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Civil Nuclear Liability Bill (PB-3:8.4.10)

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The government has recently drafted the "Civil Liability for Nuclear Damage Bill (CNLB), 2010" and plans to introduce it in Parliament. The Bill is to provide for "civil liability for nuclear damage, appointment of Claims Commissioner, establishment of Nuclear Damage Claims Commission and for matter connected therewith or incidental thereto". Several important issues have been raised in the public debate and we discuss some of these here.

Do we need this Bill?

Countries where nuclear power plants were built and operated by the private sector had recognized the need for liability arrangements to provide for compensation in the event of an accident. This led to several legislations such as: US Price Anderson Act (1957), Paris Convention (1960), Vienna Convention (1963) and Convention on Supplementary Compensation (1997). These have been reviewed from time to time.

In India, all aspects of design, construction and operation of nuclear power plants fall under Government of India as specified in Atomic Energy Act, 1962. The 200 MW reactors built with US assistance in Tarapur were fully indemnified by the Government of India. The absence of a liability law did not affect the Kudankulam Project where two Light Water Reactors (2,000 MW) are under construction by Russian government agencies.

However, the Indian nuclear power industry is growing rapidly with a targeted capacity of 35,000 MW by 2020[1]. The domestic Pressurized Heavy Water Reactors (PHWR) will peak at 10,000 MW and large-scale deployment of Fast Breeder Reactors (FBR) will take time. Therefore, import of Light Water Reactors is crucial to add capacity and this requires a provision to cover the liability. The Bill enables import of fuel and power reactors from other countries and also entry of the private sector in building and operating the reactors. As of now, India is not a signatory to any of the above mentioned conventions and further, the Atomic Energy Act doesn't have a provision to this effect. In the absence of a civil liability bill, it would be very difficult for India to achieve rapid growth in nuclear power.

Who should own the liability?

A nuclear reactor consists of complex systems, each with materials, equipment; monitoring and control instruments procured from manufacturers from different countries. Their selection, pre-operation testing and subsequent performance are all subject to constant review by the plant operator and a Regulatory body.

There have been two major accidents in commercial nuclear plants: Chernobyl (USSR) and Three Mile Island (US). The International Atomic Energy Agency (IAEA) has categorized these at level seven, (the highest) and five respectively[2]. In both cases, it was gross error on part of the operations personnel at key stages during the accidents that turned these into disasters.

[1]Chairman, DAE, March 23rd, 2010

[2]International Nuclear Event Scale (INES) 1990 classifies nuclear and radiological accidents and incidents into seven levels.

This policy brief is part of the CSTEP research brief series. CSTEP policy briefs are succinct reviews of state of the art technologies and the options they provide to society.

Center for Study of Science, Technology and Policy

Old CAIR Building
Raj Bhavan Circle
Raja Ramanna Complex
Bangalore - 560 001
Tel: +91 (80) 4249-0000
Fax: +91 (80) 2237-2619
Email: admin@cstep.in

Design of a nuclear power system and its operations procedure are intricately linked. While there are continuing developments to improve the efficiency, performance and safety of nuclear power reactors, it is necessary that operations procedures linked to a design are strictly followed. The so called check list for nuclear power reactors should not be under any circumstances over ridden by operators' impulsive action. This also highlights the need for operators' education and training that can never substitute for greater compensation.

Moreover, in the event of an accident, assigning liability to a single entity (the operator) greatly helps victim to claim compensation without delay and litigation. This also forces the operators to choose the best suppliers as well as operate the plants safely. In the unlikely event of an accident, the liability of the operator is absolute, irrespective of fault (except for acts of armed conflicts, hostilities, and civil wars). But, the operator has a right to recourse (Article 17 (b) of CNLB) if the accident has resulted because of negligence on part of supplier of material and equipment, this being purely an internal matter between the operator and such supplier.

In India, as of now, the state owned Nuclear Power Corporation of India Limited (NPCIL) is the only "operator" for building and operating nuclear power reactors. Hence, NPCIL (and indirectly the government) should be absolutely liable in the event of a nuclear accident. If India allows private operators to be part of nuclear industry, the logic of operator liability is unchanged in accordance with global practices.

Is the liability amount sufficient?

The estimation of liability depends on the likely damage a nuclear accident could cause to human life, environment, property and economic loss.

The Chernobyl accident was a catastrophe; graphite fire, hydrogen explosion and fuel meltdown led to destruction of the reactor building and direct expulsion of vast quantities of radioactive content into the atmosphere; much of the flows crossed national borders. The cost of the Chernobyl accident has been estimated at hundreds of billion dollars[3]. In contrast, in the Three Mile Island accident that occurred in the US, despite significant fuel meltdown the containment structure was intact and allowed little release of radioactivity with no impact on the environment. Currently reactors are required to be so designed that a combination of fuel meltdown and breach of containment would have a likelihood of less than one in a million. A disaster of Chernobyl type is far less likely now with the new reactor designs including those in India.

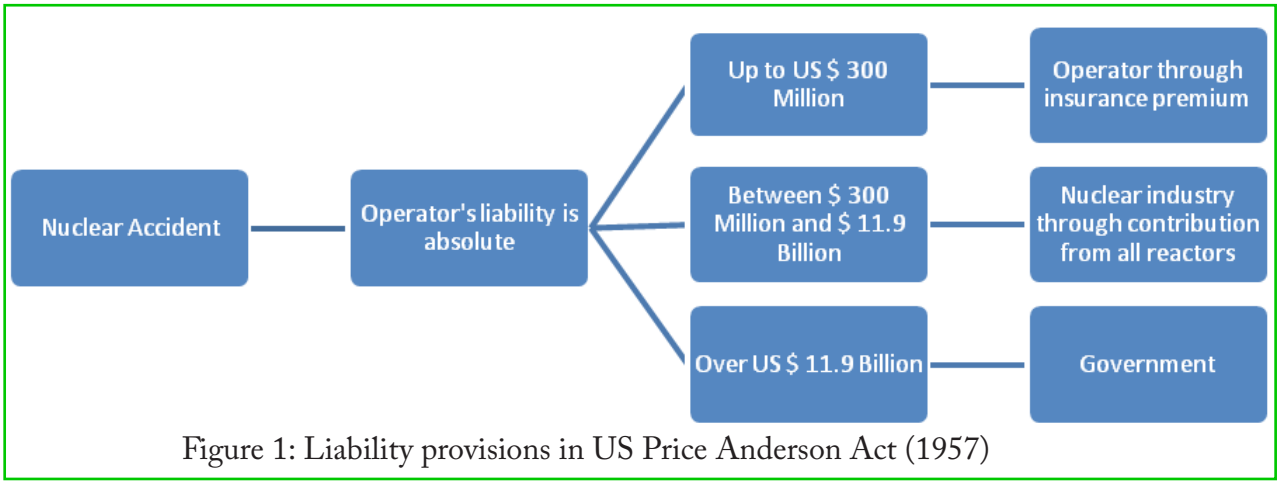

Figure 1: Liability provisions in US Price Anderson Act (1957)

[3]Chernobyl's Legacy: Health, Environmental and Socio-Economic Impacts: The Chernobyl Forum 2003-05

The crucial point is that liability laws cannot be designed to cope with a catastrophe; otherwise no operator will build and operate a nuclear power plant. In the event of a catastrophe, civil liability ends and the government takes over like in case of major floods, tsunami, cyclones, and earthquakes.

The US was the first to come up with the Price-Anderson Act (PAA-1957) at a time when the first nuclear power plants were planned. This was based on a theoretical study of radioactivity release from a 200 MW reactor that ignored the presence of the containment structure and other safety features[4]. Since then, there have been impressive advances in safety measures and scientific assessments indicate that the impact of any foreseeable accident would be far less severe. Nevertheless, the US is continuing with the same provisions as before. According to the PAA now, the operator is responsible for liability up to$ 300 million through American National Insurers (Figure 1). If the liability is more than this, then the nuclear industry contributes to make up the deficiency (up to $11.9 Billion) and beyond this, the government bears the risk and liability.

The Paris Convention includes members from all West European countries with a few exceptions. The Convention has recently proposed new levels, subject to ratification (Figure 2)[5]. It has raised the operator's liability to €700 million; the installation state is expected to provide an additional €500 million and another €300 million would be available by collective state contribution (total of € 1.5 Billion). These amendments of 2004 are not in force yet since most countries have not ratified the convention though they have signed it.

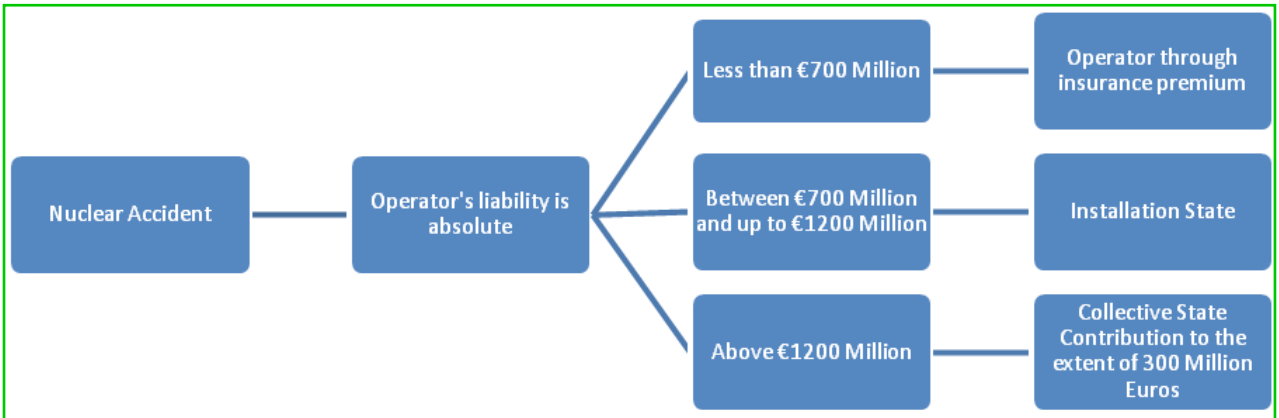

Figure 2: Liability provisions proposed in Paris Convention (1960), subject to ratification

In 1997 IAEA parties adopted a Convention on Supplementary Compensation for Nuclear Damage (CSC). It proposes the operator's liability at a minimum of 150 million Special Drawing Rights (SDRs)[6]. Additional amounts are to be provided through contributions by states parties collectively on the basis of installed nuclear capacity (Figure 3). So far 13 countries (including US) have signed the convention with four ratifications; however, it has not yet entered into force.

The liability provisions now prevailing in various countries show a wide range (Table 1). Each country has fixed the liability limits based on a combination of several factors such as: experience with nuclear power, perceived risk of accident, and participation in any international agreement etc.

[4]Brookhaven Report: *Theoretical Possibilities and Consequences of Major Accidents in Large Nuclear Power Plants*, WASH-740, 1957
[5]Only Switzerland has signed this as on April 2009.
[6]1 Special Drawing Right (SDR) = $1.5

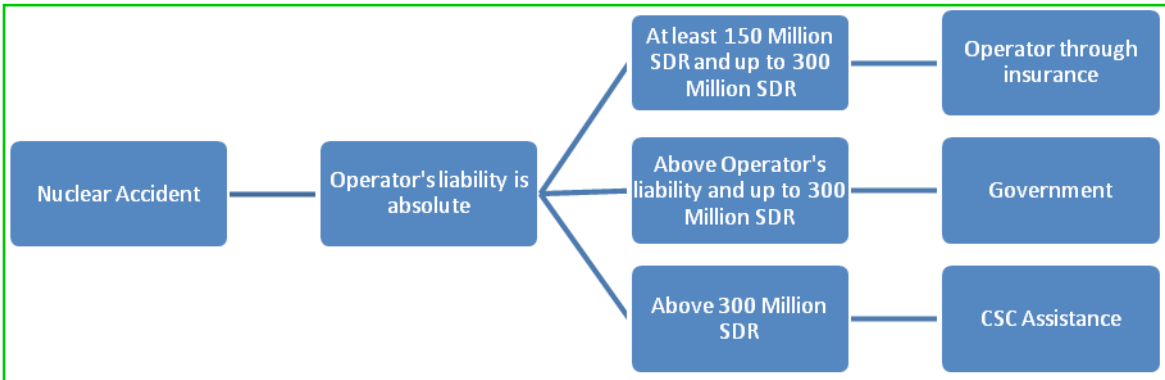

Figure 3: Provisions in Convention on Supplementary Compensation (CSC)[7]

Table 1: Existing liability provisions in a few countries[8,9,10,11]

	Installed Nuclear Capacity (MW)	Operator's Liability Amount ($ Million)	Additional State Compensation ($ Million)	Additional Compensation (International agreements) ($ Million)	Total ($ Million)
Canada[12]	12,679	71	0	0	71
Argentina	935	80	0	0	80
Brazil	1,901	160	0	0	160
China	8,587	44	117	0	161
South Africa	1,842	322	0	0	322
India (proposed)	4,120	100	350	0	450
South Korea	17,716	474	0	0	474
France	63,236	133	144	198	475
UK	11,035	228	50	198	475
Belgium	5,943	433	0	198	631
Sweden	9,399	474	0	198	672
Spain	7,448	1,000	0	198	1,198
Germany	20,339	unlimited	2,500	198	2,698
Netherlands	485	495	2,800	198	3,493
US	101,119	11,900[13]	0	0	11,900

[7] Amount of CSC assistance depends on the number of countries adopting the convention. If all nuclear power countries adopt, the assistance would be more than 300 million SDR.
[8] OECD Nuclear Energy Agency, December 2009
[9] World Nuclear Association (http://www.world-nuclear.org/info/reactors.html)
[10] In European countries listed above, the liability amount will increase when the latest amendments to Paris convention take effect (Fig 2).
[11] Russia (22,811 MW), Germany (20,339 MW) and Japan (47,102 MW) require unlimited liability for operator.
[12] A new legislation is expected to increase the liability amount.
[13] Operator's liability is $ 300 Million and the balance is from contributions by nuclear industry. Additional state compensation if required will be provided with Congressional approval.

In the proposed Indian Bill, the maximum liability is pegged at 300 Million Special Drawing Rights (SDR) ($ 450 Million), which is similar to the provisions in several countries and conforms to the international convention CSC. Of this amount, the operator has been assigned a liability up to Rs 500 Crore (about $100 Million) to be made available without any litigation and the government provides the balance. If India signs the CSC, it would become eligible for an additional amount of compensation depending on the number of countries adopting CSC.

Considering the present small size of the nuclear power program (4,120 MW) and the lack of insurance mechanisms for nuclear accidents, the government's decision to take on more liability provides much needed support to the program which is poised for expansion. As of now, the state owned NPCIL is the only "operator" and if required the government would supplement the compensation paid by NPCIL. As nuclear power expands and includes private operators (with the government's approval), NPCIL and private operators could take on higher liabilities in future. This would also provide an incentive for all of them to ensure safety in their plants. The liability provisions should be periodically revised to make sure that the provisions are adequate and aligned with international practices.

Conclusion

The proposed Civil Nuclear Liability Bill is vital to promote the growth of nuclear power in India with international and domestic public and private participation. In the unlikely event of an accident, the operator liability is absolute in international practice. This ensures timely availability and disbursement of compensation to the victims. Bearing in mind that the major accidents in the past were mainly due to gross error on the part of operations personnel, there should be a renewed emphasis on operators' education and training. The amount of liability proposed is comparable to the provisions prevailing in several other countries, but should be periodically revised as the programme expands. If India were to sign the Convention on Supplementary Compensation (CSC), which is in its interest, additional contributions from other states parties to the convention would become available.