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## **A Nuclear Third Party Liability Regime of a Multilateral Nuclear Approaches Framework in the Asian Region**

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**Abstract:** There are two primary challenges for establishing nuclear third party liability (TPL) regimes within multilateral nuclear approaches (MNA) to nuclear fuel cycle facilities in the Asian region. The first challenge is to ensure secure and prompt compensation, especially for transboundary damages, which is also a challenge for a nation-based facility. One possible solution is that in order to share common nuclear TPL principles, all states in the region participate in the same international nuclear TPL convention, such as the Convention on Supplementary Compensation for Nuclear Damage (CSC), with a view to its entry into force in the future. One problem with this approach is that many states in the Asian region need to raise their amount of financial security in order to be able to participate in the CSC. The second challenge lies with the multiple MNA member states and encompasses the question of how decisions are to be made and responsibilities of an installation state are to be shared in case of a nuclear incident. Principally, a host state of the MNA facility takes on this responsibility. However, in certain situations and in agreement with all MNA member states, such responsibilities can be indirectly shared among all MNA member states. This can be done through internal arrangements within the MNA framework, such as reimbursement to a host state based on pre-agreed shares in accordance with investment and/or making deposits on such reimbursements in case of an incident.

**Keywords:** Multilateral nuclear approach (MNA); nuclear third party liability (TPL); the Convention on Supplementary Compensation for Nuclear Damage (CSC)

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## 1. Introduction

Currently there is a rapid expansion of nuclear energy utilization in the Asian region, and at the same time, proliferation of uranium enrichment and reprocessing (ENR) technologies and facilities are also of concern due to their being another source of usable material for the production of nuclear weapons. In order to cope with this particular issue, nuclear weapon states and nuclear supplier states have been exploring various measures, including international controls of nuclear material, multilateral nuclear approaches (MNA) to nuclear fuel cycle facilities, bilateral nuclear cooperation agreements and export controls.

MNA commonly consist of the joint engagement of a number of states and/or their nuclear industries in civilian nuclear fuel cycle facilities, especially ENR facilities, and they intend to prevent further proliferation of ENR technologies and facilities by reducing the number of such nation-based facilities. Such joint engagements include investment, ownership, management, operation and decision-making of MNA facilities as well as various combinations of the above elements.

One of the necessary features of such a MNA framework is to construct a robust nuclear TPL regime. The same as with a nation-based facility, nuclear facilities cannot initiate their operations without the TPL regime. Currently, however, the nuclear TPL regimes range widely in the states of the Asian region and only a few states are members of an international nuclear TPL convention. Therefore, in order to ensure compensation for transboundary damage caused by an incident in the MNA facility, developing a common nuclear TPL regime under the same international nuclear TPL convention is indispensable for establishing the MNA facility. With this in place, compensation for transboundary nuclear damage would also be ensured even if the facility is not a MNA, but a nation-based facility. One principle of the nuclear TPL regime is exclusive liability of a nuclear installation operator. Furthermore, if the amount of nuclear damage caused by such a liable operator exceeds its amount of financial security, a state to which the operator belongs generally provides necessary assistance to the operator to make up the balance, based on the nuclear TPL law of the state. Multiple MNA member states and/or business enterprises in such states directly and indirectly relate to the operation of the MNA facility. From a nuclear TPL viewpoint, “a liable operator” and “an installation state”, together with their responsibilities or their share of responsibilities in case of a nuclear incident, should be clearly defined under such circumstances before launching operation of the MNA facility.

These are the keys for establishing a sustainable MNA framework in the Asian region. In this paper, the author delineates possible solutions for those key factors. In the author’s first paper, MNA’s twelve necessary features were delineated [1], while her second paper clarified measures necessary to harmonize a MNA framework with bilateral nuclear cooperation agreements as one of twelve features of MNAs [2]. In this author’s third paper, the focus is on how to construct a nuclear TPL regime as another one of the twelve MNA’s necessary features for a sustainable MNA framework. No such analyses or proposals on this issue were found in earlier studies. This paper, together with her first and second papers, is expected to be a significant reference for establishing an MNA framework in the Asian region in the immediate future.

## 2. An Appropriate International Nuclear TPL Convention for States in the Asian Region

Whether or not a nuclear facility is a nation-based or in the form of MNA, a nuclear incident in such a facility might cause transboundary damage to its neighboring states. In order to ensure secure compensation for such damage, international conventions on nuclear TPL adopt six basic principles [3]:

- Strict liability of a nuclear operator.
- Exclusive liability of an operator of a nuclear installation.
- Compensation without discrimination based on nationality, domicile or residence.
- Mandatory financial coverage of the operator's liability.
- Exclusive jurisdiction.
- Limitation of liability in amount and in time.

This explains why most nuclear energy states in Western European jointly participate in the Convention on Third Party Liability in the Field of Nuclear Energy of 29th July 1960, as amended by the Additional Protocol of 28th January 1964 and by the Protocol of 16th November 1982 ("Paris Convention") [4] all together and enact nuclear TPL laws satisfying provisions of the Paris Convention. In the same way, whether or not a nuclear facility in the Asian region is a nation-based or in the form of MNA, as far as states in the region engage nuclear activities, all states principally need to join the same international nuclear TPL convention and enact nuclear TPL laws satisfying this convention.

Although the International Atomic Energy Agency (IAEA) projections indicate a "significant growth in the use of nuclear energy worldwide" [5] centered in Asia and that "47 of the 67 reactors under construction are located" [5] in the region as shown in Table 1, none of the states, apart from the Philippines, Russia and Kazakhstan, are members of any international conventions on nuclear TPL, as shown in Table 2, Table 2 also indicates that the current nuclear TPL regimes in Asian states vary widely, including the extent of limitation of liability by the liable operator and the degree of financial security as shown. It is also worth noting that China has not yet enacted nuclear TPL laws, although there are 29 nuclear power reactors under construction [6] and nuclear power generation capacity will increase to "200 GWe by 2030 and 400 GWe by 2050" [6].

**Table 1.** Nuclear Power in Asia, and involvement with the Nuclear Fuel Cycle [7].

	Nuclear capabilities					Other status of the fuel cycle *
	Number of power reactors				Total	
	Operable or in operation	Under construction	Planned			
China	17	30	59	106	UM, C, E, FF	
India	20	7	18	45	UM, FF, R, WM	
Japan	50	3	9	62	C, E, FF, R, WM	
Republic of Korea	23	5	6	34	C, FF	
Taiwan	6	2	0	8		
Indonesia	0	0	2	2	FF	

Table 1. Cont.

	Nuclear capabilities				
	Number of power reactors				Other status of the fuel cycle *
	Operable or in operation	Under construction	Planned	Total	
Vietnam	0	0	4	4	
Bangladesh	0	0	2	2	
Pakistan	3	2	0	5	UM, E, FF
Total	119	49	100	268	

\* UM: Uranium mining, C: Conversion, E: Enrichment, FF: Fuel fabrication, R: Reprocessing, WM: Waste management facilities for fuel spent away from reactors.

Table 2. Nuclear third party liability (TPL) regimes in the states of the Asian region [8].

	Ratification of international convention on nuclear TPL	Domestic nuclear liability law	Operator's liability			Amount of financial security		Compensation by Government	
			Limited (L)/Unlimited (U)	Extent of limitation of liability	(mil. US dollar <sup>vii</sup> )	local currency	(mil. US dollar <sup>vii</sup> )	Available (A) /not available (N)	Compensation by Government
Japan (JPY)	No	Yes	U	-	-	120 bln JPY yen	1,200	A	-
Republic of Korea	No	Yes	L	300 mil. SDRs	456	5 mil. Korean Won	46	A	Not specified in the law
China	No	No <sup>ii</sup> [9]	L	300 mil. (RMB <sup>iii</sup> )	48.6	300 mil. (RMB)	48.6	A	800 mil. RMB
Taiwan	No	Yes	L	4.2 billion (NTS <sup>iv</sup> )	141	\$4.2 bln (NTS)	141	A	Not specified in the law
Philippines	Yes <sup>i</sup>	Yes	L	US\$5 mil.	5	<sup>viii</sup>		A	\$5 mil.
Indonesia	No	Yes	L	900 bln (IDR <sup>v</sup> )	80.5	Not specified in the law			
Malaysia	No	Yes	L	50 mil. (RM <sup>vi</sup> )	15.2	<sup>viii</sup>		A	50 mil. RM
Vietnam	No	Yes	L	150 mil. SDRs	228	150 mil. SDRs	228	Not specified in the law	
Russia	Yes <sup>i</sup>	Yes	L	US\$5 mil.	5	US \$5 mil.	5	A	Not specified in the law
Kazakhstan	Yes <sup>i</sup>	Yes	L	Not specified in the law					

<sup>i</sup> Philippines, Russia and Kazakhstan are members of the Vienna Convention, which has been in force since 12 November 1977 [4]; <sup>ii</sup> Replies to questions on the liabilities of compensation for damage resulting from the nuclear accident in June 2007; <sup>iii</sup> Chinese Yan Renminbi (RMB); <sup>iv</sup> New Taiwan Dollar (NTS); <sup>v</sup> Indonesian Rupiah (IDR); <sup>vi</sup> Malaysian Ringgit (RM); <sup>vii</sup> All currency rates are as of 11 September 2013; <sup>viii</sup> The nuclear energy committee decides on insurances or types and conditions of other financial securities.

Exploring appropriate international nuclear TPL conventions for the Asian states, two options are possible. One option is to create a completely new convention for the Asian states, while the other is for

all states in the Asian region to join one of the existing international TPL conventions as shown in Table 3. Considering the facts that;

- there are wide gaps among Asian states on nuclear energy utilization, as shown in Table 1,
- their current nuclear TPL regimes vary widely, as shown in Table 2,
- political and economic regimes also vary, and
- therefore, it is anticipated to be difficult and to take a long time to uniform such varying regimes,

the latter option is a realistic and practical solution for the states in the Asian region.

**Table 3.** Comparisons of international conventions on TPL of their members and extent of limitation of liability.

	<b>Vienna Convention [10] amended by 1997 Protocol [11]</b>	<b>Paris Convention [4] amended by 2004 Protocol [12] <sup>iii</sup></b>	<b>Compensation for Nuclear Damage (CSC) [13] <sup>iii</sup></b>
Member states (ratification/ accession)	<ul style="list-style-type: none"> <li>• Vienna Convention: 39 states (as of 15 April 2013)</li> <li>• 1997 Protocol: 11 states <sup>i</sup> (as of 1 March 2013)</li> </ul>	<ul style="list-style-type: none"> <li>• Paris Convention: 15 states <sup>iv</sup></li> <li>• 2004 Protocol: 2 states <sup>v</sup> (as of August 2013)</li> </ul>	<ul style="list-style-type: none"> <li>• four states (Argentina, Morocco, Romania and the US, as of 24 June 2013)</li> </ul>
Extent of limitation of liability and contribution by contracting parties, if any	<ul style="list-style-type: none"> <li>• Not less than 300 million SDRs <sup>ii</sup> (approx. 456 million USD)</li> <li>✓ Not less than 150 million SDRs provided that in excess of that amount and up to at least 300 million SDRs public funds shall be available</li> </ul>	<ul style="list-style-type: none"> <li>• Not less than 700 million Euros <sup>vi</sup> (approx. 924 million USD)</li> </ul>	<ul style="list-style-type: none"> <li>• The first tier: Not less than 300 million SDRs per an accident <ul style="list-style-type: none"> <li>✓ A transitional amount: at least 150 million SDRs for the maximum of 10 years from the date of the opening for signature of the Convention</li> </ul> </li> <li>• The second tier: An international supplementary fund prepared by contracting parties, in case the damage caused by an incident exceeds, or is likely to exceed, the amount of the first tier</li> </ul>
Lower amount of financial security	<ul style="list-style-type: none"> <li>• Not less than 5 million SDRs <sup>ii</sup> (approx. 7.6 million USD)</li> </ul>	<ul style="list-style-type: none"> <li>• Low-risk installations: 70 million Euros</li> <li>• Transport activities 80 million Euros</li> </ul>	<ul style="list-style-type: none"> <li>• Not less than 5 million SDRs with respect to installations and materials that pose a reduced risk of nuclear damage in the event of an incident. (However public funds must be made available to cover any claims up to 300 million SDRs.)</li> </ul>
Financial security	<ul style="list-style-type: none"> <li>• The nuclear installation operator must have financial security equivalent to its liability.</li> </ul>		

<sup>i</sup> Argentina, Belarus, Bosnia and Herzegovina, Kazakhstan, Latvia, Montenegro, Morocco, Poland, Romania, Saudi Arabia and United Arab Emirates; <sup>ii</sup> SDR is a unit of currency of the International Monetary Fund. One SDR equals approximately 1.52 US dollars as of 11 September 2013; <sup>iii</sup> Not yet entered into force; <sup>iv</sup> Belgium, Denmark, Finland, France, Germany Greece, Italy, Netherlands, Norway, Portugal, Slovenia, Spain, Sweden, Turkey and United Kingdom; <sup>v</sup> Norway and Switzerland; <sup>vi</sup> 1 Euro equals approximately 1.32 US dollars as of 11 September 2013.

Regarding the three international nuclear TPL conventions in Table 3, the Vienna Convention on Civil Liability for nuclear damage (“Vienna Convention”) entered into force on 12 November 1977 [10] and the Convention was amended by the Protocol in 1997 [11]. The Paris Convention was amended in 2004 by Protocols [12], although the amendment has not yet entered into force. The 1997 Convention on Supplementary Compensation for Nuclear Damage (“CSC”) [13] has not yet entered into force either, but it will come into effect on the 90th day after the date when five states with a minimum of 400 gigawatt (GW) thermal of installed nuclear capacity ratify the CSC. In this respect, if Japan becomes a member of the CSC, the Convention enters into force.

Among the three conventions mentioned above, the CSC is an appropriate convention for the Asian states for the following reasons;

- The CSC’s global application (Article II): The convention is open to any state that is a party to either the Vienna Convention or the Paris Convention, or that declares that its national law complies with the provisions of the Annex to the CSC.
- Geographic distribution of participating states of both the Vienna and the Paris Convention: Participating states in the former convention are located in Central and Eastern Europe and South America, while states in the latter convention are in Western Europe. They are both far away from the Asian region and nuclear incidents in such states are unlikely to cause nuclear damage in the Asian region.
- The CSC’s two-tiered system of compensation for damage caused by a nuclear incident (Article III): The Convention adopts a two-tiered system of compensation. The second tier of compensation is the international supplementary fund. All the CSC member states contribute to the fund in case of nuclear incidents. The more states with a large nuclear capacity participate in the Convention, the larger the ensured resource of funding. In this respect, the US, which has the largest nuclear reactor capacity in the world, already has ratified the CSC in 2008, and the resource for the second tier has been strengthened. If Japan, which is the third largest nuclear reactor capacity in the world, also becomes a member of the Convention, the resource of the fund would be further secured. In addition, the CSC’s spirit of such mutual cooperation of the second tier shares similarity with the base of the MNA framework.
- The CSC’s special undertaking for installation states’ obligation to ensure financial security for the first tier of compensation (Article III): An installation state principally has an obligation to ensure the availability of 300 million SDRs or a greater amount; however, for a maximum of 10 years from the date of the opening for signature of the CSC, at least 150 million SDRs are set out as the financial security amount in the case of a nuclear incident occurring within that period. This reduction of financial security is an advantage especially for new entrants to nuclear energy utilization in the Asian region. In addition, 3 million SDRs as financial security equals the amount amended in the Vienna Convention.
- A special arrangement for a state with a provision of unlimited liability of a liable operator (Article 5 of the Annex): States which adopt unlimited liability of a liable operator, such as Japan, are required to obtain not less than 300 million SDRs as the amount of financial security of a liable operator.
- Prospect of the CSC’s entry into force (Article XX): The CSC does not enter into force until at least five States with a minimum of 400,000 units of installed nuclear capacity have joined. In this

respect, if Japan, which currently has the largest nuclear capacity in the Asian region, joins the CSC, the conditions for its entry into force would be satisfied.

However, from a practical perspective satisfying the CSC's amount of financial security of an installation state, as shown in Table 3, is currently only possible for Japan and the ROK, together with the Vietnam, when applying a lower amount of financial security. Regarding states with large nuclear programs, Russia needs to raise its amount of financial security from 5 million US dollars to 300 SDRs, while China is, first of all, required to set up the consolidate nuclear TPL regime in accordance with the Convention.

Needless to say, Asian states do not have to review their nuclear TPL regime for satisfying CSC's entry conditions, only for establishing the MNA framework. The reason for this is that, considering a MNA's purpose of nuclear non-proliferation, MNA facilities would be ENR facilities and the number of such facilities would be limited. However, as mentioned, the participation in one of the nuclear TPL convention ensures secure compensation for domestic and transboundary nuclear damage in case of a nuclear incident in a nation-based facility. Therefore, it is worth it for states in the region as a whole to become members of one of international nuclear TPL conventions.

As to the possibilities of Japan's participation in the CSC, according to a draft of the new Basic Energy Plan issued in December 2013, "The government will review the nuclear damage compensation system and accelerate its effort toward concluding the Convention on Supplementary Compensation (CSC) for nuclear damage" [14], although Japan's nuclear TPL regime faces several challenges to be solved for ensuring consistency with the CSC, including definition of nuclear damage, jurisdiction, period of exclusion, and necessary arrangements for CSC's lower amount of financial security.

### **3. Nuclear TPL Regimes in MNA Frameworks**

#### *3.1. Nuclear TPL Regimes in Existing MNA Frameworks*

As a reference for exploring the TPL regime in the MNA framework in the Asian region, it is worth analyzing such regimes in existing MNA frameworks of the European Gaseous Diffusion Uranium Enrichment Consortium (Eurodif, a subsidiary of Areva SA) and URENCO Limited.

First of all, as shown in Table 3, most Western European states, including France, the UK, the Netherlands and Germany, host states of both Eurodif's and URENCO's enrichment facilities, together with their neighboring states, are all members of the Paris Convention. Therefore, in the case of a nuclear incident in such MNA facilities, nuclear damage in the region is principally to be compensated in accordance with provisions of the Paris Convention.

The Eurodif was formed in 1973 by France, Belgium, Italy, Spain and Sweden as a joint stock company, but only a French operator exclusively holds the enrichment technology and operates the facility. Therefore, the Eurodif follows French nuclear laws and legislations including nuclear TPL, and in case of a nuclear incident, principally the French operator is assumed to be an exclusively liable operator, while the Government of France is also assumed to take responsibilities as an installation state. The URENCO are invested by companies in Germany, the Netherlands, and the UK, and they equally share the facilities' ownership, operation, and decision-making in the URENCO, as stipulated in the Treaty of Almelo of 1971. Since each state has one enrichment facility, each facility respectively follows

its host state's relevant nuclear laws and legislations including nuclear TPL, such as Eurodif. Therefore, in the event of a nuclear incident in a facility, nuclear damages are principally compensated based on its host state legislation on nuclear TPL, which also satisfies the provisions of the Paris Convention. These Eurodif and URENCO arrangements are quite natural, since they operate their enrichment facilities based on their own enrichment technology, and consequently they should be responsible for nuclear incidents in their facilities. In addition, advantages of these arrangements are.

- Even if the facilities are in the form of MNA, they are equally treated as nation-based facilities.
- Both a liable operator and an installation state can easily be identified, despite the existence of multiple stakeholders in MNA frameworks.
- It is unnecessary to change both host states and other MNA member states' legislations on nuclear TPL based on the existence of a MNA framework.

In addition, regarding frameworks of international control of nuclear material, such as a low enriched uranium (LEU) reserve established at the International Uranium Enrichment Center in Angarsk, Russia in December 2010 [15] and an IAEA international fuel bank currently on the way to be established [16], principally, such a reserve and a bank follow their host states' (Russia's and Kazakhstan's) nuclear TPL laws in accordance with the Vienna Convention, since both states are members of the Vienna Convention. In this respect, whether or not a facility is a nation-based or under the MNA framework or under international control, they are all treated equally under a host state's nuclear TPL laws and regulations and the Vienna Convention.

On the other hand, the IAEA fuel bank has a different characteristic from the Russian LEU reserve, Eurodif and URENCO. Since there is no enrichment plant in Kazakhstan, either Kazakhstan or its nuclear operator accepts and stores the LEU, which has been enriched by enrichers in other states. However, in case of a nuclear incident in the bank, the nuclear operator and the state of Kazakhstan, respectively, are required to bear responsibilities as a liable operator and an installation state, although the bank is an international organization-controlled bank. In cases of Eurodif, URENCO and a Russian LEU reserve, as mentioned above, nuclear operators and their governments have enough reasons to be positioned as exclusively liable operators and installation states in case of a nuclear incident since they are actually and directly engaged in enrichment activities by using their own enrichment technologies and facilities. Compared with nuclear reactors, risks of nuclear incidents in LEU storages are low, but in this case, such responsibilities can be equally shared among stakeholders by internal arrangements within the bank.

### *3.2. Case Studies and Analysis of Appropriate Nuclear TPL Regimes in a MNA Facility*

Assuming to establish a MNA facility, Table 4 shows case studies of possible combinations of the MNA facility's technology holder, an operator, and an installation state, together with possible responsibilities of MNA member states in the case of a nuclear incident in a MNA facility based on the analysis described in Sections 2 and 3.1.

These case studies are based on the following premises;

- All MNA member states are assumed to participate in the same international nuclear TPL convention, such as the CSC, and enact nuclear TPL laws and regulations in accordance with the convention.

- Even if a host state of a MNA facility provides the MNA facility with an “extra-territorial” status, the MNA facility still needs to follow a host state’s relevant nuclear laws and regulations, including nuclear TPL, and it must be provided with the necessary licenses for its nuclear activities.

As to possible responsibilities of MNA member states, the key points are to identify what state takes the responsibility of being “an installation state” in the event of a nuclear incident and, if necessary, how these responsibilities are shared among multiple MNA member states.

**Table 4.** Case studies on a nuclear TPL regime in a multilateral nuclear approaches (MNA) facility.

	Case 1	Case 2	Case 3	Case 4	Case 5
(1) A technology holder of a MNA facility	a <sup>i</sup>	b <sup>i</sup>	the MNA company <sup>iv</sup>	c <sup>ii</sup>	x <sup>iii</sup>
(2) An operator of a MNA facility (= a liable operator in case of a nuclear incident in the MNA facility)	a	the MNA Company	the MNA Company	the MNA Company	the MNA Company
(3) A host state of the MNA facility	State A <sup>v</sup>	State B <sup>v</sup>	State B	State B	State B
(4) Responsibilities of MNA member states in case of a nuclear incident in the MNA facility	None (except state A)	<ul style="list-style-type: none"> <li>• Principally, as a representative of MNA member states, State B, a host state of the MNA facility, directly takes responsibility as an installation state of a MNA facility.</li> <li>• However, especially in Cases 3, 4 and 5, if all MNA member states agree, this responsibility can be indirectly shared among all MNA member states, through internal arrangements within the MNA framework, such as reimbursement paid to a host state based on pre-agreed shares and/or making deposits on such reimbursement in case of an incident.</li> </ul>			

<sup>i</sup> a, b: nuclear companies which belong to a MNA member State A and B, respectively; <sup>ii</sup> c: a nuclear company which belongs to a MNA member state, except States A and B; <sup>iii</sup> x: a nuclear company which is not a member of the MNA Company and to which non-MNA member states belong; <sup>iv</sup> The MNA Company: a joint stock company consisting of MNA member states and/or nuclear operators which belong to MNA member states; <sup>v</sup> State A and State B: MNA member states.

Case 1 indicates a case of a nation-based nuclear facility. However, it also applies to a case of a MNA facility into which all MNA member states have invested, but that operated only by one technology holder, such as Eurodif. In this case, it is natural that an operator “a” and a “State A”, respectively, take responsibility as a liable operator and an installation state in case of an incident.

In Cases 2, 3, 4 and 5, the MNA Company, a joint stock company consisting of multiple MNA member states and/or nuclear operators which belong to MNA member states, operates the MNA facility. The facility is situated in State B, therefore, the MNA Company, as an operator of the facility, follows relevant nuclear laws and regulations, including nuclear TPL, in State B. In the event of a nuclear incident, the MNA Company becomes a liable operator, however, as stakeholders of the Company, MNA member states and/or nuclear operators, who constitute the Company, indirectly share the responsibilities of a liable operator.

Regarding an installation state, although other MNA member states engage in the MNA facility through the MNA Company, State B, as a host state as well as a representative of all MNA member states,

directly takes responsibility as an installation state for following reasons:

- The MNA Company and its facility are both situated in a State B.
- Therefore, the MNA Company and its facility follow relevant nuclear laws and regulations of State B. Such laws and regulations include Safeguards, nuclear security, physical protection of nuclear materials and facilities, export controls, nuclear safety, emergency preparedness and nuclear TPL, *etc.* In addition, every authorization for the MNA facility including its design, construction and operation, is provided by the Government of State B. Therefore, State B has enough reasons to become an installation state and take responsibilities in the event of a nuclear incident.
- If all MNA member states are collectively or respectively considered as “an installation state”, legal relations would be complex, and such complexity may prevent timely compensation for nuclear damage.
- Assuming that the above arrangement is possible and that the compensation for nuclear damage caused by the MNA Company is insufficient, all MNA member states are directly required to share their responsibilities as “an installation state”. However, assuming one state cannot afford to take on a part of an installation state’s responsibilities, there would be the question of which states need to substitute such responsibilities. If so, prompt compensation for nuclear damage would be prevented.

However, as for the IAEA international fuel bank mentioned in Section 3.1, especially in Cases 4 and 5, it would be hard for State B to take responsibility as an installation state by itself, since the technology utilized in the MNA facility is not clearly the nuclear operator’s, and State B may not be able to be informed regarding the details of the technology due to non-proliferation and/or trade secrets of the technology holder. In those cases, although State B takes responsibility as an installation state in accordance with nuclear TPL laws and regulations in State B, through internal arrangements within the MNA, all MNA member states indirectly can share this responsibility of State B based on pre-agreed shares, such as reimbursement paid to a host state based on pre-agreed shares of investments and/or making deposits on such a reimbursement in advance. Such deposits can play the same role as a public fund in the CSC. If neither State B nor other MNA member states are willing to take such direct and indirect responsibilities as “an installation state”, the MNA facility should not be situated in State B. In addition, from the viewpoint of feasibility and practicability of establishing a MNA facility in Case 5, it would take time to establish this within State B, since the MNA member states either collectively or individually are expected to be required to conclude nuclear cooperation or supply agreements with an operator x and the state to which operator x belongs, since x is not a MNA member.

As to Case 3, since the MNA Company not only holds the technology but also operates its facility, it is more understandable than in Cases 4 and 5 that all MNA member states indirectly share responsibilities of State B as an installation state. However, from the nuclear non-proliferation viewpoint, Case 3 has a higher risk of proliferation of nuclear technologies than the other Cases have, since the MNA Company, consisting of various nuclear operators and their states hold the technology. Especially for the purpose of nuclear non-proliferation, MNA facilities are expected to be ENR facilities. Therefore, from the nuclear non-proliferation viewpoint, Case 3 is not desirable based on risk of proliferation of ENR technologies and facilities.

As to Case 2, also from a nuclear non-proliferation viewpoint, the technology utilized in the MNA facility remains in the territory of its state. In this respect, this case is a desirable situation for a MNA

facility, as far as each MNA member state does not want to have the technology and agrees to situate the facility within the territory of the technology holder. Also from this perspective, compared with Cases 3, 4 and 5, State B has more reasons to take responsibility as an installation state in case of a nuclear incident, since the technology holder in its state dominantly holds the technology and State B is in a better position to control this technology compared to other MNA member states.

To sum up the above case studies, firstly, in a MNA facility, the MNA Company—a joint stock company consisting of MNA member states and/or nuclear operators, which belong to MNA member states—and an operator of the MNA facility, become the liable operators in case of a nuclear incident. Each members of the MNA Company indirectly bears the responsibility through investments into the facility. Secondly, there are various combinations of a technology holder, an operator of the facility, and an installation state, and principally, a host of the MNA facility takes on the responsibility as installation state. However, in some cases, all MNA states can indirectly share the responsibilities through internal arrangements within the MNA framework, such as reimbursement paid to a host state based on pre-agreed shares and/or making deposits (a fund) on such reimbursements in the event of an incident. If MNA member states are unwilling to share these responsibilities, they need to find a new host state.

#### **4. Other Considerations in Relation to Nuclear TPL Regimes in a MNA Framework: Choice of Host State of a MNA Facility**

On the premise of a nuclear incident and for the purpose of providing necessary and appropriate compensation for nuclear damage, the nuclear TPL laws prescribe the responsibilities of a nuclear operator and an installation state. In the first place, however, whether or not a nuclear facility is nation-based or in the form of MNA, preventions of occurrences of nuclear incidents themselves take precedence over establishing nuclear TPL regimes. The more nuclear incidents can be prevented, the less necessity there is for nuclear TPL regimes to be utilized. In this respect, one of the twelve MNA features of “establishing a nuclear TPL regime” within a MNA framework mentioned in the authors’ first paper [1] closely relates to another MNA feature of “Siting—choice of a host state (installation state)”. In order to prevent nuclear incidents, a host state would need to do the following:

- To become a member of appropriate international treaties, conventions, and to follow standards and guidelines on nuclear safety, emergency preparedness and nuclear TPL *etc.*, and to reflect them in its domestic legislation.
- To become a member of appropriate international treaties, conventions, and to follow standards and guidelines on nuclear non-proliferation (Safeguards), nuclear security, physical protections of nuclear materials and facilities, export control, *etc.*, and to reflect them in its domestic legislation, since nuclear incidents could happen due to terrorists’ attacks.
- To be politically, socially and economically stable.
- To maintain good relations with neighboring states and the international community.
- To have no territorial disputes, including conflicts on natural resources.
- To have necessary and sufficient knowledge, expertise and experience to host (and operate) MNA facilities.
- To ensure safe and secure routes for transportation of nuclear material.

## 5. Conclusions

In this paper, the author delineates a possible nuclear TPL regime in a MNA framework in the Asian region. The first priority is that all states in the region participate in the same international nuclear TPL convention, such as the CSC. However many states need to develop their nuclear TPL regime and raise the degree of limitation of financial security in order to participate in the CSC. Secondly, a host state of a MNA facility, as a representative of MNA states and as an installation state, principally takes on the responsibilities of an installation state. However, in certain situations and in agreement with all MNA member states, such responsibilities can be indirectly shared among all MNA member states through internal arrangements within the MNA framework, such as reimbursements paid to a host state based on pre-agreed shares and/or making deposits on such reimbursement in the event of an incident.

As a practical matter, in order to establish sustainable and feasible MNA, there are also various characteristics that MNA have to be equipped with, including structure and organization of an MNA framework, finances, economics, industrial operations, decision-making processes, political responsibility, choice of host states of MNA facilities, *etc.* In this context, this study is the very first step, and based on this study on nuclear TPL regime in a MNA framework in the Asian region, the author continues to further explore other issues for the establishment of sustainable and feasible MNAs.

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## Conflicts of Interest

The author declares no conflict of interest.

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