Friends of the Earth Europe

Nuclear industry: Face your demons

towards full liability for nuclear power plant operators

Introduction

The nuclear power debate can get emotional, but it is both in the interest of the nuclear power industry and in the interest of environmental NGO's like Friends of the Earth Europe to address factual concerns. It is a fact that nuclear power plants are heavily underinsured considering the risks which nuclear power plant operators impose upon society.

In this background position paper Friends of the Earth Europe describes the current regime of liability for nuclear power plants, before going on to introduce an alternative. Since 2004 European countries have been updating regulation to increase nuclear power plant-operators liability[1] insurance to € 700 million per incident. Given the human tragedy of a severe accident, Friends of the Earth Europe believes € 700 million would be far from adequate to financially compensate victims and suggests an alternative model which could provide a liability coverage more then a hundred times greater than currently, and eventually unlimited.

Current status

In the early sixties, recognising the cross border effect of nuclear incidents, two groups of countries agreed amongst each other how to arrange the liability of nuclear power plants. This resulted in the Vienna (IAEA) and the Paris (OECD) conventions. Both included different, but limited, third party liability. These conventions are linked by a Joint Protocol, adopted in 1988.

The main purpose of the conventions is to:

- Limit liability to a certain amount and limit the period for making claims;
- Require insurance or other surety by operators;
- Channel liability exclusively to the operator of the nuclear installation;
- Impose strict liability on the nuclear operator, regardless of fault, but subject to exceptions.
- Grant exclusive jurisdiction to the courts of one country, normally the country in whose territory the incident occurs[i]

At the time when the liability treaties were drafted, there were high expectations of nuclear power. The fledgling nuclear power industry was given a head start, and was not burdened with full liability.
The conventions set a minimum level of liability, but States are able to set higher levels themselves if they wish. See Table 1 for the amounts for which operators had to be insured before the adoption of the updated protocol[ii].

Country	Operator liability € million
Belgium	335
Bulgaria	50
Czech Republic	335
Germany	2500
Finland	195
France	90
Hungary	111
Lithuania	170
The Netherlands	335
Slovakia	75
Slovenia	170
Spain	135
Romania	83
Sweden	335
The United Kingdom	170

Table – Current levels of national operator nuclear liability.

In 2003 and 2004, protocols were passed on the Vienna and Paris conventions respectively, which changed the definition of nuclear damage and the scope of the coverage. Consequently, new minimum

1 When we write in this paper about liability, we mean *accident liability for third party damages*. Another significant liability for nuclear power stations is their final decommissioning costs. These are not dealt with in this paper. For more information on decommissioning see, for example: Wuppertal Institut (2007): *Comparison among different decommissioning funds methodologies for nuclear installations*

limits of liability were set as follows: Operators (insured) € 700 million; installation states (public funds) € 500 million; and collective states contributing € 300 million. This results in a total minimum liability of € 1,500 million.

Those States which ratified the treaties are slowly introducing the new liability limits into their national legislation. Operators are now voicing concerns about the rising costs of paying for cover. The European Commission announced in early 2007 that it will conduct an impact assessment aimed at harmonising the two different liability regimes, as it is recognised that having such different liability regimes and a range of insurance limits could potentially influence the nuclear energy market.

When attempting to set limits for liability it is helpful to consider the insurance costs of known disasters. Doing so demonstrates that € 700 million (~$ 990 million) as a limit for liability is not a vast amount when compared to the costs of other disasters. For example:

- Hurricane Katrina, August 2005, insurances compensated $ 45,000 million;
- Terrorist attacks on 9/11, 2001, $ 20,700 million[iii];
- Exxon Valdez, March 1989
    - Clean-up of oil spill, $ 2,500 million;
    - Settlements, $ 1,100 million[iv];
    - The economical loss (fisheries, tourism) suffered due to the damage to the Alaskan ecosystem was $ 2,800 million[v];
- Explosion of AZF chemical plant in Toulouse (France), September 2001, € 1,800 million[vi];

For insurance purposes a major earthquake in Northern California is estimated have an economic impact of between $ 93,000 and $ 120,000 million[vii].
By 2040, insurance companies estimate that they will have to compensate $ 1 *trillion* (1 million million) dollars in damage compensations for losses caused by extreme weather events related to climate change.[viii]

The above examples are all non-nuclear incidents. Unlike in the event of a nuclear incident, the damage could be repaired and people could start rebuilding their homes once the fires were put out. Examples of damages following nuclear incidents include:

- $ 1,000 million – cleaning up Three Mile Island (in which the containment remained intact);
- $ 15,000 million – estimate of the direct loss caused by the Chernobyl disaster in the former Soviet Union[ix]. It is estimated that the damages could accumulate to € 235,000 million for Ukraine and € 201,000 million for Belarus in the thirty years following the accident

Various estimates have been calculated of the total damage which could be caused by accidents with nuclear power plants. They range from € 83,252 million[x] to as much as € 5,469,000 million[xi]. Based on these estimates the cost of a large scale nuclear accident could be up to 8,000 times higher than the insurance currently available. So for every € 8,000 of damages only € 1 of compensation would be available from the insurance of the nuclear power plant.

Europe has a variety of different nuclear reactors - some of them old, some of them relatively new. All of these have different possible failure rates. In a report commissioned by the European Commission, CE Delft calculated that with 140 nuclear power plants in the European Union, assuming an average core melt accident probability of once in 20,000 reactor years, and assuming 25 years of operational lifetime, the chance of such an accident ever happening with the existing nuclear fleet would be 20%[xii]. With the current trend of extending the operational lifetimes, this risk increases.

A nuclear accident in Europe is far from impossible. And it is clear that such an accident will barely be covered by the nuclear power plants' insurances. After the € 700 million from operators' insurances is spent, states and the international community guarantee another € 800 million of compensation. But then what?

Besides the lack of protection for potential victims of a severe nuclear accident, there is another danger.

> *A nuclear accident in e.g. central Europe may destroy land or property in surrounding nations. Serious diplomatic controversies may rise. Individuals as well as large estate owners (such as insurance companies and pension funds) are likely to suffer large losses. The effect on the financial system is often overlooked. Since most credits are guaranteed by real estate a lot of creditors will not recover their loans. The consequence can be the bankruptcy of many financial institutions, which may disturb the international financial system.*[xiii]

Taking into account the financial effects, it is estimated that the total external cost of the nuclear accident risk in the EU is € 20,000 million annually[xiv]. Only a very small part of these costs are internalised by the sector through insurance. CE Delft estimated that the price of nuclear power in France would be three times higher if the operators were to take up full liability[xv].

If nuclear power's cost did reflect its risks, it would seem a much less attractive energy option, especially when compared to renewable energy, which currently enjoys no such insurance break. Insurance for a 43 kW photovoltaic system on the roof of a school covers third-party claims up to € 2.5 million. For this, the owner has to pay a yearly premium of about € 70[xvi]. He or she does not get a subsidy, and neither do the owners of wind turbines or hydroelectric dams, which also have considerable risk potential. Therefore, the current insurance status not only disturbs the international financial system, it also distorts fair competition between different modes of power production.

Possible alternative

Nuclear risk is very different from traditional insured risks. Whilst the chances of disasters occurring are small, there is the potential for an accident at a nuclear power plant to be catastrophic. The small catastrophic possibility makes it hard to insure nuclear power plants on the commercial insurance market.

However, besides regular, actuarial based insurances, there are various other ways to assert funds for third-party liability. For example, the United States (not a part of the Vienna or Paris conventions) adopted the Price-Anderson law in 1957. This law creates a system of shared liability where the 104 operators in the US together guarantee an amount of liability. In 2005 this amount was increased to $ 10.46 billion (~€ 7.4 billion). Although this amount is still only a fraction of the expected total costs, and there are some doubts about the financial backing, the mechanism of sharing liability is promising.

Faure and Skogh proposed a similar risk-sharing mechanism for Europe. The proposed system is not radically different from the current system, except for some key points. First, liability is shared between *all* plant owners which are insured in the new system. Secondly, there is no limit to the liability. However before a majority of operators participate, a limited, but already significantly increased, sum of liability can already be applied.

> *The suggested size of the guarantee, and thus the potential liability of the plant-owners and the States is about the same as it is today. The difference is that all plants share the costs of accidents wherever they occur in signatory States. Assume, for instance, that there is an accident in France that causes damages of US $ 60 billion in France, Belgium and Germany. Each of the 100 plant-owners will then contribute 600 million dollars.*[xvii]

Such a scheme could lead to the closure of unsafe or poorly located reactors because neither the sector or its insurers would be willing to bear these risks. Now such units are kept looming because operators don't pay for full insurance coverage. As nuclear power plant operators know their industry, their risk aversion strategies might be better then those of external regulatory boards[xviii].

As the member states of the European Union already obliged themselves to “take all measures necessary to facilitate the conclusion of insurance contracts covering nuclear risks”[xix], the EU can become the platform where this innovative scheme will be first applied.

Conclusion

In the early sixties, when liability treaties for nuclear power plants were first drafted the industry was in its infancy. There were high expectations of nuclear power and as a result plants were given a head start, and not burdened with full liability. But now the nuclear industry has matured. Friends of the Earth Europe believes it is time for nuclear power plant operators and governments to take their heads out of the sand and recognize that nuclear power is neither inherently safe or well insured. It is time for the nuclear industry to face its demons.

Friends of the Earth Europe demands that operators of nuclear power plants take full financial responsibility for the risks they take when producing nuclear energy. Currently, they collect the profits of their nuclear power plant, but shift the associated risk to the general public. Every time operators pay an insurance fee which does not cover total possible damages, society invisibly pays the rest – that is, until a major accident happens.

The current liability insurance of €700 million is far from adequate and the extraordinary risks of nuclear power should compel us to develop an extraordinary system which makes nuclear power operators *fully* responsible for their risks, with unlimited liability.

More then 20 years after the Chernobyl disaster, nuclear power remains the most dangerous form of energy and Friends of the Earth Europe believes it is time for Europe to stop using taxpayers' money to guarantee such a dangerous and expensive technology. The subsidising of nuclear power is creating an unfair playing field in which other safer technologies are disadvantaged.

Friends of the Earth Europe believes that a sensible energy policy for Europe should have energy efficiency and renewable energies at its heart, and is in favour of massive investments in these two elements. The insufficiency of the current liability for nuclear power is distorting the market and disadvantaging these alternatives which Friends of the Earth believes are essential in the battle against climate change.

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i Read an analysis on the motivation behind these aims: Faure & Van den Bergh (1990) Liability for Nuclear Accidents in Belgium from an Interest Group Perspective, *International Review of Law and Economics*

ii Many non-nuclear states are also party to the liability conventions, but their insurances are not relevant here

iii Insured losses. Source: SwissRe; The 40 most costly insurance losses 1970 – 2005, http://www.swissre.com/pws/media centre/large loss fact files/charts and figures/charts and figures.html

iv See http://iml.jou.ufl.edu/projects/spring01/Hogue/exxon.html

v A contingent valuation study of lost passive use values resulting from the Exxon Valdez oil spill, Report to the Attorney General of the State of Alaska, 1992

vi See http://www.munichre.com/publications/302-03451_en.pdf

vii When the Big One Strikes Again, Estimated Losses due to a Repeat of the 1906 San Francisco Earthquake, C.A. Kircher, H.A. Seligson, J. Bouabidc, and Guy C. Morrowd (2006)

viii Insuring for Sustainability, United Nations Environment Programme Finance Initiative, May 2007

ix Faure & Skogh: Compensation for Damages Caused by Nuclear accidents: A convention as insurance (1992)

x Dreicer, Tort & Manen (1995) ExternE - externalities of energy, volume 5: Nuclear, p. 205

xi Ewers & Rennings (1992) Economics of Nuclear Risk – a German Study, in O. Homeyer and R. Ottinger (eds.), Social Cost of Energy, Present status and Future Trends.

xii CE (2003) Environmentally harmful support measures in EU Member States, p. 128

xiii Faure & Skogh (1992) Compensation for Damages Caused by Nuclear accidents: A convention as insurance. p. 506

xiv Oosterhuis (2001) Energy subsidies in the European Union, p. 6

xv See endnote xii, p. 133

xvi Irrek (2002) Subsidy reform - moving towards sustainability, p. 6

xvii See endnote xiii, p. 509

xviii See Schneider et al (2007) Residual Risk - An Account of Events in Nuclear Power Plants Since the Chernobyl Accident in 1986 (Chapter 4) for a review of systemic issues with NPP safety.

xix EURATOM treaty, Article 98