering them un pumpable.

Another apparent cause of shortage appears where the discharge terminal is not the final discharge storage point. In this instance underwriters are dependent upon third parties such as pipeline operators whose interests are not always the same as the owners of the crude oil on those of underwriters.

It should also be mentioned that it is not unknown for apparent shortages of sweet crude and fuel oil to occur where vessels have used cargo for bunker purposes. The attention of underwriters is drawn to a recent change in rules of the American Burea of shipping and other classification societies which now permit the boring of crude oil and shops for bunkers purposes. When considering claims, underwriters are advised to ask for a copy of the charterparty to determine if such "burning of cargo is permitted" in the charter forms. Shortages can be confirmed if a check on ship's bunkers is made at the time of discharge.

This practice can have catastrophic results. Those who read in 1980 the report of the enquiry into the explosion of the SYGNA under classification repairs in Singapore will have noted the reference to crude oil found to be present in bunker space and additions to the vessel's pipelines.

## 2. Actual Determination of Oil Losses

Having defined factors which may show up as shortages, it is necessary to touch upon the actual determination of loss. It will be obviously to all that oil being a liquid is most easily measured by volume and that is the method used. The oil industry uses the barrel as its standard unit and that measure is 35 imperial gallons or approximately seven barrels to the tonne. The exact amount depends upon the density of the oil which can vary considerably. Here I reminded you of the figure I mentioned earlier in chapter one when I point out the differences between Arabian "light" and Arabian "heavy". Although heavy and light refer to the American Petroleum Institute gravity measurements it is obvious that a tonne of Arabian heavy will occupy a smaller volume than Arabian light.

Shortages can only be determined by a comparison between what is loaded and what is unloaded. Between the two figures there will be a difference which must be adjusted to determine that which is actually lost. It is usually these differences in amounts shipped and the amounts discharged which give rise to shortage claims. The three main ways to determine the actual

loss are:

#### 2.1. Shore measurement of volume of oil loaded

It is essential to obtain samples of the oil loaded and to have details of the temperature of the oil loaded.

The most accurate way to determine the contents of a tank is to ullage the tank. The shore tank can be accepted as providing the most accurate measurement because it is a rigid vessel capable of being measured with a high degree of accuracy. It is also possible to determine temperature in the tank at several levels.

Contrast the situation on board the tanker receiving the cargo, where oil is flooding into ship's tanks swirling round and, certainly when the tank is empty, below the water line and therefore influenced by cool seawater rather than the hot sun.

Because of the need to ullage the contents of a ship's tank while maintaining the safety of the vessel precautions need to be taken and indirect means of measuring the contents of ship's tanks frequently have to be used. A vessel which is fitted with inter gas equipment cannot have hatches opened to determine the depth of the oil in the tank. Indirect means have to be used and considerable care must be used in positioning the measuring equipment to avoid inaccurate measurements being made by ship's officers.

It is necessary to mention that a full centre tank in

a ULCC contain up-wards of 40,000 tonnes of crude oil and that the tank will be filled in about six hours. Small wonder that the contents of the tank will take twelve or more hours to return to rest. Only when movement has ceased can ship measure the volume of oil loaded. By this time the tanker may be upwards of 100 miles away from the loading terminal if early departure procedure are used. By then it will be very difficult for a ship to challenge figures purporting to declare the shipped quantity details.

## 2.2. Measurement of rate of oil loaded

Another way of measurement is the measurement of the rate of flow of the oil being loaded- obviously the quantity loaded is determined by the rate of flow of oil past a measuring point. Because of the enormous amounts being loaded it is not possible physically pass each barrel of oil through a measured container. Rather what is measured is the rate of flow past a know cross-section which is adjusted to provide the details of oil loaded. Unless the flow meters are very accurate and constantly proved, considerable errors can occur. In recent years the oil companies have spent much money, labour and time to improve measurement systems and so reduce so called loss.

## 2.3. Description of the oil loaded

As I mentioned before oil can vary widely depending upon the source. It is not possible to rely upon the phrase "Crude Oil" to describe what insurers are

insuring. Crudes vary so widely that it has become a major headache for chemists and technicians. Here suffice to say that it is possible to "finger print" each crude as those vessels which dump oil in navigable waters are beginning to find out. However, in practice most underwriters have to be content with this simple description when considering most risks offered to them to insure.

Crude oil will always have a water content although the actual amount may vary from a negligible quantity to upwards of 1½%. The exact quantity can only be determined by contrituging the sample in a specially designed container. This will also determine the quantity of sediment in the crude oil. Here I should only at well head but also in short tank.

To summarise, before we can be sure what is loaded we must know the temperature and the volume and composition of the liquid loaded before we can determine the quantity of oil loaded. I need hardly to point out that exactly the same process must be under-taken at discharge to determine what is discharged.

### 3. Documentation In Oil Shortages

In the simplest of oil shortage claims the ship's ullages at discharge port will confirm that she arrived with effectively the same amount of cargo as evidence by the ullage report from the load port. The ship will then discharge her cargo and a clean tank certificate will be issued, thereby proving that



the ship had discharge all of the cargo that she loaded.

There are occasions when the ship's figure do not match within acceptable tolerance and it is then necessary to check the actual calculations and to consider other documentations. In these cases the following documents should be considered.

### 3.1. Load Port

There are six necessary documents in the loading ports:

#### 1. Certificate of Quality

This certificate is frequently issued on the basis of the analysis of "an average samples" taken from the shore tank.

The basic sediment and water has actually settled out of the oil in the shore tank because of its static condition. For this reason the figure quoted for "BS & W" should be treated with extreme sceptism. The shore tank invariably has some sediments and water at the bottom of it and as the cargo is drained off through the pipe at or near to the bottom of the tank this sediment is stirred up and mixed with the oil which arrives in the ship's tanks.

The certificate will also show the weight of the oil by volume. This will be expressed either as "API gravity", "Relative density at 60 F", or "density at 15 C". It is then possible to compare the density on this certificate with the density used to calculate

the ship's figures.

## 2. Certificate of Quantity

This certificate should be supported by the actual calculation of the quantity from the load port. It should show the quantity supplied from each shore tank and the densities and temperatures used to calculate the quantity supplied.

This certificate sometimes indicates the amount of water in each tank and it is sometimes useful to compare the percentage of water to oil by volume shown on this certificate with the percentage shown on the certificate of quality.

The densities used in the calculation on this document should be compared with the densities in the certificate of quality and the ship's calculations.

## 3. Pre-Load- The ship's tank inspection certificate

This will certify either that the ship's tanks are clean and dry and suitable for loading the intended cargo or that the tanks were dry except for recorded amount of slops and sediments.

## 4. Ship's Loading Ullage Report

This report will indicate a volume of cargo loaded at a specific temperature. This volume must then be corrected to a volume at 15 C or 60 F.

It is useful to check that the correct volume correction factors has been supplied and that the same density has been used as shown on the other certificates. Individual tank temperatures give a better result than using an overall ship's average.

#### 5. Bill of Lading

The Bill of Lading frequently shows the volume as well as the tonnage of cargo loaded and it is often useful to check the density used to calculate tonnage by doing a simple division.

#### 6. Loading Samples taken from Ship's Tanks

The analysis of the composite of these samples will be the only accurate determination of the actual density of the cargo loaded and of the actual BS & W content of that cargo.

### 3.2. Discharge Port

In this port there are three basic documents:

#### 1. Ship's Arrival Ullage Report Form

This should be checked as in (Ship's loading ullage report) above, and the ship's departure and arrival figure can then be compared in order to establish whether or not there has been any loss during the voyage. When the assessor is not doing the calculations in person it is useful to check that the calculations have been done using the same densities and the same set of volume correction tables.

2. The Ship's Clean tank certificate on completion of discharge

This certificate completes the ship's documents to show that she has arrived with and discharged all of the cargo loaded.

3. Certificate of Outturn

This certificate is normally irrelevant to the ship's liability but forms an interesting check to ascertain whether or not the receivers own figures show that he has suffered a loss.

The certificate show the details of the contents of the shore tanks both before and after discharge to them by the ship. It is frequently a valuable exercise to check the densities and temperatures recorded in the tanks to see if they are within the bounds of physical possibility. For example it is impossible to add an oil of density 0.8 to an oil of density 0.9 and achieve a mixture with a density of 0.75 .

It is also interesting to calculate the weight increase in each tank since this frequently shows that the bill of lading weight has been delivered even if there has been an apparent shortage when looking at the increase in volume in the shore tanks.

4. Basic Insuring Conditions

The basic insuring conditions for oil shipments are the American bulk oil clauses SPI3C or institute bulk oil clauses.

#### 4.1. American bulk oil clauses SPI3C

American bulk oil clauses is the well establish clause for oil shipments insurance. The American clause covered all risks but excluding certain shortage, leakage and contamination losses unless caused by specific named perils such as stranding and sinking. This clauses had not been withdrawn in favour of new clauses based on English cargo clauses.

#### 4.2. Institute Bulk oil clauses CL275

The increase in oil prices came at a time when many changes were occurring in the world. Marine Insurance was not immune to such change, infact cargo underwriters assisted in the recent major changes which have taken place in policy forms and clauses.

Amongst those changes the London market has drafted Institute Bulk Oil Clauses for use with the new policy form. These clauses are offered as a replacement of the establish American Bulk Oil Clauses SPI3C.

Bulk Oil Insurance does not need a full all risks cover, therefore underwriters specified the risks to which bulk oil is prone. The perils are named: loss or damage reasonably attributed to INTER ALIA fire, explosion, vessel stranded, grounded, sunk or capsized collision or contact of vessel, discharge at port or place of distress, earthquake, volcanic eruption or lighting.

All these are the major perils. It covers loss or contamination to subject matter by general average,

sacrifice, jettison, leakage from connecting pipes, negligence of master etc in pumping cargo ballast or fuel. Contamination resulting from stress of weather. Also cover the usual general average and salvage charges and "both to blame" liability. The Institute clause does however make clear that if a specific excess percentage is designed in a given risk for leakage, etc.. Then this excess will be deemed to include the trade ullage. In addition the Institute clause contains a claims adjustment clause based on a gross/gross comparison. Appendices of the two clauses will give a full extent of coverage.

Within the trade many sales contracts are on a net delivered basis and this has encouraged the development of insurance on a guaranteed outturn basis. In simple terms provided insurers are satisfied as to the method of measuring quantities loaded and discharged any difference in weight above the agreed percentage will be covered by the insurance.

Such schemes allow for calculation of losses to be on a gross/gross or net/net basis, provided certain controls required by insurers are strictly adhered to.

##### 5. Kinds of Cover Available For Oil Transit

Not many years ago when the oil majors companies were largely trading among themselves using their own vessels to move their own low value product from their own wells often to their own refineries, the loss of a few of oil here and there was of no very great importance.

With oil now being traded widely as a commodity by companies not necessarily involved in production, the recoverability and swift settlement of losses with the obvious effect on cash-flow and commercial situations which does, affect the sale ability of product. Thus especially in these days of oversupply, if there is little difference in pricing it makes sense to buy where experience indicates good insurance cover and sound claims service in case of loss.

#### 5.1. I.C.C. All Risks and Institute Cargo Clauses (A)

I.C.C.- All Risk (Institute Cargo Clauses- All Risks), a set of clause published by the Institute of London Underwriters for use with the S.G. (Ship and Goods) form of policy. These extend the perils expressed in the S.G. policy to embrace "All Risks", subject to exclusions of loss proximately caused by delay or from inherent vice in the subject matter insured. The last published set of those clause, dated 1963, remained in use for cargo insurance<sup>4</sup> until the S.G. policy form was withdrawn from use in 1982. The ICC All Risks were also withdrawn by ILU and are no longer printed.

Institute Cargo Clauses (A), this set of standard cargo clauses (CL.252 1/1/82) was published by ILU for attachment to the MAR (Marine) form of policy only. In practice it is referred to the ICC (1982) A and is used in circumstances where the insurer and assured agreed to all risks conditions in a cargo insurance contract. The "all risks" cover in the ICC (1982) A is subject to four clauses which incorporate excluded

perils. These are (Cl.4), the "general exclusions" clause; (cl.5) the "unseaworthiness and unfitness" exclusion clause; (cl.6) the "War" exclusion clause, and (cl.7); the "strikes" exclusion clause. The cover embraces both total loss (actual and constructive) and partial loss (particular average and general average sacrifice), also the assured's liability for GA contribution, salvage charges, and sue and labour charges (including forwarding charges for goods discharged short of destination in consequence of an insured peril; cover for contribution and charges being subject to reduction in event of under insurance. Liability under the contract of carriage "both to blame" collision clause is also embraced. Duration of cover is on "warehouse to warehouse" basis, incorporating the standard "transit clause". An "English law & practice" clause is incorporated for the guidance of courts outside English jurisdiction, for circumstance where a foreign jurisdiction clause replaces the English Jurisdiction of cover.

In this cover although unexplained shortage was not mentioned, but under an all risks policy one can show that a certain quantity of oil was loaded and a certain lesser quantity discharged one will have proved a loss by non-delivery. The onus of proof would then, revert to underwriters to show that the cause of the non-delivery was a peril not covered by policy-not easy.

In practice any loss which can be proved by loading and outturn reports no underwriters would ask you to



prove what happened to this missing quantity (more than the 0.5 normal loss allowance). He would pay your claim and pursue the carriers(s).

## 5.2. Bulk Oil Clauses SPI3C

These American clauses are much more likely to be used in the insurance of oil than plain all risks and although in clause 7 they start off promisingly enough with the phrase "against all risks what so ever", beware, for they then systematically whittle away at this very wide cover. One will note that shortage, leakage and contamination are ruthlessly excluded unless caused by the good old marine perils, stranding, sinking, fire, collision plus a few goodies by way of losses during loading transshipment and discharge. Additionally, contamination is covered if caused by stress of weather.

It will be seen therefore that SPI3C are pretty restrictive when it comes to contamination and shortage losses.

Theft probably was not even considered to be a feasible loss the time these clauses were drafted. So theft is excluded by the absolute shortage exclusion and is not reinstated, therefore losses by theft are not covered.

Clause 8 of SPI3C is an additional perils or "Inchmar-es" clause which is fairly self explanatory but be aware that London underwriters make a distinction bet-

between mismanagement of the cargo which, the American markets do not and it is likely that most shortage and or contamination claims falling in this area are likely to be concerned with the mismanagement of the cargo rather than the vessel i.e. errors during trimming operations or even at loading or discharging.

## 5.2 Guaranteed Outturn.

This type of cover although basically "all risks" acknowledge the fact that often for no very explicable reason or through a series of interlinked facts not necessarily in themselves fortuitous, shortages in excess of the normal 0.5% will occur.

The average clause will read something like "To pay average irrespective of percentage including leakage, shortage and contamination howsoever arising in excess of 0.5% calculated upon" and here will follow a series of variations such as each tank of whole shipment etc. Usually underwriters allow the assured to choose the most advantageous method of calculating the normal loss figure.

The method of calculating shortage losses will be by a straight forward comparison of certified loading and outturn figures. The loading and outturn figures will be produced by surveyors usually from a list approved by underwriters and a warranty to this effect is almost invariably written into the policy.

Guaranteed outturn therefore is obviously from the point of view of parties concerned with buying,

selling and shipment of oil cargoes, the most desirable cover but if Guarantee outturn coverage is required, it is essential that the following points be clarified and specified in the policy terms and conditions:-

(A) The documents which are to be used to evidence the loading and discharging quantities e.g.:-

1. The terminal figures at load port and discharge port as evidenced by the certificate of quantity issued by the terminal. Or
2. The Bill of Lading at load port and the surveyor's discharge report at the discharge port.

(B) Whether the adjustment is to be "gross to gross" or "net to net".

Oil sales contracts normally specify that approved surveyors are to attend both loading and discharge to verify shipped quantities and this requirement is usually incorporated into the policy as a Warranty.

Whilst the sales contracts may state that the purchase price will be calculated on the bill of lading quantity, the surveyor's load port survey report will frequently dispute the vessel's figure usually resulting in a reduction of the loaded quantity.

If the bill of lading (B/L) figure is also to be used to evidence the amount/value to be insured then the acceptance of the B/L figure by underwriters must NOT be qualified in any way, e.g. by the words "unless proof to the contrary is established".

The words "unless proof to the contrary is established" would allow the surveyor's revised figure to be used for adjustment purposes even though premium may have been paid on the higher B/L figure. The same criteria apply to the discharge figures. If the B/L is accepted to be the loaded figure without qualification, this figure would be both "gross" and "net". Examples illustrate how the adjustments could vary will be given later in claims adjustment topic.

#### 6. Claim Settlement:-

In most cases where an individual or a company takes out insurance cover it is in the fervent hope that they will never have to make a claim.

This is clearly not the case where insurance covers, the movement of cargo often worldwide and on a continuing basis. In cargo insurance losses are a fact of life and this fact is acknowledged when insureds, usually with the assistance of their brokers, and underwriters put together a cargo cover.

A claim upon a policy of marine insurance on goods may arise upon the happening, as the result of insured perils, but shortages in oil shipment do occur not always by reason of a marine peril.

However claims have to be decided on whatever evidence is available and therefore covers must be tailored with these problems in mind.

#### 6.1. Claims Documents Required

Bearing in mind that the claimant has the burden of substantiating his claim, he must produce evidence to show that the loss or damage was caused by insured perils and to prove the extent of his claim.

The checklist which follows, of claims documents which may be required in respect of shipment of oil and related petroleum products, for preparation of claim upon a policy of insurance on oil cargoes. The list does not pretend to be comprehensive; on the other hand, not all the documents listed will necessarily be required for any one claim, depending upon the nature of the claim.

Claims Checklist:-

- (A) Copy of the declaration and/or original certificate of insurance.
- (B) Copy of the Sales Invoice(s).
- (C) Copy of the Purchase Invoice(s).
- (D) Copies of the Sales/Purchase Contract(s) in respect of CONTAMINATION claims and, at Underwriters' discretion, in respect of large and/or contentious claims.  
Sales Contract.  
Purchase Contract.
- (E) Original Bill of Lading unless Underwriters have otherwise agreed accept a copy of the original Bill of Lading which has been correctly endorsed by all relevant parties to the Sales/Purchase Contracts.  
Original Bill of Lading.  
Endorsed copy of the original Bill of Lading.
- (F) Copy of the charter party, if applicable.
- (G) Copy of the Load Port Surveys/Statement of facts etc. . ,  
By Approved Surveyor.  
By Non-Approved Surveyor.
- (H) Copy of the Discharge Port Surveys/Statement of facts etc. .  
By Approved Surveyor.  
By Non-Approved Surveyor.
- (I) Claim on carrier/other third parties.
- (J) Reply from Carrier/other third parties, if received.
- (K) Dock/ Warehouse/ Delivery Receipt.

- (L) Survey Report/ original Fee Note.
- (M) Other Expense Bills (originals).

## 6.2 Claims Adjustments

In most of insuring conditions for oil shipment there is a specific clause outlining the manner in which claims should be adjusted, and whether the adjustment is to be "gross to gross" or "net to net" basis.

There has always been plenty of meaningful discussion as to whether claims should be settled on a gross for gross or not for net basis but the new bulk oil clauses could be seen to lend some authority to the gross for gross school for thought.

The term "gross volume" includes sediment and water and free water at both loading and discharge therefore any shortage resulting from an insured peril in excess of 0.5% would not represent the oil received short but the LIQUID received short. The actual shortage of oil could be much greater.

The claims figure could vary widely when applying the two systems of calculations. The following examples illustrate how the adjustments could vary.

Example:- "Gross to Gross"

Bill of Lading 100,000 BBLs

Discharged:

- oil 79,500 BBLs

-B.S.&W. 750 BBLs

-free water 250 BBLs

-----  
98,500 BBLs 98,500 BBLs

Shortage 1,500 BBLs

Less 0.5% deductible 500 BBLs

-----  
Claim 1,000 BBLs

=====

"Net to Net"

Bill of Lading 100,000 BBLs

Discharged Oil 97,500 BBLs

-----  
Shortage 2,500 BBLs

Less 0.5% deductible 500 BBLs

-----  
Claim 2,000 BBLs

=====

N.B. It is important to check the exact amount and application of the deductible. It is usually expressed as 0.5% whole shipment but this figure may vary and be applied to each tank or whole shipment at the option of the Assured.



## CHAPTER THREE

### ONSHORE OIL INSURANCE

#### 1. General Introduction to Onshore Operation

The oil and gas Industry has a unique and complex structure of parties, contracts and equipments. Over the years, special language system of words and phrases has evolved to describe industry activities.

Petroleum is a generic name for combustible hydrocarbons found in the earth. It occurs in the gaseous, liquid and solid states, its specific gravity or density. Crude oil with a high specific gravity or density brings a better price. Another important physical property is its viscosity, which is a measure of its ability to flow easily. A fluid with low viscosity has great mobility and can be recovered economically.

Petroleum is found and produced with the assistance of petroleum geologists who utilize sophisticated methods to find commercial oil deposits in sedimentary rock formation. They look for reservoir traps (i.e. fault traps and salt domes), which are underground formations favourable to the accumulation of oil and gas. Traps frequently occur as the result of a breaking or bending of a rock plane i.e. faulting. Traps can also be formed by great masses of salt or serpentine rock that lifted the overlying rock layers to form salt domes.

An exploration company obtains the advice of petroleum geologists to help find reservoir traps. The geologists utilize regional surveys, surface geology reports and the like to identify areas of interest. In a wild cat or undeveloped territory, the geologist uses a geophysical survey, and usually employs a seismograph to "shoot" the area to produce a contour map of the subsurface.

If the geological and geophysical survey results are favourable, the geologist recommends that specific tracts of land be leased and that an exploratory well be drilled in a specific location. The site selected for the test well usually appears on the contour map as the high point on a faulted anticline.

Individual and companies, no matter how financially strong they may be, usually do not finance and operate a well completely by themselves. Investors in oil and gas ventures tend to seek partners to share the risks and profits of each well.

There are two categories of economic interest in mineral rights; those which pay the costs of drilling and production (working interest), and those which do not (royalty and overriding royalty interest). The working interest owners incur all costs; therefore, they make all decisions about how to drill and operate a well, and also when to plug and abandon it. Usually they are responsible for loss or damage if accidents such as blowouts occur. From the group the group of working interest investors, one party or company is the operator, and the rest become, for lack of a bett-

er term, non operators. The legal instrument employed to satisfy this arrangement can be in the form of a general partnership, a limited partnership, joint venture agreement or similar document.

One of the responsibilities of the operator is to hire a drilling contractor to drill the well. To insure the proper co-ordination of all phases of drilling, the operator hires other subcontractors. Generally drilling contractors are paid by the foot, by the day or on a fixed price basis. The most common drilling method today is with a rotary rig.

After reaching the desired depth, the geologist will conduct various tests of the underground formation to determine if oil or gas are present in commercially profitable quantities. If they are not present, the well will be plugged and abandoned as a dry hole. If the tests are positive, the well will be completed.

Well completion is an expensive process, often requiring stimulation procedures such as acidizing and fracturing. If subsurface pressure is insufficient, a pump or "Christmas Trees" (an assembly of control valves and fittings) may be set on the surface to draw up the petroleum.

Once the well is completed, a blowout preventer usually is set on the surface over the well head. A blowout preventer is a sophisticated mechanical device which can be activated to shut the well down whenever

the subsurface pressure and, therefore, flow of

the subsurface pressure and, therefore, flow of fluids cannot be controlled for any of a wide variety of reasons.

From the well head, the fluid recovered flows or is pumped in a pipeline to a separator and then flows in a gathering line to a storage area such as a tank battery. Ultimately the oil is trucked to market or pumped into a nearby transmission line. If gas is present in the well it is separated from the oil and processed through a dehydrator and ultimately piped through a gathering line to a gas refinery plant.

Producing wells are like other machines which receive daily use. They require routine maintenance. Frequently, the operator will hire a well servicing contractor to perform these maintenance functions. Many times the contractor will reenter the hole in order to deepen the well or perform other operations necessary to enhance recovery of the petroleum substance. Enhanced recovery operations are frequently necessary because the life of a reservoir is limited from the day production begins. As oil flows, the formations natural pressure drops.

Eventually the operator must employ artificial techniques to force oil from the reluctant reservoir at the same daily amount as was previously realized. One method is to inject water into the formation to float upward into the wellbore. This is called secondary recovery. Once this techniques no longer produce the desired results, tertiary recovery techniques may be

employed, such as injecting carbon dioxide, steam or even fire into the reservoir. By way of graphic summary, these activities are illustrated in figure (4). With this abbreviated introduction, we should be prepared to review the fundamentals of risks management and well control insurance pertaining to blowout of oil and gas wells.

## 2. Oil Industry Contracts

No exploration or production activity can occur unless there is an area of land or sea over which the oil company has the right to prospect for oil or gas, exceptionally this prospect may be freehold land over which the prospecting company owns both surface and subsurface rights, but more normally it will hold a lease over the oil and gas rights, a licence, a concession or some form of production sharing contracts.

### 2.1. Contracting Parties

An oil and gas drilling venture typically involves the following contracting parties:

1. Operator
2. Non-operator
3. Operator's subcontractors
4. Drilling contractors
5. Drilling contractor's subcontractors
6. Landowner

The operator conducts the research for hydrocarbons. With the help of a geologist, he determines where oil

or gas may be found. He purchased the mineral rights to the land, and obtains a lease of the surface of the land in order to conduct drilling operations. To finance the project, the operator normally obtains support from outside investors, called non-operators, who invest in the project in return for a working or percentage interest in the well. Non-operators usually do not exert control over the operator's actual search for the oil. The operator may have to hire specially SUBCONTRACTORS, such as mud logging experts. In addition the operator will hire a DRILLING CONTRACTOR to perform the actual drilling of the well. The drilling contractor in turn will hire numerous SUBCONTRACTORS in order to drill the well in accordance with the operator's specification.

## 2.2. Industry Contracts

Generally, there are at least four basic contracts necessary to solidify the multiple relationship between the six parties to an oil or gas exploration venture:

- (a) Lease Agreement (between operator and landowner)
- (b) Operating Agreement (between operator and non-operator)
- (c) Drilling Contract (between operator and drilling contractor)
- (d) Master Service Contract (between operator and driller and sub-contractor).

These contract and their relationship to the parties

involved are diagrammed in figure(2) based on the language of the contract, each party assumes certain responsibilities and liabilities in the event of injury or death to people and for damage to property.

Diagram in figure (3) roughly outlines the spheres of responsibility between driller, operator and subcontractors which result from the execution of the most commonly used drilling and service contracts for land wells, that is, the International Association of Drilling Contractors (IADC) U.S. Revised 1982 Daywork Contract. While there are some overlapping responsibilities, the thrust of the IADC contracts is to assign responsibilities to parties without regard to negligence. For example, the IADC Daywork contract basically makes the driller responsible, without regard for negligence, for damage to his equipment, his employees, and his subcontractor's equipment and employees. There are a few notable exceptions as seen by the shaded areas in diagram in figure(3) likewise, the operator is responsible for his equipment, employees and subcontractors, as well as for the expenses of a wild well.

For the operator, drilling contractor and subcontractors, a review and analysis of all appropriate contracts is the first step in determining if a particular party has any direct or Acontingent liability for blowouts and attendant well control expenses. The balance of this topic will focus on the general review of basic contract forms.

#### 2.2.1. Surface Lease Agreements

When the operator signs a lease of land from the landowner, he can bind himself contractually (either expressly, by implication or by law) to pay for damage to the landowner's crops, livestock, water supplies or other property on the land, arising from a blowout. The lease can hold the operator responsible for damage due to his negligence, or create strict liability regardless of negligence. Even without signing a lease agreement, the operator will be subject to the state's law, which may have specific standards of care for operators conducting drilling operations. The law of the operator's liability for surface estate damage is very complex and varies in every state. Depending upon the particular lease agreement and the law of the particular jurisdictions, the operator may be liable to landowner, either by express contract provision, by implication, or by state law, for the costs to control a well, and the costs to remove pollution and debris, regardless of the negligence of the operator.

In summary, knowledge and careful review of leases reveal many exposures and liabilities to the operators. Leases are frequently overlooked when evaluating insurable exposures. Many individuals review only their drilling contracts. However, even if the operator has signed a favourable drilling contract from the standpoint of transfer of risk, he still may incur significant contractual liabilities from the lease agreement, as well as from the common law or statutory law for damage to the surface estate, to other mineral rights, to adjoining property, and from state or



federal regulatory authorities.

### 2.2.2. Operating Agreements

If the operator cannot sufficiently reduce or eliminate his liability to lessors and to other property owners previously discussed, can he pass some of these continuing exposures on to others in subsequent contracts? The answer, of course is that he can. The operating agreement can be used as (1) a device to share his liability for blowouts and well control expenses with non-operators and as (2) a device to share the cost to insure the well control exposure with the non-operators.

An operating agreement is a contract between the operator and his non-operating working interest owners to share proportionately in the expenses, profits (if any) and liabilities of an oil or gas exploration venture. In the absence of such agreement executed prior to the inception of drilling operations, the parties to the venture could be held to be jointly and severally liable for all costs, expenses and liabilities regardless of their respective ownership interests. In order to avoid this result and to clarify contractual responsibilities, prudent operators usually execute a written operating agreement. There are Model Form for Operating Agreement (like AAPL Form 610- 1989).

These model form make no attempt to provide a full insurance programme for all parties. The operator may

want a simple program of minimum limits and cover-

ages, whereas the non-operator may prefer the opposite.

### 2.2.3. Drilling Contracts

Like oil leases and operating agreements, drilling contracts are usually non-standard. Drilling contracts are classified into four basic categories: daywork, footage, turnkey, and combination (or manuscript).

(i) DAYWORK CONTRACTS: The contractor charges a specific per day (called a day rate) regardless of the amount drilled per day, if any. Typically the operator is deemed to be in control of activities of the driller and others at the well site, and the contracts generally place the risk of loss for well control and related expenses on the operator either expressly or by implication.

(ii) FOOTAGE CONTRACTS: The contractor charges a fee according to the number of feet of hole drilled, regardless of the amount of time or expense involved to drill each foot of hole. Generally the contractor is in control and the contract usually places the risk of loss for well control and related expenses on the contractor by implication. However, there may be exceptions. Many footage contracts contain what is commonly referred to as a "Gulf Coast Clause" which states that when a normal formations are encountered, the contract, either automatically or at the option of the driller, reverts to daywork. This implies that the

risk of loss for well control reverts to the oper-

ator.

(iii) TURNKEY CONTRACT: This type of contract calls for the payment of a stipulated amount to the drilling contractor, but only upon completion of the well. In a turnkey operation, the contractor furnishes all material and labor and controls the entire drilling operation, independent of supervision of the operator. Presumably, the contractor has a direct exposure for well control expenses. If, however, the contractor is insolvent or abandons the well while it is blowing out, then the operator has a contingent well control exposure as well as a direct well control exposure, vis-a-vis: (1) his contractual obligations to the lease holder not to damage the land, (2) his liability to adjacent landowners not to damage their property, and (3) his responsibility to state and/or federal regulatory authorities to comply with safety regulations, pollution laws, clean-up laws and the like, and (4) his own financial interest in restoring and completing the well. For example, the operator could be liable for negligently hiring a drilling contractor who abandoned a well out of control.

Under a turnkey contract, once the well is completed by the drilling contractor, then the operator takes control and assumes full responsibility for the well control exposure.

(iv) COMBINATION CONTRACTS: These contracts have provisions of both daywork and footage contracts.

In summary, when economic conditions favour the oper-

ator (low price of oil) then footage and turnkey contracts tend to predominate i.e. Abundance of footage and turnkey drilling contracts on API forms (therefore more insurable risks for driller). Conversely, when economic condition favour the drillers (high price of oil), then daywork contracts predominate usually on IADC forms (therefore, more insurable risks for operator). A summary of these interrelationship of these contracts shown in figure (2). While these interrelationships do not hold true in all instances, they support the general idea that parties with strong bargaining power seek to shift the risk of loss to the other contracting parties. This is very important to remember when analyzing contractual risks in the oil business because, as a practical matters many drilling contracts and operating agreements are not executed until after the well has been drilled.

As a sample of the allocation of many responsibilities between the parties IADC Daywork contract is summarized in Appendix (i)

### 3. Major Hazard Of The Industry

#### 3.1. Well (belowout).

Blowouts are the most costly and feared operational hazard related to oil and gas operation. Blowouts occur when there is an imbalance of pressure between the inside and outside of the down-hole casing. The fluid in the hole must have a hydrostatic (i.e. liquid) weight sufficient to counter balance the outside formation pressure. If the mud weight is too

heavy, the fluid will be pushed out into the form-

ation. Conversely, if the mud weight is too light, the gas or oil in the formation may force its way up the hole and a blowout is under way. A spark from the surface equipment could start a fire or cause an explosion.

Blowouts occur anywhere in the world where drilling operations are conducted. According to a United States Department of Interior Geological Survey, during an 8-year period, 1971-1978, 46 blowouts occurred on the outer continental shelf of the United States thirty of the blowouts occurred during drilling operation. The remaining 16 blowouts occurred during completion, production and workover operations. During the 8-year study period, 7,553 wells were spudded and one blowout occurred for every 250 wells drilled.

E. Danenberger (US. Dept. of Interior Geological Survey, open file Report 80-101, 1980) in this study (Outer continental shelf OIL AND GAS BLOWOUTS) concluded that "because of the differences in local geology (from both hazards and resources standpoints) and operating conditions, the complex human factors that are involved, and continuous technological changes, one cannot realistically expect to forecast blowouts by analysing historical records. This applies to mature areas and especially to frontier areas. Attempts to make forecasts and extrapolations are often misleading and should not serve as the bases for policy determinations".

Detailed well control insurance underwriting loss sta-

tistics are not readily available. However, general loss data from two LLOYDS of London marine underwriting syndicates supports the conclusions in Mr. Danenberger's report that losses cannot easily be predicted. (Janson Green 1980 Loss results for Well Control Insurance Unpublished report).

Since blowouts can be both frequent and severe, it is important to identify the factors which affect the total loss potential. These factors are organized into three categories as shown in Appendix (ii) There is no consensus among experts as to the maximum blowout exposure at any particular location or depth. The advice of an experienced petroleum geologist who is familiar with the particular area to be drilled is invaluable. He or others knowledgeable in the area may know the zones, pressures and gases of the drilling prospect in order to better estimate the loss potential. One company qualified in well control adjustment, indicates three times the original drilling cost may be a useful average multiple for estimating the cost to control and redrill land wells in the United States as a minimum guideline. Guy Mathews, president, Mathews Daniel Company, (Personal Interview 1982).

A multiple of three may be too conservative in deeper zones with known high pressures. Thus, multiples of 6 or more times the original drilling cost may be more appropriate for some location.

With wells being drilled deeper and blowouts increasing dramatically in recent years, there is no sure to measure objectively the maximum loss potential of a blowout.

### 3.2. Well Out Of Control

Well out of control is considered one of the major hazard of the oil industry, and shall be defined as a well from and whilst there is a continuous flow of drilling fluid, oil, gas or water above the surface of ground, or water bottom in case of a well(s) located in water, which is uncontrollable and cannot be controlled by the blowout preventer or storm shokes or Christmas Trees or other equipment required.

Frequently a well be out of control in the oil industry sense, even though the flow of drilling fluid, oil, gas or water does not manifest itself "above the surface of the ground". Technically it is possible that a well could be "out of control" without a "blowout" occurring for insurance purposes. While recognizing the fact a "blowout" may be a peril whereas a well "out of control" is a result, it is difficult nevertheless to reconcile the differences in actual meaning if any, between the two terms. Both definitions require the following:

1. A continuous flow
2. That is uncontrolled or uncontrollable
3. Of specific substances
4. Above the surface of the ground
5. Which cannot be controlled by well control equipment.

However, the definition of a "blowout" seems to additionally require the following:-

1. The flow must be sudden and accidental
  
2. It must be followed by another flow

3. It must lack the capacity for "prompt" control by the specially equipment.

However, the difference in actual meaning between the two terms "blowout" and "well out of control" may be spurious.

Problems is the interpretation of words arise in all aspects of a legal society. Supreme court justice Felix Frankfurter once commented. "I don't know how to define pornography, but I know it when I see it". A similar situation exists in well control insurance. While the policy definition of a well "out of control" is simply and broadly stated. It does not encompass every factual loss of fluid or pressure situation at the well site.

### 3.3. Machinery Breakdown

Refinery operations is one of the major operational phases of the oil industry, range from basic crude oil cracking activities through to production of the more complex downstream product which would include incidental LPG.

There are very important and valuable machineries in oil refining operations, the wet gas compressor, which takes the cracked goes from main column to recovery train is a critical unit. Catalytic reforming units (e.g. plat formers) are totally dependent on the operation of the recycle gas machine which is usually steam turbine or electric motor driven centrifugal compressor.

A machinery breakdown incident could cause an inter-



ruption up to 12 month in the worst case Scenario causing a loss of profits of up to 390 million ptas plus ofcourse the cost of repair of replacement of the machinery affected.

High pressure units, including hydro-treaters and hydro-crackers, are often provided with only one feed pump for cost reasons. These limits are generally very liable if well maintained but catastrophic failures do occur, and such an incident could cause a problem if the pump casing were damage. Spare rotors for these items are often kept in stock, but it is unusual to keep pump casings.

Since in most cases the material loss is accompanied by an interruption or interference of the insured's business operations. The result is a financial loss in the form of loss of profit and unearned standing charges (wages, salaries, interest payments, depreciation etc.). In many cases the loss sustained as the result of the interruption of business operation for exceeds the material loss and for this reason loss of profits following machinery breakdown insurance is normally purchased in addition to straight Machinery Breakdown Insurance.

#### 3.4. Pollution and Clean-up

Oil pollution is one of the main hazard of oil industry. Oil pollution in onshore operation, mostly resulted from peril such as a "blowout" or well becomes "out of control", due to uncontrolled flow from

the well of oil, gas or water above the surface of the

ground. This flow of oil causes a lot of pollution surface of the ground. This flow of oil causes a lot of pollution losses. Direct losses which could include body injury, diseases and mental suffering, damage to, and deterioration of, real property, wood land, and agricultural; indirect losses which could include increased cost and loss of profits due to either business interruption or the impairment of land fertility, contamination or pollutants into or upon land. The atmosphere or any water course or body of water. The operator also will spend large amounts of money to clean-up or contain pollution and contamination in an effort to avoid legal liability imposed by law or by contract.

Prior to the Santa Barbara oil spill in 1960s, insurance for seepage and pollution liability and clean up/containment expenses was not identified as a separate insurance since it was covered, in most instances, by the general liability and umbrella liability policies. After the Santa Barbara spill, however, American Insurers began specifically excluding the pollution exposure. Of necessity, this led to the creation of a market which specifically identified and insured the seepage, pollution, clean-up and containment exposure. Lloyd's underwriters responded by offering the pollution coverage in the OEE policy (Operators Extra Expense Indemnity) on an "occurrence" basis (thereby covering "gradual" or non-sudden seepage as well as "sudden and accidental "pollution") for wells insured for control of well expenses.

However knowledge and careful review of leases agre-

ements by leasee reveal many exposures and liabilities to him, and this will give him chance to reduce or eliminate his liability to lessors and to other property owners, or even pass some of these continuing exposures on to other in subsequent contracts.

#### 4. Major Classes of OnShore Oil Insurances

##### 4.1. General Introduction

The previous chapter has outlined the framework, activities and hazards of the industry and pointed out various special factors to be considered for insurance purposes.

There are three separate phases in the development of any oil or gas field:

- (i) Exploration Drilling.
- (ii) Construction and Installation of the production equipment.
- (iii) Production Operations.

The insurance factors for each phase are described in this chapter. In contrast to offshore insurance, many onshore insurance are arranged for a single company and its risk management philosophy is an important factor to underwriters. They are particularly concerned with detail of the physical risk.

However, there is one fundamental difference between "oil and gas" and other branches of insurance, which needs to be explained. Most types of insurance are

purchased in the name of a specific assured and

cover the property of the Named Assured or the legal liability of the Named Assured to third party property or persons. Almost every activity in the oil industry is a co-venture between:

(a) A group of oil companies, one of whom is designed the "operator" who is responsible for managing and operating the project and,

(b) The various contractors who are employed to carry out the project. These can include owners of drilling rigs, supplier etc.. and companies who provide specialist services such as well logging, cementing, catering and maintenance work.

Therefore in very general terms, insurers accept that it is the venture that is being insured, rather than the individual companies participating in it. The contracts between the companies will state clearly which company is responsible for purchasing each type of insurance. The contractual agreements thus reached, with waivers of subrogation between the parties, simply the overall insurance programmes.

#### (i) Exploration Drilling Phases

Following receipt of satisfactory geophysical data on the lease in question the operator will negotiate for the charter of an appropriate drilling unit from a contractor to drill the exploration wells. Whilst the allocation of the principal risks during these phase is determined in the contract between the operator and drilling contractor, other significant liabilities arise through the involvement of other sub-contractors. Each contract has to be analysed, the liabilities identified and appropriate insurance coverage

arranged.

No two drilling contracts are the same in that the devision of responsibilities various in details. However, the principal exposures can for convenience be divided into following categories:

- (i) Damage to owned property and to property belonging to other parties involved in the drilling operations.
- (ii) Bodily injury to drilling contractor's employees and to their employees of their sub-contractors.
- (iii) Bodily injury to operator's employees and to the employees of their sub-contractors.
- (iv) Third party liabilities.
- (v) Cost of control, redrilling expenses and seepage and pollution.
- (vi) Removal of Debris.
- (vii) War and political risks.

Once the liabilities have been defined and oppoitioned in most contracts there is an Article dealing with the general subject of insurance, together with a schedule of minimum insurances to be carried by the contractor. The contractor will be required to present either copies of the policies or certificates of insurance evidencing coverage and maintenance thereof.

It must be remembered that the Drilling contract is a document arising out of a negotiated situation.

Certain liabilities will always remain the province of the operator e.g. cost of control, pollution etc . and others that of the contractor e.g. damage to the drilling rigs. Other areas of responsibility may fall on either party. Much will depend on the expertise of the negotiators and also of the number of the contractors bidding for a job and the availability of suitable drilling rigs. In times when there is little work for contractors, the operator will be able to force the contractor to accept additional responsibilities. Conversely when there is a shortage of available units, the operator will have to accept more responsibilities in order to persuade the contractor to accept the job.

(ii) Construction and Installation Phase

Once the field has been discovered evaluated and declared to be commercial value, the next stage is to construct and install the onshore production properties. In normal field these will consist of fixed onshore platforms, storage terminal pipelines.

There will be a large number of contractors involved in the supply of equipment, fabrication of the properties, transportation, installation on site. If each of these contractors were allowed to provide insurance for his particular part of the project it would:

- (a) Be impossible to monitor and administer
- (b) Be difficult to ensure that adequate insurance is in force.
- (c) Leave the possibility of that some risks would be

uninsured or doubly insured.

It is therefore normal practice for one policy to be purchased which covers all of the project right through from supply of equipment to final commissioning. This policy is usually bought and controlled by the operator, although in some cases the major contractor acting as a project manager may do so.

(iii) Operational Phase

Once all the construction contractors have left the site and the field begins production all the major insurance are purchased by the operator.

(a) Fixed onshore properties-physical damage

These would be insured on all risks form including the removal of the Debris.

(b) Cost of Control

This is the same policy as used during the exploration phase, but in addition to the drilling wells it would also cover producing shut-in and idle wells.

(c) Third Party Liabilities

The operator would by third party liability policy with a limit appropriate to the area of the world in which the field is located.

(d) Loss of Production and/or Revenue

This is an expensive form of insurance owing to its past claims record. It is usually purchased in those cases where the loss of production arising from a shut down of the field would cease financial difficulties for the oil company. Major oil companies who have production from many fields in many countries would

not normally need to buy this insurance.

There are three major classes of onshore oil insurance:

1. Physical damage on an all Risks or Named peril basis (e.g. OEE).
2. Business interruption on an all Risk or named peril basis.
3. Third party liability (often linked to marine and or aviation liability cover).

These will be discussed in detail in this chapter with examples of suitable policy wording, since there are few standard wordings.

#### 4.2. Physical Damage Insurance

Insurance against direct physical damage to drilling rigs and another equipment at the well site has been readily available for some time. Workers compensation insurance is available, if injured as a result of blowouts, while general liability and umbrella liability policies cover many blowout exposures creating liability to others for bodily injury or property damage. However, the Standard Insurance Service Offices (ISO) comprehensive general liability policies have specific exclusions for expenditures of the insured to control blowouts of the insured's well or for liability to others for well control expenses incurred to control a well which has blown out as the result of a blowout of the insured's well.



As operators intensified their efforts to find oil and gas in deeper and/or more complicated formations, the risks and expenses of controlling blowouts increased, sometimes geometrically. Until the 1940s insurance underwriters traditionally considered these out of pocket extra expenses as uninsurable business risks.

However while there are few "standard" policies, the Lloyd's of London September 1978 Operator Extra Expenses Indemnity (OEE) policy will be used as a foundation for discussion and analysis. In the late 1940s Lloyd's of London's marine syndicates first offered a control of well policy to operators and nonoperators. It covered only the costs to control a blowout, crater or fire. Thus the OEE policy has its origins as a type of property insurance coverage, even though the policy did not insure against direct physical damage to property at that time. In the early 1960s, agents, brokers and buyers showed considerable interest in underwriters insuring other out of pocket expenses i.e. the costs to REDRILL a well which had blown out. The London market responded again, but redrilling expenses coverage initially was underwritten as a separate policy from control of well insurance. Indeed, the basis of rating of the two coverages differed in that control of well was priced on a rate per foot drilled basis while redrilling was priced on a rate percentage of the drilling and/or completion costs of the well.

The original scope of the well of control insurance policy (OEE) has been expanded over the years to cover a wide range of expenses and liabilities incurred by

the insured as consequence of a blowout and attendant cost to control it.

The 1978 London Composite "All Risks" of physical damage and/or DEE insured against the following expenses, liabilities and damages:-

1. The cost of REGAINING CONTROL OF A WELL which has blown out, including costs incurred after the flow has been controlled at the surface of the ground if such control measures are at the direction of regulatory authorities. This includes necessary costs to drill relief wells.
2. The costs incurred in extinguishing an oil or gas well fire.
3. The costs of REDRILLING a well which has been lost or damaged as a result of a blowout, crater or fire back down to the depth at the time of loss, not to exceed the original cost of said well.
4. The costs and expenses resulting from SEEPAGE, POLLUTION or CONTAMINATION:
  - a. Liability for damage to or loss of use of property or bodily injury (including costs of defense).
  - b. The costs of removing, nullifying or cleaning up seeping, polluting or contaminating substances emanating from property or wells insured.
5. Damage to or destruction of the insured's property. "All Risk" coverage is provided for such things as platforms, production property, etc. , including

the cost to remove debris.

The OEE policy contains numerous exclusion, there shall be no indemnity or liability under this policy for:-

- (a) Loss of any well or wells, or hole or holes.
- (b) Any fines or penalties imposed under the laws of any State or Country or other Government entity.
- (c) Any punitive or exemplary damages.
- (d) Any claims arising directly or indirectly from seepage, pollution or contamination if such seepage, pollution or contamination:
  - (i) Is deliberate from the standpoint of the Assured or any other person or organization acting for or on behalf of the Assured, or
  - (ii) Results from violation of or non-compliance with any rule regulation or law of an applicable Government entity.
- (e) Any claims arising directly or indirectly out of the transportation of oil or similar substances by watercraft.
- (f)
  - (i) Hostile or warlike action in the time of peace, or war, including action in hindering, combating or defending against an actual impending or expected attack (a) by any government or sovereign power or by an authority maintaining or using military, naval or air forces, or (b) by any agent of any such government power, authority or forces;
  - (ii) Any weapons or war employing atomic fission or radioactive force whether in time of peace or war:

- (iii) Insurrection, rebellion, revolution, civil war, usurped power, or action by governmental authority in hindering, combating or defending against such an occurrence, seizure or destruction under quarantine customs regulations, confiscation by order of any government or public authority, or risks of contraband or illegal transportation or trade.
- (g) Any loss, damage or expense caused by or attributable to earthquake or volcanic eruption; nor fire or explosion and/or tidal wave consequent upon earthquake or volcanic eruption.

This exclusion does not, however, apply to the following areas:

- (i) Gulf of Mexico not East of eighty-two degrees West and not South of eighteen degrees North; (the general term Gulf of Mexico shall be deemed to include tributary waters and the International Canal).
  - (ii) The North Sea.
  - (iii) The United States of America East of the States of Arizona, Utah and Idaho.
  - (iv) Canada South of Sixty degrees North.
- (h) For any claims caused by, resulting from or incurred directly or indirectly as the consequence of an act for political or terrorist purposes of any person or persons whether or not agents of a sovereign power and whether the loss, damage or expenses resulting therefrom is accidental or unintentional.

- (i) Loss or damage due to wear and tear, error in design, gradual deterioration, rust, corrosion, dampness of atmosphere, extremes of temperature or mechanical breakdown. Nor does this insurance cover the cost of repairing or replacing any part which may be lost, damaged or condemned by reason of any latent defect or inherent vice therein.
- (j) Loss or damage to electrical equipment or apparatus caused by electrical fault or breakdown unless fire ensues and then only loss or damage directly caused by such fire.
- (k) Loss, damage or expenses caused by or arising out of delay and/or loss of reservoir or reservoir pressure of the property and wells as scheduled in paragraph M.
- (l) Loss, damage or expenses caused by the infidelity of the Assured or any other person or organization acting for or on behalf of the Assured.
- (m) Loss or damage to oil and/or gas except while in storage after production on offshore property as scheduled in paragraphs M. (1) and M.(3).
- (n) Loss or damage to drill stems, casing or tubing in the well or other in-hole equipment.

#### 4.3. Machinery Breakdown Insurance

Traditionally, the peril of the breakdown of boilers and machinery has been separate from of fire and named additional perils. This was partly because it did not have an extraneous cause and partly because specialist engineering consideration were involved in its underwriting.

The development of "All Risks" insurance increased pressure on underwriters to include the peril, that is to say, to omit it from the of exclusions in an "All Risks" policy. There is once again resistance to in conclusion of this peril, particularly if there are fears about management and maintenance in a given risk. Also many insurers find that their fire etc. . Treaties preclude them from declarations which include Machinery Breakdown cover. Thus severely restricting acceptances to a net retention.

Where a policy is covering property on a blanket basis, it may be possible to obtain beneficial terms for Machinery Breakdown if it is limited to a list of items agreed with underwriters.

Machinery Breakdown Insurance covers loss or damage to insured Machinery as a result of any unforeseen and sudden accident. Possible causes of such accidents can include defects in casting and materials, faulty design, faults at the workshop or in erection, bad workmanship, lack of skill, negligence, malice, fearing a part by centrifugal force, short circuit, storm, frost and ice or any other cause not specifically excluded from the cover. Exclusions can include, for example, fire, lightning, chemical explosion, Acts of God, war and revolution, some of which would be covered under a normal material damage insurance. For an accident to be indemnifiable it does not matter whether the machinery was working or at rest, while being dismantled for cleaning and overhaul or whether being removed to another location within the Insured's premises.

Under machinery breakdown insurance, indemnity is provided in respect of damaged or destroyed Machinery Solely for the material loss sustained by the Insured. This type of insurance does not protect the Insured against all losses which may arise in connection with the breakdown of machinery since in most cases the material loss is accompanied by an interruption or interference of the Insured's business operation. The result is a financial loss in the form of loss of profit and unearned standing charges (wages, salaries, interest payments, depreciation etc.). In many cases the loss sustained as a result of the interruption of business operation for exceeds the material loss and for this reason loss of profits following Machinery Breakdown insurance is normally purchased in addition to the straight Machinery Breakdown insurance.

To properly determine the need for and scale of the insurance requirements. In these areas a careful evaluation of the company's exposure is required. As a starting point, critical machinery (in respect of both value and its importance to the production operation) must be identified for each location. For each item basic detail including the value and replacement times need to be established.

The effects on the production operation should then be established and evaluated to determine the on profits at a local level. In any event the profit contribution per process unit per unit of production is generally available (this has been the form of loss of profits information in the past) and this can be utilised

to established the gross exposure in respect of loss of profits following machinery breakdown. It should be borne in mind that measures taken to mitigate loss usually involve increased cost of working which should be taken into account in evaluating the total exposure.

In this way it should be possible to identify the maximum exposure to the company both in respect of the Machinery Breakdown itself and any consequential loss of profit. The numbers thus evaluated will indicate the limits of cover which need to be purchased. This should of course be set at a figure to provide a margin which would allow for any possible increases during the policy period.

It is normal in the oil and petrochemical industry to follow the practices outlined above to minimise the machinery breakdown exposure, both in respect of property damage and loss of profits.

#### 4.4 Business Interruption Insurance (B.I.)

Much of what has been written with regard to property damage and Machinery Breakdown applies also to Business Interruption (B.I.) . Where B.I. Insurance is required, it is preferable to present a combined property damage/B.I. slip to Insurers, since they are generally not prepared to take a higher percentage share of B.I. limit compared to property damage.



With the reduction in demand major companies are generally not interested in purchasing B.I. insurance, since the fall in production at one of their plants could be compensated at another location or in another country. The main exception is in respect of petrochemical plants where it is a recognised fact that minor property damage could cause lengthy stoppages and disproportionately higher claims.

The present economic climate means that few petrochemical companies are operating at a profit. Far from reducing the demand for B.I. cover this in fact has led to a greater need to protect Insured's standing charges, particularly wagheroll and interest on loan repayments.

The various alternative methods used for hydrocarbon risks. As mentioned, there is currently a greater demand for a standing charges only form rather than a full Gross Profit Policy.

Both forms include provision for additional working expenses. The indemnity period should represent the estimated time it would take for a plant to be restored to the same operating conditions as applied before the material damage incident. In the hydrocarbon industry this may be three to four years, because oil companies will usually have to import replacement part which need to be purpose built. In practice, the Insureds generally choose an indemnity period for which the premium corresponds to their budgetary requirements. It is advisable to obtain quotations

for 12, 18 and 24 months for clients' consideration. (Reference should be made to the Engineer of the oil and gas Division for the minimum recommended period for any particular plant).

The indemnity period would normally commence from the date of the property damage loss. However, the introduction of waiting periods to replace monetary deductibles means that the indemnity period effectively commences at the end of the waiting period. Particular feature of waiting period in respect of hydrocarbon risks can be the imposition by Insurers of an obligatory waiting period (which can be as high as 30 days) during the first year of new business.

There are no special features with regard to stating the location of the premises of the insured, but careful enquiries need to be made with regards to claims potential arising from offsite extensions. These can take form of suppliers' extension (e.g. a major source of feedstock of the plant concerned), a customers' extension (e.g. where there is a contractual commitment to supply product which in event of a plant shut down would need to be secured, at possibly higher costs, elsewhere), and/or a public utility extension (e.g. the closure of a power station or gas works providing power to the premises). It should be noted that only a loss due to stoppage at such off-site premises following an insured peril event, would be indemnifiable.

The major oil and petrochemical underwriters are now

well aware potential consequences of such extensions and it should be noted that offsite extensions may give rise to an accumulation problem for such that offsite extensions may give rise to an accumulation problem for such underwriters and therefore a market capacity problem for the broker on the whole property damage/B.I. slip.

It is now customary within the oil/petrochemical insurance market, due to the international oil/chemical price fluctuation and/or government price intervention (either of which can materially affect any estimated gross profit), to allow automatic adjustment, at the end of the policy period, of both the sum insured (retroactively) and the premium. Usual limits are a maximum 30% increase or 50% decrease (known as 30% up 50% Down Clause).

In summary this cover is normally combined with physical damage and underwriters are very reluctant to write it alone. The special features of this peril is the way in which a breakdown, which costs little to repair and may be below the deductible, can cause a very substantial interruption loss. This applies in the oil and gas sectors where a particular item has been designed for a given location and replacement parts will have to be specially made.

#### 4.5. Third Party Liability Insurance

In general Third Party Liability in the oil and gas industry onshore is dealt with in the same way as any

other non-marine liability insurance, and by the same underwriters, some preferring to write lower layers and other high excess layers.

The following are the special aspects to be taken into account in respect of an oil or gas placement:

(a) Where the insured has exposures both on and offshore, every effort should be made to combine them. Because of the interlinking relationship between production platforms, pipelines and onshore processing location, gaps in cover could easily occur if underwriters are unwilling to make this combination. Currently marine underwriters are more prepared to include non-marine risks than the converse, but Lloyd's have been attempting to enforce a division.

(b) A major liability hazard in these industries is the damage caused by seepage and pollution. Many underwriters will wish to exclude this absolutely. It may be possible to "buy back" this risk when caused by fire, explosion or vehicle impact only or when sudden and accidental only. The exception to this is in Drilling Exploration and production activities where it is normal for insurers to provide seepage and pollution liability cover as part of a cost of well control policy.

(c) A notable hazard to which oil companies are exposed is the refuelling of aircraft. One of the most catastrophic events that can be imagined in this area is that as a result of the wrong fuel being put into an aircraft, it crashes onto a major city killing or

injuring all the passengers and crew and many people in building or in the open, and causing extensive fire, explosion and impact damage to property. Oil companies will probably want higher limits for this risk than those they have chosen for general liability and the excess aircraft refuelling layers will normally be written by aviation underwriters.

(d) Surveys, which used to be confined to physical damage and business interruption, are now available for the third party risk and may be particularly in the oil and gas industries.

Location and surrounding property are particularly important factors. A terminal, which may carry a comparatively low rate for physical damage, will have a high liability risk if it is in a built up area. In contrast, a refinery is normally located away from residential areas and covers so large an area that even major explosions are unlikely to affect third parties property.

## 5. Claims Procedures

In general there is nothing special in the method of setting claims for this industry. However one of the following may apply:-

- (a) Claims cooperation clause- Reinsurers may wish to state the extent to which they wish to be involved with original insurers in the adjustment and settlement of a claim. Sometimes they make this apply only when the potential claim exceeds

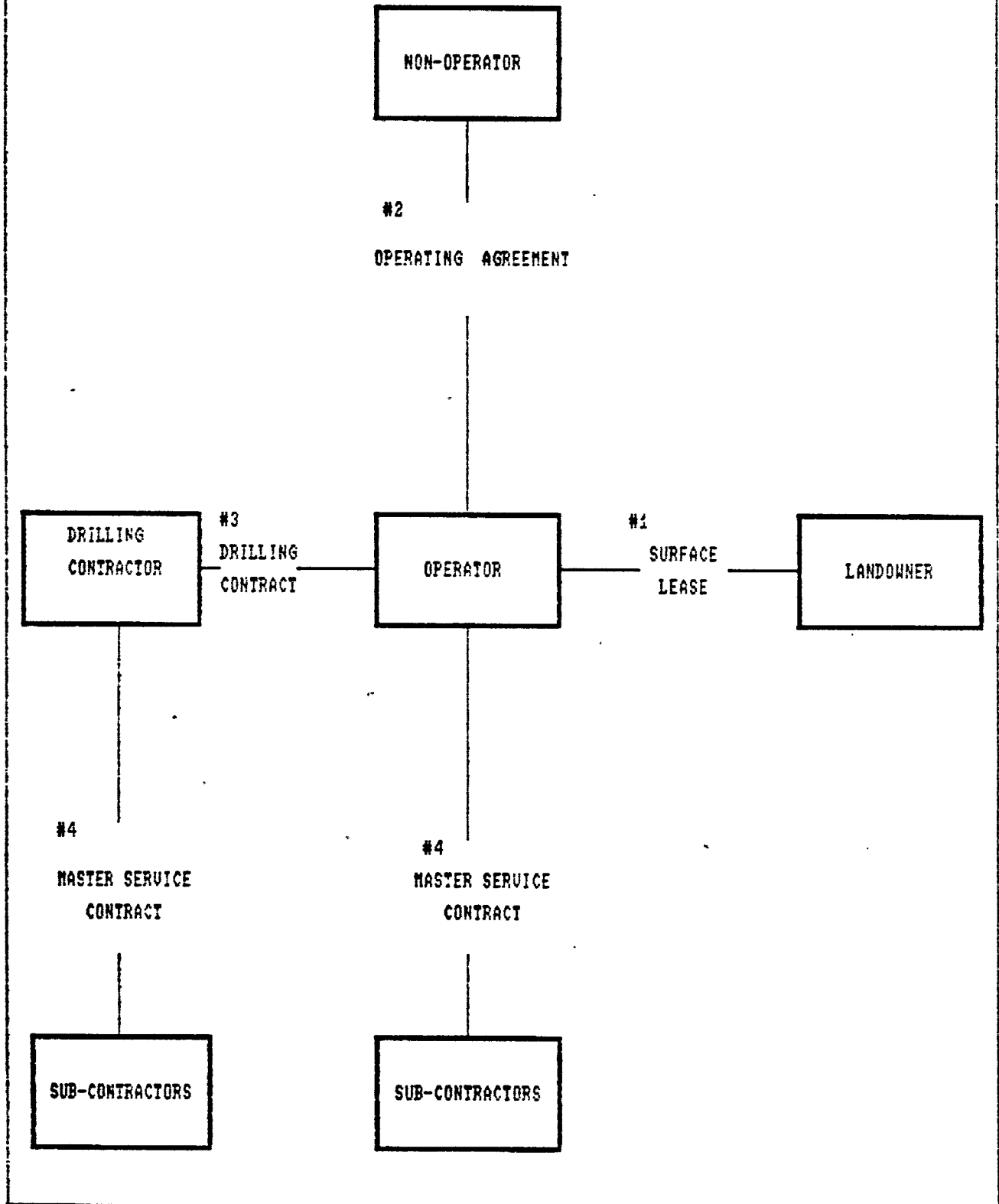
a given figure.

(b) Claims control clauses- this is similar to (a) but Reinsurers in this case insist on making the ultimate decision on adjustment and settlement.

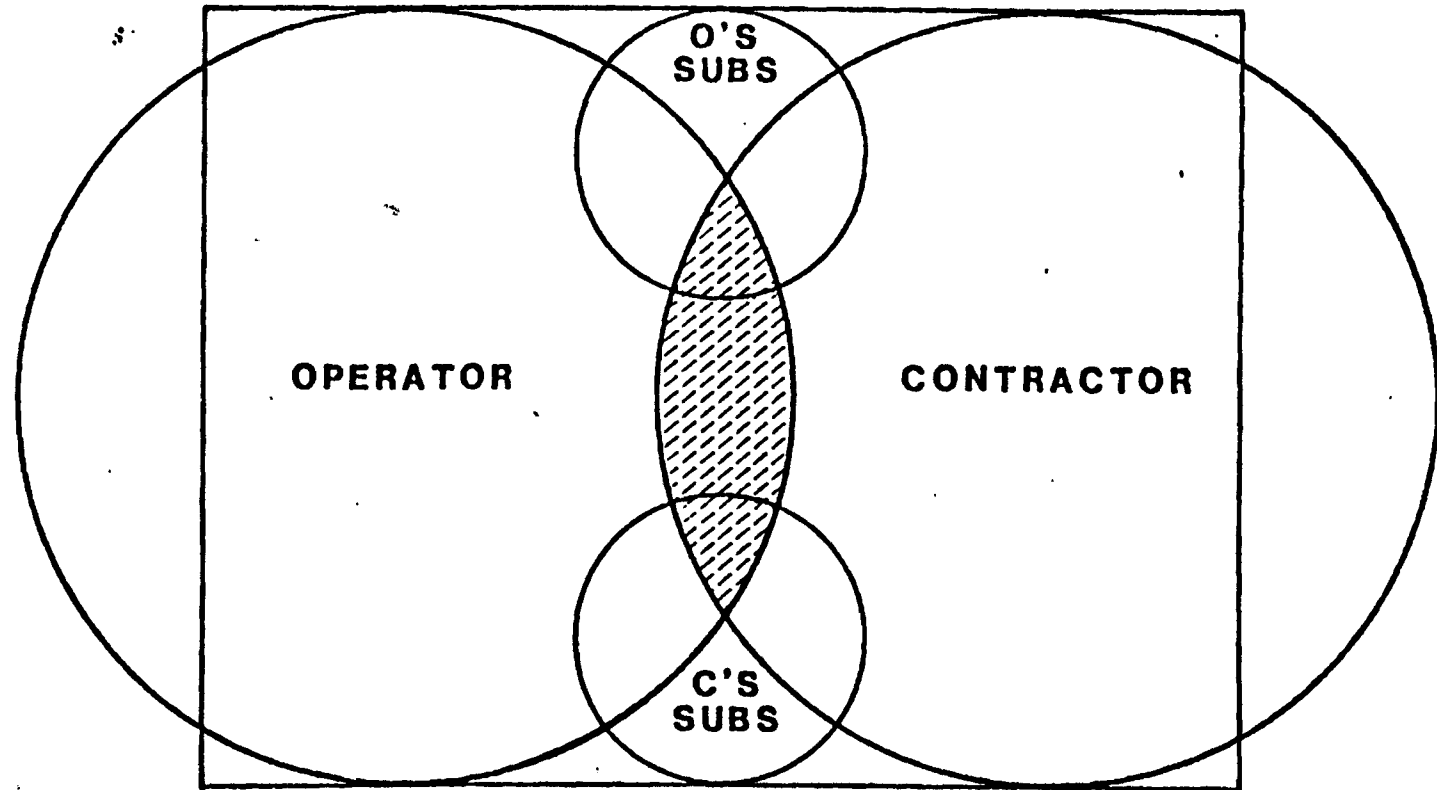
(c) Nomination of adjusters- this may be applied by Reinsurers in (a) and must be in (b). There are international adjusters who are specialised in this industry and it is not an common for such adjusters to be named in the policy wording.

Figure(i)

CONTRACTUAL FRAMEWORK OF TYPICAL  
OIL AND GAS VENTURE



**FIGURE 3.1**  
**WELL SITE**



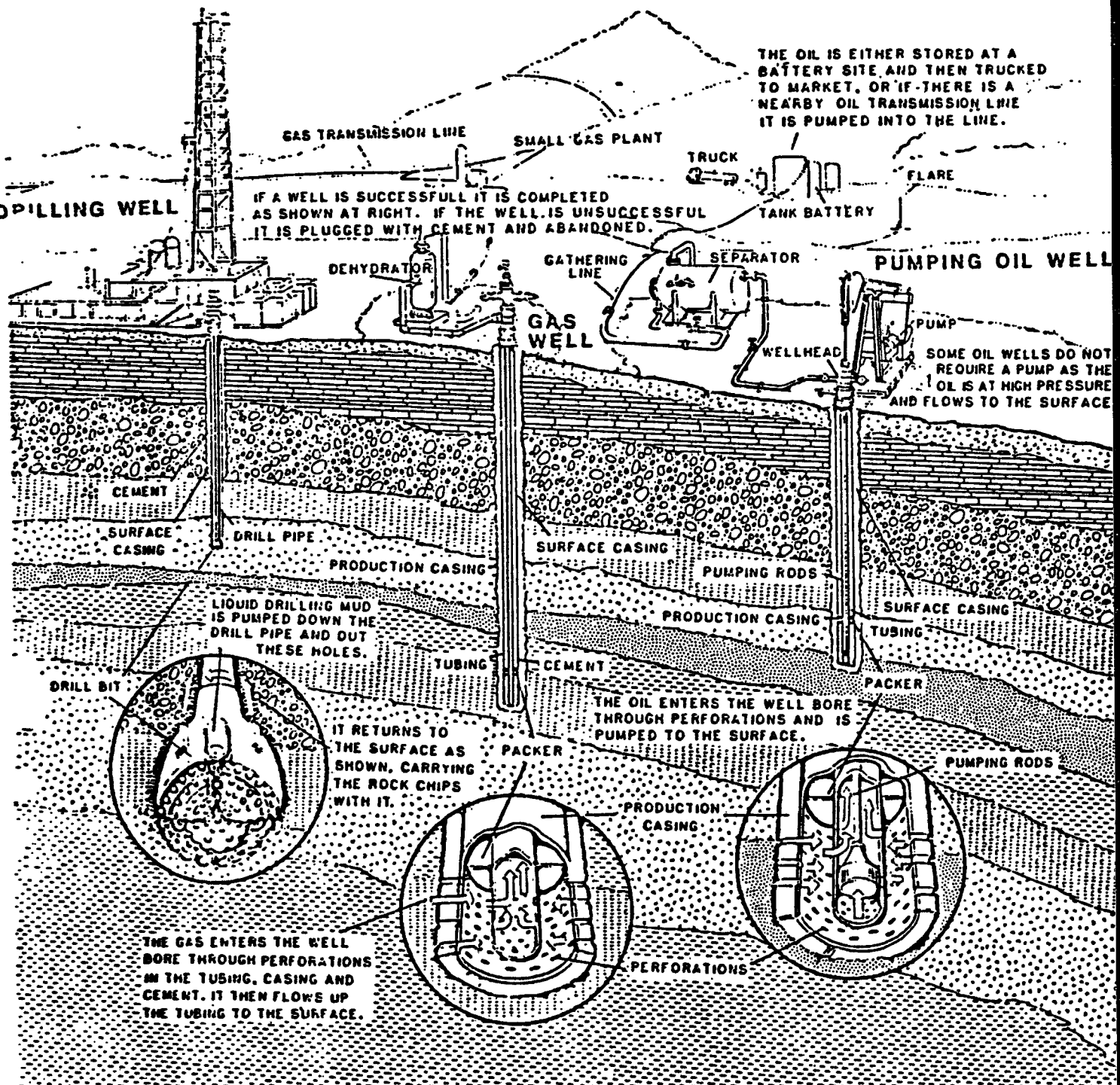
**CONTRACTUAL SPHERES OF RESPONSIBILITY**  
**IN TYPICAL OIL & GAS VENTURE**



FIGURE (iv)

DRILLING AND PRODUCTION ACTIVITIES

THIS ILLUSTRATION IS PROVIDED TO HELP YOU BETTER UNDERSTAND THE TERMINOLOGY USED IN DESCRIBING OIL AND GAS DRILLING ACTIVITIES.



COURTESY OF CONSER PETROLEUM CORPORATION

## CHAPTER FOUR

### SUMMARY AND CONCLUSION

#### 1. summary

Oil and its installations are capital intensive operation combining high-hazard technology with a high concentration of value. The rating of oil risks is fraught with difficulties inherent in the characteristics of the class-individual and companies, (involved in oil trade or exploration) no matter how financially strong they may be, usually do not afford to go in this business without insurance. Even the gaint multinational oil companies like (seven sisters ) who today have highly sophisticated risk management programmes and various forms of self-insurance programmes still require the protection of insurers for catastrophe exposure such as total loss or major general average etc. . As insurance is just another form of risk transfer, amongst all other types of risk-taking all the oil trader and oil companies use the insurance to transfer some risk of oil industry. For oil insurance the market basically there are two principal sectors, the marine and non-marine, with both Liloyd's Underwriters and insurance companies participating in each sector. These days a certain degree of self-insurance exist in all sectors. The marine market covers hull and machinery of the ship, the cargo, and the freight. The marine market

will not provide demurrage cover, which obtain through (P & I) Club.

Marine insurance is designed to protect the insured against the risk of the perils of the Sea, and acts of war, and unforeseeable loss. The duty of procuring cargo insurance when carried by is depending on the terms of the contracts of sales. But bear in mind that when you are buying CIF you are as much buying a policy of insurance as you are buying a cargo of crude oil, it is essential that when you buy CIF you know what the terms of the the insurance policy that you are buying are, and who the insurer is. The important part from the trader's point of view is that you get the terms of your insurance cover agreed. Because it can come as a nasty shock to find that you are not as fully covered as you were going to be (the Salem case ).

The transportation of oil by Sea although it is still the cheapest mode of carriage, it is the most risky way due to characteristics of the cargo carried. The oil trade has recognised the existence of losses which may almost be considered inevitable. Like following loss:

1. In transit loss
2. Rob loss (Retained on board)
3. Ship/ Shore measurement

The oil industry stipulated an allowance of half of one percent in contracts calling for these shortages,

due to the decline in accuracy of loading and discharge details and the inherent vice of the oil ( higher clinging, ROB factor and evaporation ) allowance may frequently be exceeded although there has been no physical loss of oil by reason of the operation of a marine peril.

The major problems in oil transportation are the problems relating to measuring accurately the amount of oil loaded against the amount of oil discharged and the broker when placing coverage for trader must ensure that the method of measuring this outturn differential must be built into the wording of the contract at the outset and clearly understood by the two parties to the contract, being the oil trader and the underwriters, in order to avoid disputes as to which method of measurement will be adopted after a shortage is notified. The most common method will be to compare net amounts shipped to net amounts delivered.

Oil transportation is the major source of a pollution (The Torrey Canyon Oil pollution in 1967, the Santa Barbara Oil spill in 1969, and Exxon Valdez in ALASKA in 1989.). The more complicated, and most vital, area for operator in the field of oil is legal liability to third parties, which generally arise out of escapes, spillage or other forms of loss of containment of cargo at the terminals.

Marine insurers could be exposed to claims for contamination or pollution damage both hull cargo under insurance written on an all risks basis. Hull insurers are exposed to collision liability claims too under the provisions of the running down clause under which the insurer is liable for three-quarters of the cost of damage to the property of third parties caused by a collision of the insured vessel. Following the extensive oil pollution of the English and French Coasts caused by the Torrey Canyon in 1967, British Insurers amended the clause to limit their liability only to damage to a third party's vessel or cargo directly due to the leakage of cargo or bunker oil of the insured vessel following a collision between the two vessels. Thus UK hull policies clearly exclude any liability or general environmental damage. Insurers established in most other countries followed suit.

Shipowners' pollution liabilities are mainly covered by the protection and indemnity (P&I) mutual clubs, the cover being arranged to protect shipowners against their liabilities under the provisions of national statutes and international conventions governing pollution at sea and other waterways.

The 1969 International Convention on civil liability for oil pollution damage get the pattern of (a) imposing a strict liability on shipowners for damage caused by oil pollution, (b) placing a limit on the amount of that liability, (c) virtually making insurance compulsory, and (d) giving a right of direct action against the insurer if the shipowner fails to pay. The major

oil companies and tanker owners responded by entering into voluntary agreement concerning liability for oil pollution (TOVALOP), and in 1971 the International Fund for oil pollution Damage) the contract regarding an Interim supplement to tanker liability for oil pollution (CRISTAL). Since 1969, as the P&I clubs have acquired more claims experience, they have raised the upper limit to the indemnity they will provide from US \$14.4 M to US \$ 300 M in 1985 (Gold,1985).

Contamination is one of permanent risk of the oil transportation, in circumstances in which samples are taken from the ship, there must be risk of contamination from previous cargos. To avoid this risk usually samples are taken from shore tanks, even in this case there must be a grave risk of shore line contamination. The only solution to the problems is to take samples of the products otherwise than at the place where the risk is to pass.

In recent years shortages of sweet crude and fuel oil occur where vessels have used cargo for bunker purposes- The attention of underwriters is drawn to a recent charge in rates of the American Bureau of shipping and other classification societies which now permit the burning of crude oil and slops for bunker purposes. Shortages can be confirmed if a check on ship's bunkers is made at the time of discharge.

As an attempt to solution to underwriter problems relating to oil shortage MR ANTHONY J P KING (Assistant General Manager- marine) of Orion Insurance Company

in his statement "Insurance of oil cargoes and the Institute Bulk Oil Clauses" put the following solution to the underwriter:

- (1) To restrict their conditions and cut out shortage cover. An attractive choice but there is a demand for shortage or "difference in out-turn" cover.
- (2) To increase deductible. This can certainly be justified on the facts. Small shortages have become large shortages both in percentages and cash terms. Transshipment certainly increases the apparent loss and interestingly some transshipment facilities in the Caribbean work on an allowance of .3% transfer by pipeline also produces apparent shortages perhaps for the same reason.
- (3) Lastly to increase rates. In 1980 rates dropped substantially while results worsened. Unfortunately in 1984 rates are lower than in 1980 while monetary losses from all causes continue to increase."

These solutions put by MR King although it seems attractive but we as marine insurance is an international service commodity freely traded in many countries, we have to be aware of international competitive pressures, which make MR King solution is streamly difficult.

The basic insuring conditions for oil shipments are the American bulk oil clause SPI3C or Institute bulk oil clauses. The American clauses covered all Risks

excluding certain shortage, leakage and contamination losses unless caused by specific named perils such as stranding and sinking. Institute bulk oil clauses specified the risks to which bulk oil is prone. The perils are named.

In addition to these two basic insuring conditions, oil traders has encourage the development of insurance on a guaranteed out turn basis,. Guaranteed out-turn from the point of view of parties concerned with buying, selling and shipment of oil cargoes, the most desirable cover, because it pay average irrespective of percentage including leakage, shortage and contamination however arising in excess of 0.5% calculated upon.

Claims in oil shipment do occur not always by reason of a marine peril., However claims to be decided on whatever evidence is available and therefore covers must be tailored with these problems in mind, and the claimant has the burden of substantiating his claim, so he must produce evidence to show that the loss or damage was caused by insured perils and to prove the extent of his claim. So documentation on oil shipment is very important for preparation and proving of claims.

In most of insuring conditions for oil shipment there is a specific clause outlining the manner in which claims should be adjusted, and whether the adjustment is to be "gross to gross" or "net to net" basis.



The fundamental differences between onshore oil insurance and the other branches of insurance, is the most types of insurance are purchased in the name of a specific Assured and cover the property of that named assured or the legal liability of the named Assured to third party properly or persons. Almost every activity in the oil industry is a co-venture between group of oil companies responsible for managing and operating the project, and the various contractors who are employed to carry out the project. So insurers should understand that it is the venture that is being insured, rather than the individual companies participating in it.

There are five basic operational sectors in the oil industry onshore (exploration, production, refining, loading and storage, marketing) in contrast to offshore insurance, many onshore insurance are arranged for a single company and its risk management philosophy is an important factor to underwriters. Under each of the five sectors I have just outlined, there is a general outline of the property involved for insurance purposes.

Non-marine market provides cover for onshore properties and also the accidental financial loss or even loss of profits. It provides the following covers. The property Damage Cover provided normally given protection against fire and/or explosion following such natural catastrophes as earthquake, volcanic, eruption and windstorm. Whilst this will in most cases be all the cover required by the Multi-Nationals, the

smaller companies look for more comprehensive insurance protection either by insuring named additional perils or by purchasing All Risks cover with listed Exception or exclusions.

Business interruption cover normally means protection against the inability to earn net profit and basic overhead, but such protection is dependent upon these having been insured material damage loss preceding it; and the TWO must be connected directly. Business interruption is very important, because minor property damage could cause lengthy stoppages and disproportionately higher claims.

Other non-marine insurance provided by non-marine market are:

- (i) Machinery Breakdown- this cover normally include physical damage and protection against the peril of the breakdown of boilers and machinery. Recently these perils included in the "All Risks" policy, although there is still resistance to the inclusion of this peril, particularly if there are fears about management and maintenance in a given risk.
- (ii) Construction All Risks (C.A.R.)  
These construction All Risks normally covers material damage and third party liability within one policy, the period in a C.A.R. blanket policy will be 12 month or more with a provisions for cover to continue.
- (iii) Third Party Liability  
In general, third party liability in the oil

industry onshore is dealt within the same way as any other non-marine liability insurance, third parties liability arise out of damage caused by seepage and pollution, or wrong fuel being put into an aircraft.

Indemnity is provided to the insured for legal liability owed to third parties, together with legal expenses of defence of legal action of incurred. Location and surrounding property are particularly important factors to third party liability cover. A terminal, which may carry a comparatively low rate for physical damage, will have a high liability risk if it is in a built-up area. In contrast, a refinery is normally located away from residential areas and covers so large an area that even major explosions are unlikely to affect third parties' property.

Different hazards obviously exist in the various operations enumerated in onshore oil operation. It is necessary to quantify the nature and extent of the risks of loss and damage to which each type of property can be exposed in order to determine to extent to which these risks and the consequence thereof can and should be insured.

Because of the special hazards that exist in the hydrocarbon industry, major brokers have created specialist department to relate to the oil companies and their potential insurers.

## 2. CONCLUSION

Oil industry is capital intensive operation combining high-hazard technology with a high concentration of values. The rating of oil and oil industries risks is fraught with difficulties. Even Giant multi-nationals who have so many billions of dollars in assets that they can afford a substantial degree of self-insurance they still have to buy catastrophe cover.

It is a fact of life in the modern world of insurance underwriting that even if a large body of technical knowledge is available to the underwriter he is still at the mercy of market factors, such as competition over premium rates for the same risk.

A part from the actual rate of premium charged, possibly the most important item on underwriters checklist before he puts his signature to the insurance contract will be the figure represent the maximum likely extent of his liability under that contract (maximum probable loss or estimated maximum loss). In many industries, it may be possible to contain the fire and explosion with certain bounds by means of adequate separation or blast protections and to calculate with degree of confidence an appropriate EML factor. The underwriting of oil risks, however, requires a more sophisticated approach, which takes into account where appropriate the destruction potential of a build-up of explosive vapours released as a result of even relatively small containment failures.

The next most important consideration I would expect is the description of the risk that he is underwriting. Broadly speaking, rating of this types of oil risk is hardly an exact science. It would be utterly folly for any underwriter to lead in this class without either specialise in the class or have developed the engineering strength to support their own judgement. The only way to write oil risks is from a position of knowledge- knowledge of the process hazards and the particular risk offered. Regular on-site inspections by qualified engineers are essential, together with full disclosure of technical data by the placing broker. Everyone with close experience of energy-related risk knows that underwriting oil risks without complete technical information can be a "recipe for disaster".

The third most important item, as far as I understand, is the question of, adequate of insurance, that is "Does the sum insured represent the value at risk on absolute maximum liability under the terms of the insurance contract" as it is clearly appeared that oil pollution is one of the major hazards of oil. In most European countries insurance has been made available under public liability policies for pollution loss caused by sudden and accidental events, though in the case of high risk industries such cover will only be provided for premises that satisfy an insurer's loss prevention requirements following a survey. The short comings of the cover provided are usually in relation to: (a) the limits of indemnity available. (b) the exclusion of liability arising from continuous or

repeated pollutants (including such emissions which conform to legally permitted limits, and (c) the exclusion of preventive clean up costs. However, two leading London brokers questioned on the subject said that the majority of their clients are not interested in buying insurance against any pollution liability risks and there also appears to be little demand for cover against contamination of, or damage to, firms own properties.

The reluctance of insurers to supply insurance against pollution liabilities, or at least for gradual pollution, are due principally to the difficulties they have in defining, limiting and quantifying their potential liabilities. Those difficulties stem from the nature of pollution losses; the current state of knowledge regarding pollution and its possible effects, the limitation of existing loss data, and the uncertainty that exists regarding current and future laws dealing with the rights of third parties to compensation for loss sustained (the development risk).

For risks of the type that I have been discussing, I would reiterate that it is clear that even quite small losses can have very wide-ranging ramifications for the for the insurance market as a whole. To underwrite oil risks knowledgeably and economically need specialise pool, which could combine expertise with capacity; to meet as far as possible the specific need of the insured, and to inject into the market a measure of stability without destroying competition.

I believe that the emergency of a specialised market like International Oil Insurers (IOI) could promote stability and conditions conducive to the achievement of underwriting profit, the building up of reserves and, in the longer term, the development of capacity to keep pace with the immense investment in the oil industries.

It is a fact that the large oil risks are usually widely reinsured, both through treaty and facultative placing. I see the relationship here as a kind of partnership between the two sets of insurers involving the fullest cooperation since the cedants have the necessary access to risk information but may, lack the required underwriting knowledge, whereas the reinsurers require the fullest risk information to do justice to their specialist skills.

The partnership should also extend to co-operation or claims handling so that the knowledge gained can be built up and used constructively in loss control and prevention. We have to understand that Reinsurance, like Insurance, needs the money of the many to discharge the claims of the few. Any hold up of premiums must mean that in times of stress it may not be possible to fund large claims quickly.

The ability of the world-wide reinsurance market to respond quickly to one country which has suffered a catastrophic loss depends on countries permitting free flow of premiums across frontiers.

For their part, the reinsurers have an obligation,

which most take seriously, to disseminate acquired knowledge and to assist domestic markets in the servicing of their insureds.



### Glossary Of Some Hydrocarbon Parameters:

- 1) Hydrocarbons: Organic compounds containing Carbon and Hydrogen only.
- 2) Density: The density of a fluid is normally recorded at a standard temperature of 15°C and is the factor for the fluid recording its mass per unit volume.
- 3) Specific gravity: Specific gravity has now been re-termed relative density. This parameter is normally recorded at a temperature of 60°F/60°F. Relative density is exactly what it says, that is, it is the density of the fluid at 60°F compared with the density of water at 60°F. On occasions this parameter has been cited as being recorded at 15°C/4°C and as will be readily recognised, the density of water at 4°C is, in fact, unity thereby making the parameter as recorded really only the density of the hydrocarbon.
- 4) A P I Gravity: The A P I gravity of a fluid is the American Petroleum Institute's factor for a hydrocarbon fluid at 60°F derived from the following formula:

$$\text{A P I gravity at } 60^{\circ}\text{F} = 141.5 \div \frac{\text{the relative density at } 60^{\circ}\text{F}}{60^{\circ}\text{F}} \text{ minus } 131.5$$

This parameter is regularly used in calculations for the determination of volume and weight of crude oil when such a volume is declared in barrels.

- 5) B S & W: Bottom sediment and water, also known as base sediment and water, is a parameter derived from a laboratory test in order that foreign particles such as sand and similar materials, together with water are extracted from a hydrocarbon fluid by the use of a centrifuge and a water saturated solvent (normally toluene) in order that a prospective purchaser may have an indication as to the degree of impurity or foreign material known to him in the hydrocarbon fluid which he is purchasing. Clearly, such a purchaser would not wish to pay for such impurities at the price quoted for the purchase of the hydrocarbon fluid. It should

be noted that this parameter is recorded as a percent volume and is derived at a temperature of approximately 120°F dependent upon the type of fluid being examined.

6) Sediment: This parameter is recorded normally as a percent weight and derived by a laboratory test using a porous filter with its weight measured both before and after the test. The result of the differences in the weight of this filter is described as being the sediment by extraction.

7) Water: This test is carried out by a method called the 'Dean and Stark' method and relies upon the evaporation and, thereafter, the recondensation of water in a hydrocarbon fluid falling into a calibrated trap. The quantity of water recovered in the trap is thereafter related back to the volume of the sample (normally 100 mls) to derive the water percent by volume.

N.B. For obvious reasons the addition of the water test and the sediment test cannot be equated to the B S & W test as one of these tests is by weight, the other by volume and the B S & W being recorded by volume. Furthermore, varying temperature parameters will not allow the results to be compared.

8) Pour Point: This test, as it describes, is the point of pour of a hydrocarbon liquid when it is cooled. The results of such a test have a direct bearing upon the carriage parameters for this cargo and difficulties that may be incurred for the discharge of same.

9) Asphaltenes: This test determines the quantity of asphaltene in black hydrocarbon liquids which, again, may have a bearing upon the unpumpable volumes remaining on board and the pumping characteristics of the fluid to be discharged.

10) Viscosity: Viscosity can normally be recorded under numerous units the majority of which are purely factors and only have indirect bearing upon a physical parameter. Such units are now being replaced by the unit of the viscosity known as centistokes and this viscosity is kinematic viscosity of a fluid at a described temperature. The alternative viscosity methods are those of, for example, Redwood and Saybolt Universal. The viscosity temper-

atures for kinematic viscosity vary according to the type of hydrocarbon fluid and standardisation of temperatures for specific fluids has not yet been fully authenticated in all circumstances. Temperatures vary from 100°C to -20°C, through temperatures such as 80°C, 50°C and 40°C. An example of the non-uniformity of viscosity temperatures can be cited with respect to fuel oil, where certain fuels viscosities are recorded at 100, or more regularly at 80 and even, perhaps, at 50°C. This parameter of viscosity when read in conjunction with the pour point of the cargo, the asphaltene content, gives indication as to the pumpability of a cargo and the efficiency of a discharge.

11) Wax content: This parameter is as it says, the wax content of a hydrocarbon fluid, again, normally related to the black oils, although it may extend as far as a gas oil. The wax content of a hydrocarbon liquid is important to determine and be related to the pour point of that liquid so that the correct heating instructions of the cargo may be given. A typically bad example of wax content may be expressed with respect to Buattifel crude oil where the wax content may be as high as 43% and where the crude oil has a pour point of approximately 90°F to 95°F.

12) C fractions: These parameters are not, normally, shown in any quality certificate, but have been included in this glossary, so that arguments and discussions below in this paper, may be understood. C fractions in a hydrocarbon relate to the individual molecules in the cargo and typical examples may be readily recognised with such fractions as propane (C<sub>3</sub>), butane (C<sub>4</sub>), octane (C<sub>8</sub>).

13) Reid vapour pressure: The parameter is occasionally shown on certain quality certificates for crude oils and naphthas. This is a parameter that gives an indication of the volatility of a cargo, where the vapours given off from the cargo at a temperature of 100°F are measured on a pressure gauge or monometer. This pressure, it is argued, is the gauge pressure and not an

absolute pressure as is associated with the calculation involved in the carriage of gas cargoes. An indication as to the various Reid vapour pressures of certain of the C fractions are as follows: C<sub>2</sub>(ethane) 785 p s i, C<sub>4</sub>(butane) approximately 37 p s i, C<sub>5</sub>(pentane) approximately 1 p s i.

Although the above glossary does not include, by any means, all the parameters relating to every hydrocarbon fluid carried, for the purposes of this paper.

## BIBLIOGRAPHY

1. Insurance of oil Cargoes and the Institute Bulk Oil Clauses  
ANTHONY J P King
2. Carriage of Oil By Sea  
By T.J. GUNNER, B.sc. Maritime Studies
3. An introduction to the petroleum industry.  
3rd.Edition-1985 OUR INDUSTRY, BP Company.
4. An introduction to Onshore Oil & Gas insurance  
WILLIS FABER & DUMS LIMITED, October 1987.
5. Elements of Cargo Insurance Book  
By DENNIS BADER and GEOFFREY Whitehead.
6. Pollution and Insurance Liability for Accidental Pollution  
By ROBERT L. CARTER, B.Sc. (ECON).
7. The Relevance of Charterparty Terms in Bulk Oil Shortage  
And Contamination Claims.  
By KATHYLEE LOVE, LLB, Cantat  
Barrister (Girays Inn)  
Legal Adviser to Shell International Petroleum Co.Ltd.

8. The Broking of Oil Transportation Risks and the Future  
of oil cargo insurance.

By D. J. P. DONOGHUE

Director, Sedgwick Cargo Ltd.

Bulk Oil Transportation.

9. Risk Management: A necessity in the oil industry

By RICHARD K. KERR

RIMCO RISK Management, Inc.

The Weekly Underwriter 10/5/80.

10. Oil and Petrochemical Installation

Insuring and Reinsuring These High- Hazard Risks

By V.N. ALEXANDER, B.Sc. (ECON), FCII

General Manager,

International Oil Insurers (IOI),

GENERAL POLICY Market, October 1980.

11. The carriage of oil by Sea

T J GUNNER

12. Documentation in oil shortages cases

MICHAEL DUNHAM

13. A Practical Approach to handling of Bulk

Oil Shortages/Damages Claims

14. The Review 22nd August 1983

15. Insurance case book (1980)

16. Oil and Gas Industry Contracts

17. Machinery Breakdown Insurance

P.A. PERKINS and A. J. W. FORD.

18. Regulations for the Prevention of Pollution by Oil,

"IMO".

APPENDIX (i)

ALLOCATION OF RISK OF LOSS BETWEEN  
OPERATOR AND DRILLING CONTRACTOR  
UNDER IADC DAYWORK CONTRACT - LAND  
(REVISED JANUARY, 1982)

OPERATOR

1. Operator's equipment and property, including Operator's subcontractors' equipment
2. Contractor's rig and equipment including force majeure rate, if unsound (shifting or cratering) location, to the extent not insured by Contractor
3. Contractor's rig and equipment if exposure to unusually corrosive or otherwise destructive elements, to the extent not insured by Contractor.
4. Contractor's drill string to the extent not insured by Contractor  
( :                    ).
5. The hole and casing

DRILLER

1. Contractor's equipment and property, including Contractor's subcontractors equipment except where specifically excluded :

CONTINUED

6. Operator's personnel and subcontractors
  7. All Pollution and Contamination of all parties not specifically the responsibility of the contractor
  8. Cost of regaining control of any wild well, including Debris Removal
  9. Underground Damage
  10. Contractor's rig and equipment due to the risk of war, nationalization, expropriation
2. Contractor's personnel and subcontractors
  3. Pollution originating from the surface, as a result only of Contractor's equipment and that of Contractor's subcontractor



APPENDIX ii

FACTORS AFFECTING TOTAL LOSS POTENTIALS

- A. Time - Because of interest rates and inflation, the inevitable delays in redrilling and controlling blowouts have a serious impact on expenses and damages.
- B. Expenses incurred
- (1) legal defense costs
  - (2) expenses of firefighting specialists and their control equipment and personnel.
  - (3) costs to clean up pollution
  - (4) costs to remove a wrecked rig; platform and debris
  - (5) costs to drill a relief well, if necessary
  - (6) redrilling costs back to the original depth
  - (7) costs to control blowout of relief well
  - (8) marking, lighting and surveillance expenses
  - (9) evacuation expenses
  - (10) extra administrative and operational expenses relating to claim and management
  - (11) contingent costs of insolvent partners
  - (12) lost production
- C. Damages
- (1) property of the insured (i.e., platform)
  - (2) property of others in insured's care, custody and control (i.e. service contractor's equipment)
  - (3) pollution legal liability for bodily injury and property damage
  - (4) legal liability to third parties as a result of a blowout of an insured well which causes a blowout of an adjacent well(s) not owned by the insured

1/2/83

(FOR USE ONLY WITH THE NEW MARINE POLICY FORM)

## INSTITUTE BULK OIL CLAUSES

## RISKS COVERED

Risks  
Clause

- 1 This insurance covers, except as provided in Clauses 4,5,6 and 7 below,
- 1.1 loss of or contamination of the subject-matter insured reasonably attributable to
    - 1.1.1 fire or explosion
    - 1.1.2 vessel or craft being stranded grounded sunk or capsized
    - 1.1.3 collision or contact of vessel or craft with any external object other than water
    - 1.1.4 discharge of cargo at a port or place of distress
    - 1.1.5 earthquake volcanic eruption or lightning.
  - 1.2 loss of or contamination of the subject-matter insured caused by
    - 1.2.1 general average sacrifice
    - 1.2.2 jettison
    - 1.2.3 leakage from connecting pipelines in loading transshipment or discharge
    - 1.2.4 negligence of Master Officers or Crew in pumping cargo ballast or fuel.
  - 1.3 contamination of the subject-matter insured resulting from stress of weather.
- 2 This insurance covers general average and salvage charges, adjusted or determined according to the contract of affreightment and/or the governing law and practice, incurred to avoid or in connection with the avoidance of loss from any cause except those excluded in Clauses 4, 5, 6 and 7 or elsewhere in this insurance.
- 3 This insurance is extended to indemnify the Assured against such proportion of liability under the contract of affreightment "Both to Blame Collision" Clause as is in respect of a loss recoverable hereunder. In the event of any claim by shipowners under the said Clause the Assured agree to notify the Underwriters who shall have the right, at their own cost and expense, to defend the Assured against such claim.

General  
Average  
Clause"Both to  
Blame  
Collision"  
Clause

## EXCLUSIONS

General  
Exclusions  
Clause

- 4 In no case shall this insurance cover
- 4.1 loss damage or expense attributable to wilful misconduct of the Assured
  - 4.2 ordinary leakage, ordinary loss in weight or volume, or ordinary wear and tear of the subject-matter insured
  - 4.3 loss damage or expense caused by inherent vice or nature of the subject-matter insured
  - 4.4 loss damage or expense proximately caused by delay, even though the delay be caused by a risk insured against (except expenses payable under Clause 2 above)
  - 4.5 loss damage or expense arising from insolvency or financial default of the owners managers charterers or operators of the vessel
  - 4.6 loss damage or expense arising from the use of any weapon of war employing atomic or nuclear fission and/or fusion or other like reaction or radioactive force or matter.
- 5 5.1 In no case shall this insurance cover loss damage or expense arising from
  - unseaworthiness of vessel or craft,
  - unfitness of vessel craft or conveyance for the safe carriage of the subject-matter insured,
 where the Assured or their servants are privy to such unseaworthiness or unfitness, at the time the subject-matter insured is loaded therein.
- 5.2 The Underwriters waive any breach of the implied warranties of seaworthiness of the ship and fitness of the ship to carry the subject-matter insured to destination, unless the Assured or their servants are privy to such unseaworthiness or unfitness.
- 6 In no case shall this insurance cover loss damage or expense caused by
  - 6.1 war civil war revolution rebellion insurrection, or civil strife arising therefrom, or any hostile act by or against a belligerent power
  - 6.2 capture seizure arrest restraint or detention (piracy excepted), and the consequences thereof or any attempt thereat
  - 6.3 derelict mines torpedoes bombs or other derelict weapons of war.
- 7 In no case shall this insurance cover loss damage or expense
  - 7.1 caused by strikers, locked-out workmen, or persons taking part in labour disturbances, riots or civil commotions
  - 7.2 resulting from strikes, lock-outs, labour disturbances, riots or civil commotions
  - 7.3 caused by any terrorist or any person acting from a political motive.

Unseaworthiness  
and Unfitness  
Exclusion  
ClauseWar  
Exclusion  
ClauseStrikes  
Exclusion  
Clause

**DURATION**

- 8 8.1 This insurance attaches as the subject-matter insured leaves tanks for the purpose of loading at the place named herein for the commencement of the transit, continues during the ordinary course of transit and terminates either Transit Clause
- 8.1.1 as the subject-matter insured enters tanks on discharge to place of storage or to storage vessel at the destination named herein,
- or
- 8.1.2 on the expiry of 30 days after the date of arrival of the vessel at the destination named herein, whichever shall first occur.
- 8.2 If, after discharge from the oversea vessel into craft at the final port or place of discharge, but prior to the termination of this insurance under 8.1 above, the subject-matter insured or any part thereof is to be forwarded to a destination other than that to which it is insured hereunder, the insurance on the subject-matter insured or such part thereof shall not extend beyond the commencement of transit to such other destination, *unless otherwise agreed by the Underwriters upon receipt of prompt notice from the Assured.*
- 8.3 *Subject to prompt notice being given to the Underwriters and to an additional premium if required by them, this insurance shall remain in force (until terminated under 8.1 or 8.2 above and subject to the provisions of Clause 9 below) during delay beyond the control of the Assured, any deviation, forced discharge, reshipment or transhipment and during any other variation of the adventure provided such other variation is beyond the control of the Assured.*
- 9 If owing to circumstances beyond the control of the Assured either the contract of carriage is terminated at a port or place other than the destination named therein or the transit is terminated otherwise than as provided in Clause 8 above, then this insurance shall also terminate *unless prompt notice is given to the Underwriters and continuation of cover is requested when the insurance shall remain in force, subject to an additional premium if required by the Underwriters, either* Termination of Contract of Carriage Clause
- 9.1 until the goods are sold and delivered at such port or place, or, unless otherwise specially agreed, until the expiry of 30 days after arrival of the goods hereby insured at such port or place, whichever shall first occur,
- or
- 9.2 if the goods are forwarded within the said period of 30 days (or any agreed extension thereof) to the destination named herein or to any other destination, until terminated in accordance with the provisions of Clause 8 above.
- 10 Where, after attachment of this insurance, the destination is changed by the Assured, *held covered at a premium and on conditions to be arranged subject to prompt notice being given to the Underwriters.* Change of Voyage Clause

**CLAIMS**

- 11 11.1 In order to recover under this insurance the Assured must have an insurable interest in the subject-matter insured at the time of the loss. Insurable Interest Clause
- 11.2 Subject to 11.1 above, the Assured shall be entitled to recover for insured loss occurring during the period covered by this insurance, notwithstanding that the loss occurred before the contract of insurance was concluded, unless the Assured were aware of the loss and the Underwriters were not.
- 12 Where, as a result of the operation of a risk covered by this insurance, the insured transit is terminated at a port or place other than that to which the subject-matter is covered under this insurance, the Underwriters will reimburse the Assured for any extra charges properly and reasonably incurred in unloading storing and forwarding the subject-matter to the destination to which it is insured hereunder. Forwarding Charges Clause
- This Clause 12, which does not apply to general average or salvage charges, shall be subject to the exclusions contained in Clauses 4, 5, 6 and 7 above, and shall not include charges arising from the fault negligence insolvency or financial default of the Assured or their servants.
- 13 No claim for Constructive Total Loss shall be recoverable hereunder unless the subject-matter insured is reasonably abandoned either on account of its actual total loss appearing to be unavoidable or because the cost of recovering, reconditioning and forwarding the subject-matter to the destination to which it is insured would exceed its value on arrival. Constructive Total Loss Clause
- 14 14.1 If any Increased Value Insurance is effected by the Assured on the cargo insured herein the agreed value of the cargo shall be deemed to be increased to the total amount insured under this insurance and all Increased Value insurances covering the loss, the liability under this insurance shall be in such proportion as the sum insured herein bears to such total amount insured. Increased Value Clause
- In the event of claim the Assured shall provide the Underwriters with evidence of the amounts insured under all other insurances.
- 14.2 Where this insurance is on Increased Value the following clause shall apply:
- The agreed value of the cargo shall be deemed to be equal to the total amount insured under the primary insurance and all Increased Value insurances covering the loss and effected on the cargo by the Assured, and liability under this insurance shall be in such proportion as the sum insured herein bears to such total amount insured.
- In the event of claim the Assured shall provide the Underwriters with evidence of the amounts insured under all other insurances.

- 15 Claims for leakage and shortage recoverable under this insurance are to be adjusted as follows:- Adjustment Clause
- 15.1 The amount recoverable shall be the proportionate insured value of the volume of oil lost, to be ascertained by a comparison of the gross volume certified as having left tanks for loading on to the vessel with the gross volume certified as having been delivered to tanks at the termination of the transit, except that where the contract of sale is based on weight and not on volume the amount recoverable may be calculated on a weight basis from such certified quantities.
- The term "gross volume" in this Clause 15.1 means total volume without deduction of sediment and water content and free water, except to the extent that the amount of water can be shown by the Assured to have increased abnormally during the insured transit as a result of the operation of a risk covered by this insurance.
- 15.2 Adjustment shall be made to the calculation under 15.1 above to eliminate any change in volume caused by variation in temperature and any apparent change in quantity arising from the use of inconsistent procedures in determining the certified quantities.
- 15.3 Where this insurance provides for an excess to be applied to claims for leakage or shortage, such excess shall be deemed to include ordinary loss in weight or volume except when caused by variation in temperature or settling out of water. Where there is no such provision, the amount recoverable in accordance with Clauses 15.1 and 15.2 shall be subject to reduction for any ordinary loss excluded by Clause 4.2 above.

**BENEFIT OF INSURANCE**

- 16 This insurance shall not inure to the benefit of the carrier or other bailee. Not to Inure Clause

**MINIMISING LOSSES**

- 17 It is the duty of the Assured and their servants and agents in respect of loss recoverable hereunder Duty of Assured Clause
- 17.1 to take such measures as may be reasonable for the purpose of averting or minimizing such loss, and
- 17.2 to ensure that all rights against carriers, bailees or other third parties are properly preserved and exercised and the Underwriters will, in addition to any loss recoverable hereunder, reimburse the Assured for any charges properly and reasonably incurred in pursuance of these duties.
- 18 Measures taken by the Assured or the Underwriters with the object of saving, protecting or recovering the subject-matter insured shall not be considered as a waiver or acceptance of abandonment or otherwise prejudice the rights of either party. Waiver Clause

**AVOIDANCE OF DELAY**

- 19 It is a condition of this insurance that the Assured shall act with reasonable despatch in all circumstances within their control. Reasonable Despatch Clause

**LAW AND PRACTICE**

- 20 This insurance is subject to English law and practice. English Law and Practice Clause

*NOTE:— It is necessary for the Assured when they become aware of an event which is "held covered" under this insurance to give prompt notice to the Underwriters and the right to such cover is dependent upon compliance with this obligation.*

## BULK OIL CLAUSES.

1. The Assured are not to be prejudiced by the presence of the negligence clause and/or latent defect clause in the bills of lading and/or charter party. The seaworthiness of the vessel and/or craft as between the Assured and Assurers is hereby admitted, and the Assurers agree that in the event of unseaworthiness or a wrongful act or misconduct of shipowner, charterer, their agents or servants, shall directly or indirectly, cause loss or damage to the cargo insured by sinking, stranding, fire, explosion, contact with seawater, or by any other cause of the nature of any of the risks assumed in the policy, the Assurers will (subject to the terms of average and other conditions of the policy) pay to an innocent Assured the resulting loss. With leave to sail with or without pilots, and tow and assist vessels or craft in all situations and to be towed.

2. Provided prompt notice be given the Assurers when such facts are known to the Assured and additional premium be paid if required, it is understood and agreed that in case of short shipment in whole or part by the vessel reported for insurance hereunder, or if the goods transhipped by another vessel or vessels, or be carried beyond or discharged short of destination, or in the event of deviation, or change of voyage, or any interruption or other variation of the voyage or risk beyond the control of the Assured, this insurance shall nevertheless cover the goods until arrival at the final destination named in the policy or certificate of insurance or until the subject matter insured is no longer at the risk of the Assured, whichever may first occur. Any additional risks (whether of delay or of any other description) insured under this clause, which is intended merely to continue insurance in force against the same risks named elsewhere in this policy or certificate and if the risks of War, Strikes, Riots or Civil Commotions, or any of these risks, are insured against, the insurance against such risks shall not be extended by this clause to cover contrary to any express provision of such insurance.

3. Including all risks of transhipment if required and of craft to and from the vessel, each lighter, craft or conveyance to be considered as if separately insured; also to cover any special or supplementary lightering at additional premium if required. The Assured is not to be prejudiced by any agreement exempting lightermen from liability.

4. General Average, Salvage and Special Charges, as per foreign custom, payable according to foreign statement, and/or per York-Antwerp Rules and/or in accordance with the contract of affreightment, if and as required; or, failing any provision in or there be no contract of affreightment, payable in accordance with the Laws and Usages of the Port of New York; and it is agreed that in the event of salvage, towage or other assistance being rendered to the vessel and or interest hereby insured by any vessel belonging in part or in whole to the same owner or under the same management, the value of such services (without regard to the common ownership or management) shall be ascertained by arbitration and the amount so awarded, insofar as applicable to the interest hereby insured, shall constitute a charge under this policy.

5. In the event of accident, danger, damage or disaster before or after commencement of the voyage resulting from any cause whatsoever whether due to negligence or not, for which or for the consequences of which the Shipowner is not responsible by statute or contract or otherwise, these Assurers shall nevertheless pay Salvage and/or Special Charges incurred in respect of the interests hereby insured and shall contribute with the Shipowner in General Average to the payment of any sacrifice, losses or expenses of a General Average nature that may be made or incurred.

6. It is agreed that no right of subrogation except through General Average shall lie against any vessel or craft, or in respect to any pipe lines, on which cargo hereby insured is being carried or in respect of which freight insured hereunder is at risk, belonging in part or in whole to a subsidiary and or affiliated company.

7. Against all risks whatsoever (excepting as hereinafter provided) excluding the risks excepted by the F. C. & S. and S. R. & C. C. warranties incorporated herein, from time of leaving tanks at port of shipment and whilst in transit and/or awaiting transit and until safely delivered in tanks at destination, but notwithstanding anything herein to the contrary, the Assurers are not liable for shortage and/or leakage and/or contamination (except as elsewhere in this policy provided) unless caused by or arising out of the vessel or craft being stranded, sunk, burnt, in collision or in contact with any substance or thing (ice included) other than water, fire, explosion (howsoever and wheresoever occurring) or there be a forced discharge of cargo; provided, however, that these Assurers are liable for contamination resulting from stress of weather.

It is agreed that notwithstanding anything herein to the contrary, this insurance is to pay the insured value of any oil lost from connecting pipe lines, flexible or otherwise, in loading, transhipment or discharge.

Claims are to be paid irrespective of percentage, but subject to deduction for normal shortage.

8. This insurance is also specially to cover any loss of and/or damage to the interest insured hereunder, including shortage and/or leakage and/or contamination, through the bursting of boilers, breakage of shafts or through any latent defect in the machinery, hull or appurtenances, or from faults or errors in the navigation and/or management of the vessel by the Master, Mariners, Mates, Engineers or Pilots; provided, however, that this clause shall not be construed as covering loss arising out of delay, deterioration or loss of market, unless otherwise provided elsewhere in this policy.

9. These Assurers also agree that any action or proceeding against them for the recovery of any claim under or by virtue of this insurance shall not be barred if commenced within the time prescribed therefor in the Statutes of the State of New York.

10. The warranty that vessel be loaded under inspection of surveyors appointed by the underwriters is hereby waived.

11. In the event that this Policy is extended to cover property prior to the attachment or subsequent to the expiration of the cover provided by the attached Marine Extension Clauses, such extension shall always be subject to the following exclusion unless specifically otherwise stated in writing signed by this company in the extension endorsement or otherwise:

This Company shall not be liable for any claim for loss, damage or expense arising directly or indirectly from any nuclear incident, reaction, radiation or any radio-active contamination, all whether controlled, or uncontrolled, occurring while said property is within the United States or any territory of the United States, the Canal Zone or Puerto Rico, or arising from a source therein, and whether the loss, damage or expense be proximately or remotely caused thereby, or be in whole or in part caused by, contributed to, or aggravated by the peril(s) insured against in this Policy; however, subject to the foregoing and all provisions of this policy, if this Policy insures against the peril of fire, then direct loss by fire resulting from nuclear incident, nuclear reaction, or nuclear radiation or radioactive contamination is insured against by this Policy.

12. Notwithstanding anything herein contained to the contrary, this insurance is warranted free from capture, seizure, arrest, restraint, detention, confiscation, preemption, requisition or nationalization, and the consequences thereof or any attempt thereat, whether in time of peace or war and whether lawful or otherwise; also warranted free whether in time of peace or war, from all loss, damage or expense caused by any weapon of war employing atomic or nuclear fission and/or fusion or other reaction or radioactive force or matter or by any mine or torpedo, also warranted free from all consequences of hostilities or warlike operations (whether there be a declaration of war or not), but this warranty shall not exclude collision or contact with aircraft, rockets or similar missiles or with any fixed or floating object (other than a mine or torpedo), stranding, heavy weather, fire or explosion unless caused directly (and independently of the nature of the voyage or service which the vessel concerned or, in the case of a collision, any other vessel involved therein, is performing) by a hostile act by or against a belligerent power; and for the purposes of this warranty "power" includes any authority maintaining naval, military or air forces in association with a power.

Further warranted free from the consequences of civil war, revolution, rebellion, insurrection, or civil strife arising therefrom, or piracy.

13. Warranted free of loss or damage caused by or resulting from strikes, lockouts, labor disturbances, riots, civil commotions or the acts of any person or persons taking part in any such occurrence or disorder.

14. If this policy is issued for a period of time, it is agreed that should the vessel at the expiration hereof be at sea, or in distress, or at a port of refuge or of call, the interest hereby insured shall, provided previous notice be given to the insurers, be held covered at a pro rata premium until arrival at port of destination.

15. Where goods are shipped under a bill of lading containing the so-called "Both to Blame Collision" Clause these Assurers agree, as to all losses covered by this insurance, to indemnify the Assured for any amount (up to the amount insured) which the Assured may be legally bound to pay to the shipowners under such clause. In the event that such liability is asserted the Assured agree to notify the Assurers who shall have the right at their own cost and expense to defend the Assured against such claim.

## APPENDIX V

### HOW THE PRICE OF OIL AFFECTS THE INSURABLE RISK OF LOSS

#### LOW PRICE OF OIL

1. Not economically feasible for operator to drill
2. Low profit margins
3. Oversupply of rigs and equipment
4. Low cost of contract services
5. Weak financial condition of drilling contractors and operators
6. Surplus of talented labor
7. Operators less oriented toward risk taking, i.e., drill deep
8. Operator has bargaining leverage over driller
9. Abundance of footage and turnkey drilling contracts on API forms (therefore, more insurable risks for driller)
10. Driller has direct or contingent OEE insurable exposure.
11. Driller is responsible for physical damage to his rig and equipment, regardless of who is negligent.

#### HIGH PRICE OF OIL

1. Economically feasible for operator to drill
2. High profit margins
3. Scarcity of rigs and equipment
4. High cost of contract services
5. Drillers and operators financially strong
6. Scarcity of talented labor
7. Operators drill deeper, offshore, etc.
8. Driller has bargaining leverage over operator
9. IADC-Daywork contract prevails (therefore, more insurable risks for operator)
10. Operator has sole responsibility for OEE exposures.
11. Operator may be responsible for physical damage to driller's rig and/or in-hole equipment, even if driller is negligent.
12. Driller needs to buy rig business interruption.
13. Operator may need to buy business interruption for producing wells.