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SURVEY OF NUCLEAR INSURANCE - Part 1

BY

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SURVEY OF NUCLEAR INSURANCE

Introduction

1. It is a great privilege to be asked to present this paper to you, but it seems to me entirely appropriate that when considering the nuclear insurance scene, a representative of the British Insurance (Atomic Energy) Committee should be asked to do so. This is because we in London are in such close touch with the nuclear insurance developments throughout the free world, and are interested either directly or by way of reinsurance in most of its operating nuclear installations other than those in the United States, although many British Insurers are interested in the insurance of American installations through other channels.

2. The scope of the subject is very wide, and I can do no more than attempt a rather superficial appraisal of the situation as we see it from London. I am conscious of the fact that some of you may already be aware of at least some of the topics I shall mention, and if so, I hope you will forgive me.

Need for Nuclear Insurance

3. The use of nuclear energy developed comparatively suddenly, and introduced hazards with which Insurers were quite unfamiliar as compared with the conventional hazards such as fire and explosion with which they had been concerned up to that time.

4. The process of nuclear fission is accompanied by the production of intense and dangerous radiations which may be lethal to man and gravely damaging to property. This process which, if something goes wrong, involves the prospect of severe contamination of property or serious injury to people by radioactivity on a large scale, was something quite new when Insurers began to meet the need for insurance cover in the 1950's. Radioactivity is a source of damage or injury that can be detected by none of the human senses, and it may cause injury or illness which does not become

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manifest for a very long time after the subject has been exposed to radiation. Even if a nuclear incident causes no physical damage either to the installation itself or to surrounding property, the associated contamination may prevent access or use for a long time, and its removal may be a lengthy and expensive business. It also has to be remembered that the presence of radioactive substances may well aggravate damage caused by conventional perils such as fire, by prevention of access or hampering of fire fighting, and it could also result in increased cost of repairing damage caused by conventional perils.

5. The magnitude of the values at risk in a large nuclear installation such as an atomic power station, together with the possible extent of compensation to third parties in the event of an accident is very considerable. The value of one reactor unit itself, apart from the ancillary plant and property on a nuclear power station, may today be of the order of US$ 250M whilst the civil Liability risks involved may lead to the payment of damages representing greater financial liability than any hitherto encountered.

6. Governments and operators alike impose the most stringent safety requirements, and these are updated as necessary from time to time, but even so, there can be no complete guarantee against accidents and in this field a comparatively minor failure of equipment or of the human element could very easily lead to grave consequences. It has been stated that the human element played a major role in the recent accident at Three Mile Island. National Governments have addressed themselves to the control of nuclear activities, to legislation establishing the liabilities of the operators and to fixing the financial limits of such liabilities. International concern is manifest in the Paris Convention on Civil Liability in the Nuclear Field, followed by the International Atomic Energy Agency's own (Vienna) Convention on such liabilities, and you will be bearing more later in the Seminar about these Conventions.

7. Thus there is a very clear need for the operators of nuclear installations to effect insurance, not only to protect themselves, but also those providing the finance for such installations

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against the possibility of loss of the enormous financial commitments involved, whether by way of physical assets or liabilities imposed by legislation.

Nuclear Insurance Pools

8. Insurers gave much thought to the practicability of providing the necessary insurance cover at the same time as the principles of liability for nuclear accidents were being evolved. It soon became clear that ordinary insurance channels could not provide the cover needed by operators. The hazards of this new source of power were then virtually unknown to the world's insurance markets; there was no experience upon which to build, and initially there was very little spread of risk - a fundamental basis of insurance - so that conventional Insurers could not hazard their funds for the hugh sums which were involved. Neither could they be expected individually to provide their own technical resources for the assessment of the hazards and risk controls concerned.

9. Another aspect was the reinsurance situation where it was clear that normal market methods were inappropriate in that vast liabilities of unknown amount could be built up under the normal reinsurance market arrangements. Therefore, Insurers quickly determined that they would have to retain their written liabilities wholly for their own net account in order that they should know their maximum liability, and would be certain that it could not be increased by additional unknown liabilities by way of reinsurance. This basic concept of underwriting nuclear insurance on a net line basis is still firmly adhered to today.

10. The British Insurance Market initiated meetings of European Insurers, both direct writers and reinsurers, in 1957 to discuss the provision on a wider basis of insurance facilities for nuclear operators. Thus in the late 1950's, there emerged in many countries specially organised associations of insurers, or Pools as we know them, to provide cover for Material Damage and Liability risks associated with nuclear installations. In the United Kingdom, the British Insurance (Atomic Energy) Committee was set up to provide cover for operators of nuclear installations within the United

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Kingdom, and also overseas other than in the U.S.A. In this Committee, all types of Insurers from the large composite companies, smaller specialist companies, Lloyd's underwriters, Mutual companies and specialist reinsurers came together to provide the greatest possible amount of cover for the risks involved. There are now 23 similar Pools operating in some 22 countries, and the number can be expected to grow as more countries embrace nuclear power.

11. In order to marshall the large insurance capacity needed in many countries, the national Pool which is usually approached by organisations intending to build and operate a nuclear installation may decide to consult similar Pools in other countries with a view to augmenting its own capacity. This provides an appropriate spread of the risk concerned. In the absence of a national nuclear Pool, usually before there is any operating nuclear installation in the country, enquiries for nuclear insurance cover would normally be made to the appropriate market insurance association. That association would know where to obtain any advice or assistance that might be required.

12. Even where the capacity of a national insurance Pool might be very limited, it has an important role to play because it will be familiar with the insurance customs and legislation applying in its own country. Moreover, its offices would provide a basis from which inspections, surveys and claims work arising from a nuclear incident could be organised with, if necessary, technical help from other similar Pools. With the continually increasing size and value of the modern nuclear installation, it is necessary for the capacity of all the national Pools around the world to be used if the operator is to secure the amount of protection he requires. This is achieved by means of reinsurance obtained by the national Pool primarily concerned direct from other Pools without the intervention of intermediaries. In this way, it is possible to eliminate the usual placing operations of the conventional insurance markets, with a consequent saving of time and expense since the ready availability of capacity is already known.

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International Co-operation

13. Clearly, there must be frequent and continuing consultation between the various nuclear insurance Pools on all kinds of technical problems associated with the insurance of nuclear installations. It is, however, important to note that this collaboration and reinsurance is only possible to the extent that the premiums and claims payments may be rapidly and readily transferred across frontiers.

14. On the point of international collaboration, it has been customary for the British Insurance (Atomic Energy) Committee to arrange at intervals international Conferences of the Chairmen of the other national Pools in order to discuss together the problems pertaining to atomic risks insurance, and these Conferences have proved to be a very valuable forum for discussion, although it is to be stressed that no mandatory decisions are or, indeed, can be made. At the last Conference held in London in October 1978, representatives of some 22 Pools from Europe, North America and the Far East met in London to discuss problems of mutual interest.

15. In some countries, nuclear insurance Pools have been set up, although they have no operating nuclear installations. This has the advantage that the new Pool can provide an addition to world-wide capacity, and it also gains useful experience in this form of insurance which will be of advantage when its own nationals enter the nuclear field. International co-operation between the Pools is very strong, both on the technical and purely insurance levels. Five years ago, the International Guidelines for the Fire Protection of Nuclear Power Plants produced by an international working party of insurance experts, was issued, and this has become an internationally accepted standard. This has now been followed by similar guidelines applicable to other types of nuclear installations such as fuel processing factories, research reactors etc., and this co-operation can be expected to continue.

Over the years my own Committee has given help and advice to many countries contemplating the setting up of a nuclear insurance pool, and this has ranged from assistance in the formation of the Pool

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to underwriting matters and policy wordings. Recent examples include Korea, Taiwan and Yugoslavia.

The Future

16. And now a look to the future. The problems raised by recent developments in regard to oil may be expected to lead to a growth in the exploitation of nuclear energy in the shape of more numerous, larger and therefore more valuable power reactors, and of fuel manufacturing and processing plants, in the next decade or so, and the nuclear insurance Pools must and will face up to the challenge this presents. Certainly the increase in numbers of installations will present no problem as this will help to spread the risk, but it could cause difficulties for the nuclear industry in regard to the supply of fully trained technicians. But rather is it the large increase in the size of the plants and of the values concerned which will give rise to the insurance problems, quite apart from the new types of reactors being developed.

17. The next and equally important problem is to ensure that the insurance cover is available at the price the operator is prepared to pay and which Pool members are prepared to accept to relieve the operators of the very heavy financial commitments they have entered into. These objectives must be achieved if insurance markets of the world are to fulfil their major task of meeting the challenge of this great new advance in human achievement.

18. We are today facing a major public debate in many countries regarding the use of nuclear power - the question of fuel reprocessing plants, the illegal acquisition of plutonium, the general effect of nuclear installations upon the environment - all these factors affect and interest Insurers and have to be taken into account when determining the cover they are prepared to give and the premiums they will charge, but the nuclear industry can remain assured that Insurers will do their best to provide the cover required at appropriate and reasonable premiums.

HWF/PS
8th August, 1979

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Insurance covers written by Nuclear Pools

1. It has been no part of the British Pool's policy to write business which could perfectly well be written in the conventional insurance market. Accordingly, transport of nuclear materials and the construction of new nuclear installations continue to be dealt with in the ordinary conventional market, in the case of the last-mentioned, up to the time fuel loading commences i.e. when the site becomes a licensed nuclear installation. This applies, in general, in most other countries although in some, such as the U.S.A., the construction risk is undertaken by the Pool, while certain Pools underwrite the insurance of nuclear materials in transit and the associated liabilities.

2. Another important area of nuclear insurance which, in the United Kingdom, does not require to be written in the Pool since there are adequate facilities and capacity in the conventional market, comprises what may be called the minor atomic risks such as those involving radioisotopes, X-ray apparatus and sub-critical assemblies such as might be found in a research laboratory or university. None of these is regarded as representing any major hazard - normal fire and liability policies are considered to provide adequate cover, particularly as the normal Radioactive Contamination Exclusion Clause does not exclude these sources of radiation. However, in some countries the nuclear insurance Pool insures some of these minor atomic risks.

Material Damage Insurance

3. When we began to write nuclear insurance in the United Kingdom, we decided to write the material damage cover on a named perils basis rather than on an All Risks basis with many and varied exclusions. We still feel that this approach is preferable and many other Pools have adopted the British practice. It is also a cardinal principle that cover for conventional and nuclear perils is inseparable in respect of nuclear installations because of the great difficulty of separating nuclear from conventional damage in view of the interaction between them.

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4. An operator knows only too well that having spent considerable sums of money on the building and fuelling of a nuclear installation, much or all of this may be lost if there is a serious incident. Moreover, those who have provided the funds for this expenditure will usually require their investment to be protected by means of insurance. In consequence, insurance must be made available in respect of damage to the installation caused by conventional perils e.g. fire, lightning,explosion, impact by aircraft etc.

5. In addition, provision has also to be made in respect of damage which may arise from the nuclear hazards. The first of these can be described as "Excessive temperature within the nuclear reactor consequent upon a sudden uncontrolled unintentional and excessive increase or release of energy or upon the failure of the cooling system". Depending on the circumstances, this could lead to a partial or even total loss of the reactor from a fuel "melt-down".

6. A further consideration is the possibility of accidental radioactive contamination of the Insured's property on the site outside the reactor itself. That is, all his property outside the external shield of the reactor and the primary circuit. In order to make the operator's protection as complete as possible, the policy may be so worded that cover includes additonal costs of decontamination and isolation of contaminated parts.

7. I have already said that it is regarded as essential that both nuclear and conventional perils should be insured in the one policy. The need for this is particularly acute in respect of the risks of damage to the installation itself. Insurers have no historically established named peril with which to express the nuclear cover they provide. The centre of a working reactor can operate in conditions of such great heat as to be tantamount to "fire". A reactor incident could arise from conditions which might technically be tantamount to an "explosion". Since both "fire" and "explosion" are two of the perils intended to provide non-nuclear protection, descriptive headings have had to be established to identify the nuclear cover. But clearly, it could be most difficult after an event to decide with certainty just which peril

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operated first. There is also the point that radioactivity may prevent or hamper fire fighting or repairs to the plant. Therefore cover for both types of peril by the same policy with the same Insurers is obviously advisable.

8. The policy specification may describe the sums insured on the basis of a blanket amount for all buildings and contents, or they may be individually specified as with an ordinary Fire Policy. If the blanket method is used, there must be division between the reactor block and the ancillary and other buildings on the site. Nuclear fuel is always an individual item.

9. The usual form of Material Damage policy issued to an operator in the United Kingdom provides a considerable measure of protection for suppliers of goods or services to a nuclear installation. The Insured is required by the terms of the policy to agree, to the extent that he is entitled to be indemnified under the policy, that he will not claim indemnity from any person regardless of fault, negligence or breach of any condition or warranty in respect of damage to the Insured's property on the site caused by any radioactive contamination or by fire, explosion or excessive temperature each originating within the reactor, and with regard to damage to the reactor or associated buildings caused by fire, explosion or excessive temperature however arising and wherever originating. The insurers for their part undertake similarly that they will not enforce any rights or seek from other parties any indemnity to which they would otherwise have been entitled.

10. This agreement is essential in order to maintain the principle of channelling all liability in respect of a nuclear accident to the operator. If this is not done then insurers might accumulate underwriting liabilities from many sources and would be unable to determine their maximum commitment.

Liability Insurance

11. This class of insurance will be dealt with separately, and I do not think that I need repeat here what is contained in that paper.

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Other Types of Insurance Cover

12. Although the great bulk of demand for nuclear insurance is related to either cover against direct damage to the installation or cover for the operator's nuclear liabilities to third parties, including, very often, his employees, certain additional classes of insurance customarily available to industry may be required by the operators of nuclear installations. Whether such additional insurance can be granted, depends very much upon the availability of insurance capacity which, as explained earlier, has to be strictly limited in order to enable insurers participating in such insurances to establish quite clearly their net commitments on each nuclear installation.

(a) Consequential Losses

13. The losses of an industrialist whose premises are destroyed by fire extend beyond the cost of repairs. While these are being carried out, overhead expenses including staff often have to be paid as usual although production and sales may have stopped altogether. This applies, of course, to an accident at a nuclear power station resulting in an interruption of the electricity output. An accident resulting in the shutting-down of a reactor usually results in loss of profit and/or standing charges.

14. There is the interruption pending decontamination of the premises. There may well be delay in obtaining replacement of parts, particularly where there is damage to precision and scientific instruments and specialist plant and materials. Cover for financial losses arising from the consequent interruption of operations is in principle available subject to insurance capacity remaining after the material damage insurance requirements have been met.

15. Where a power reactor is concerned, the objective would be to devise a basis of cover sufficient to meet if not all, the bulk of, the "fixed expenses" with which the operator has to contend, even though for the time being the reactor is shut down and the proceeds from the sale of the electricity are no longer

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available. The actual form of policy would be similar to that written in the national Market concerned for comparable conventional risks, subject to such modifications as may be necessary when dealing with a nuclear installation.

16. As usual, the consequential loss policy would require the underlying Material Damage policy to cover the same range of perils. It would be customary to establish a period of so many months during which, subject to a franchise(exclusion from the insurance cover) of a suitable initial period, the cover would operate. If required, and subject again to the availability of the necessary insurance capacity, a consequential loss cover could be drawn on a sufficiently wide basis as to include within its scope loss of net profit as well as standing charges.

17. The extent to which in the event of a stoppage the installation operator would be able to bring into operation less efficient generating stations though at correspondingly higher cost than normal would be for examination as well as, for example, the possibility of purchasing electricity from other sources. Clearly insurers should not be expected to pay for consequential loss due to possible prolonged shutdown of the reactor imposed by Government direction during investigation of the nuclear incident.

(b) Machinery Breakdown Insurance

18. Cover may also be requested against machinery breakdown risks in the High Radioactivity Zone and subject to normal indemnity considerations this may be granted where there is sufficient capacity available. The cover is subject to strict conditions, substantial excesses and premiums are high. Machinery breakdown risks in the conventional parts of the nuclear power station are covered by the conventional Engineering Insurance market.

(c) Contingent Liabilities of Suppliers of Goods and Services

19. Another form of insurance for which a demand is sometimes encountered is in the field of contingent liabilities. Outside the world of nuclear insurance there are many forms of additional indemnity cover which may be granted to concerns or persons who have, or might have, a legal liability in connection with any

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accident at an insured establishment which causes injury or damage to third parties. Such insurances might relate to the liability of suppliers or manufacturers for their products or services supplied to nuclear installations. They might also relate to the liability of persons providing professional consultancy services, such as insurance brokers or civil engineers.

20. But, under the Conventions, liability for "off-site" nuclear hurt or damage is channelled to the operator of the installation and, in general, it is the intention of Convention type nuclear legislation everywhere thus to concentrate upon the operator all liability to third parties, including that of the suppliers and advisers.

21. Suppliers to an operator in a contracting State are thus protected. Moreover, it would seem that this protection also applies to damage which may be caused to the reactor itself or to property on the site used in connection with the operation of the installation or for the purposes of the construction of the installation. Were it not for this provision, suppliers might be liable under an action for negligence. Circumstances might arise, however, which would leave suppliers of goods or services exposed to certain claims as, for example, in respect of components supplied for "foreign" reactors. Even though the country of domicile of the supplier has Convention type legislation, it by no means follows that other countries which his goods or services may reach would have followed suit. Considerable costs may be incurred in defending a third party claim brought against a supplier even although this might be a bad claim in law.

22. One of the problems facing insurers in connection with requests for Products Liability or the other forms of contingent liability covers described is that of accumulation of liabilities in respect of a particular site where the operator's own liabilities are insured, or might be insured, by the national nuclear insurance Pool. It could happen, even, that a supplier of products would not necessarily know in which of the nuclear installations his goods were being used. Thus, insurers might find themselves involved not only in the operator's own liability insurance but could also face additional claims through some form of contingent

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liability insurance. Therefore, such policies, whether issued to suppliers or others, normally have a much lower limit of indemnity than that granted for the operator's own liability requirements to enable insurers to keep their overall potential commitments in relation to each installation within reasonable bounds.

Transport Risks and Nuclear Propelled Ships

23. As already indicated, the insurance of nuclear material in transit and, though as yet on a very limited scale, of nuclear propelled ships, are classes of cover usually handled by specialist marine insurers, sometimes through a Market Pool and sometimes by more traditional methods.

Capacity

24. The first great problem of the British Pool was to be able to provide the large capacity required to cover our early nuclear power stations and a major operation was mounted to secure the maximum support from all its members, whilst overseas Pools were also invited to contribute their maximum capacity by way of reinsurance. Essentially this is the problem that still faces all pools today, for the tremendous rise in costs and values coupled with the enormous growth in size of nuclear power stations requires the maximum capacity from the world's insurers. The situation is a constant challenge to which we are continually addressing our efforts. And not without success. In 1973 in Florence an international working party of the nuclear Pools sent out a world-wide call for capacity to be increased to £100M, which achieved a very satisfactory response. We were not complacent, and even that figure has now more than doubled but much still remains to be achieved, particularly when one remembers the growth in large multi-reactor sites with the huge values involved. By means of the exchange of reinsurance between all the Pools the necessary capacity is made available to the Pool initially concerned.

25. Capacity is not, however, merely a problem in relation to Material Damage, although heretofore it has not arisen so much in regard to liability insurance. As you know, operators' liabilities

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for personal injury to third parties due to a nuclear accident are absolute and are laid down by legislation, which arises from the international conventions adopted in relation to nuclear installations. So far the maximum liabilities thus imposed have been adequately covered by the nuclear insurance Pools without any difficulty. Some countries have passed legislation substantially increasing the liability of operators, and U.S.A., Germany and Switzerland have placed very onerous liabilities upon their nuclear installation operators. The nuclear insurance Pools have provided the required amount of cover, but it must be remembered that a nuclear accident giving rise to a major liability loss would inevitably mean a material damage loss of major magnitude at the same time, and this fact must never be overlooked.

The Present

26. Our original underwriting of nuclear risks was very much an act of faith of which Insurers can be justly proud, for we had little experience to guide us, little spread of risk, no idea as to the adequacy or otherwise of the premiums we charged and no reserves to provide for any major loss that might occur in the very early days of this new form of insurance. We have now moved to a stage where experience of operating nuclear installations is very much greater, the spread of risk is increasing and reserves are being built up. Nevertheless, it is only in the last few years that there has been a significant increase in the number of installations. All Pools are under constant pressure on the question of premiums and where there has been a reasonable period of good claims experience, a significant reduction in rates has taken place as compared with the early days of operation. It must, however, be remembered that there has yet to be the catastrophe which no expert will say is impossible. The accident at Three Mile Island was very serious and the Material Damage loss has been estimated at U.S.$ 140M which will absorb much of the nuclear insurance premiums so far paid, but it was not a catastrophe in the true sense of that word. In addition, substantial claims have been intimated under the liability insurance. I do not believe, however, that we have yet had a sufficiently long period

but also those providing the finance for such installations

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to enable us to write these potentially catastrophic risks at the rates of premium some operators seem to expect. The nuclear Pools exist for the purpose of protecting their financial commitment and to continue to maintain the insurances on other installations even after catastrophe may have hit one of them, and this requires the building up of reserves to fully meet these liabilities, The whole Pool operation is intended to function as economically as possible, and for this reason the level of operating and handling expenses, including commission, is kept very low. In this way the cost to operators is reduced to an absolute minimum. It also depends for its successful existence upon the freedom to transmit currencies in payment of premiums and losses without restrictions imposed by financial authorities in the countries concerned.

Problems facing Developing Countries

28. I suppose the main problem facing the insurers of developing countries is unfamiliarity with the special features of nuclear insurance:

(a) The concept of channelling of liability

(b) The net line basis of writing the covers

(c) Unfamiliarity with the special Pool to Pool reinsurance arrangements

(d) The special hazards of nuclear installations

and above all

(e) The lack of technical knowledge to assess the risks involved for underwriting and rating purposes.

29. These are problems which faced all the established Pools in the initial stages of their formation and activities but gradually experience has been built up, and with mutual help and goodwill the difficulties have been overcome. Over the years my own Committee has given help and advice to insurers in many countries contemplating the setting up of nuclear insurance Pools even on questions of rating and underwriting. Other Pools have

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given similar advice, and I feel sure that such help will continue to be made available as required by countries developing nuclear insurance. It is essential for all insurers in a market to contribute their maximum capacity to the national nuclear insurance pool. The stronger the local conventional insurance market, the larger its capacity for nuclear insurance and, therefore, with reinsurance assistance from other Pools, the greater ability to afford operators the protection which they seek.