

Emerging Nuclear Scenario Pakistan's Concerns and Approaches

Shireen M. Mazari

Abstract

[Major issues on the canvas of the evolving nuclear scenario include the US-favoured discriminatory approach embodied in NPT taking shape of FMCT; the heightened concerns of safety and security of nuclear assets in the wake of Fukushima disaster in Japan as well as the notions of nuclear material/weapons being acquired by non-state-actors; and the whole debate of disarmament. The US managed to get NSG waivers for India in terms of transfer of technology despite India's questionable proliferation record. A full membership of the NSG for India will be very damaging for Pakistan, as NSG works on consensus and India would veto any effort to get exemptions for Pakistan on sensitive nuclear technology. The move to use the UN increasingly as a forum for nuclear issue conflicts is unfortunate because especially in the case of the UNSC, issues become acutely politicised and hard lines are drawn. That non-state actors – primarily terrorists or other groups using violence for their political ends – would want to acquire nuclear weapons is a highly contentious assumption. As to concerns regarding Pakistan's nuclear safety and security, there are well-designed systems and practices in place – with no untoward incident reported so far, as against numerous examples in several other countries. Within the context of South Asia, it is not technology denial that will address the issue of nuclear stability, but political will. – *Editors. J*

Prevailing Scenario

The nuclear arms control and disarmament issue area has always been premised on two parallel tracks: the US-favoured discriminatory approach embodied in the Non-Proliferation Treaty (NPT) with differing sets of rights and obligations for nuclear and non-nuclear weapon states, but also reflected in treaties like the Partial Test Ban Treaty (PTBT) and now the prevailing draft of the Fissile Material Cut-Off Treaty (FMCT); and the non-discriminatory approach which has been embodied in a number of international agreements and initiatives – to name just a few beginning with the (Nuclear Weapons Free Zones) NWFZs to the Comprehensive Test Ban Treaty (CTBT), the International Atomic Energy Agency's (IAEA) now dead CAS initiative, etc. As if the NPT was not discriminatory enough, the developed countries sought to further the discriminatory norm of technology denial through Supplier Cartels like the Nuclear Suppliers' Group (NSG) and the Missile Technology Control Regime (MTCR). It is important to remember that these cartels are not international treaties and have no legally binding character – so enforcement is by choice even for members. But of course, for cartel members, there has to be a good faith understanding to sustain the cartels of technology denial.

*Dr. Shireen M. Mazari is member of National Assembly of Pakistan. This article is based on a talk she delivered at IPS on February 13, 2013.

It is the NSG that is extremely relevant. It evolved out of the London Suppliers' Club. In the wake of the Indian nuclear test of 1974,

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where material from a reactor supplied by Canada was used, a nuclear-technology Suppliers' Conference was held in London where a "trigger list" (also known as the Zangger List) was drawn up of sensitive technologies which the Club members' agreed not to export - especially to potential threshold nuclear powers. The list was later made more extensive and the group evolved into something more permanent - the Nuclear Suppliers' Group. This suppliers' agreement not only continues to exist, it set the tone for the MTCR that followed.

The NSG now has 46 members, including all the P5 states. The underlying policy is to only do business with NPT members and under conditions of full scope safeguards by the IAEA. Even though the group is voluntary and works through consensus, it is not totally informally organised. It has its published set of guidelines that are updated. The first set for nuclear exports was published in 1977, and the second after the 1990-91 Gulf War.

The Guidelines are in two parts:

Part 1: Guidelines for Nuclear Transfers (INFCIRC/254), covers export of items especially designed or prepared for nuclear use.

Part 2: Guidelines for Transfers of Nuclear-Related Dual-Use Equipment, Materials, Software and Related Technology (INFCIRC/254), covers the export of nuclear related dual-use items & technologies.

The NSG does not have a formal administrative structure and no legal authority to influence the nuclear trade policies of its members and there is no formal enforcement mechanism - so it is all premised on good faith and a mutuality of interest. That is why the NSG works on the principle of unanimity - and has a strict "no undercutting policy" - so that no one suffers in terms of orders lost. etc.!

Problem for Pakistan is that the US managed to get NSG waiver for India in terms of transfer of technology despite India's questionable proliferation record as a state. The US has also been trying to get India full membership of the NSG which will be very damaging for Pakistan as NSG works on consensus and India would veto any effort to get exemptions for Pakistan on sensitive nuclear technology. So far US efforts have not succeeded but we need to be more active diplomatically in pushing our demand for a "criteria based exemption" rather than country-specific exemption.

Emerging Nuclear Scenario: Pakistan's Concerns and Approaches

Within these two parallel approaches 3 countries – Pakistan, India and Israel, sought to remain outside the core of these regimes while becoming party to some of the peripheral treaties like the PTBT.

The 1998 nuclear tests by Pakistan and India altered the non-proliferation dynamics in that the two states now became overt nuclear powers which could not be accommodated by the existing NPT regime. However, three events undermined the NPT regime itself: one, the North Korean throwing out of IAEA inspectors and conducting a nuclear test (pu based) while leaving the NPT; two, the Iran nuclear crisis whereby Iran continued to assert its right to develop peaceful nuclear technology under Article IV of the NPT but suspicions were raised about its intent and IAEA continues to investigate – while the US and European states continue to cast suspicions on Iran; three, the Indo-US nuclear deal whereby the US clearly contravened its NPT obligations under Articles I and II as well as the preamble commitment. All three events have undermined the NPT-centred regime. In addition, the Indo-US nuclear deal also led the US to seek alteration in the dynamics of the NSG in an effort to accommodate India. Meanwhile the NWFZ idea has expanded from Latin America to the Pacific region including Australia and New Zealand to Africa and Southeast Asia.

So in the emerging nuclear scenario, the major trends that can be identified are:

One, dialectic of the discriminatory non-proliferation regime by its architects themselves – on the one hand the weakening of the NPT and on the other hand the attempt to create another discriminatory treaty in the form of an FMCT – all of which is undermining the presumption against non-proliferation as the focus turns to the nuclear programmes of certain states only.

Two, growing questions about nuclear power generation, in the wake of the Japanese power plant crisis (March 2011).

Three, the whole issue of nuclear disarmament.

Discriminatory non-proliferation regime: As to the first trend, clearly the Indo-US nuclear deal has undermined the NPT itself and following this deal other NPT signatories like UK and France have also signed civil nuclear deals with India, again contravening their NPT obligations. Japan ironically is also seeking such commercial agreements as it has one of the largest nuclear industries and the world's biggest fast breeder programme. The NPT stands weakened not by the non signatories but by the major signatories.

Also NPT article IV was never implemented, so in many ways the Treaty has never fully been implemented, only its punitive clauses.

Finally in the context of the NPT, the demands on Pakistan and India to sign the NPT are untenable because both are now nuclear weapon states and will not give up this capability. They cannot be accommodated into the NPT as Nuclear Weapon State (NWS) because of Article IX of the NPT which gives a static definition of a nuclear weapon state as one which has tested a device before 1968. However, the NPT has a built-in clause for regular review conferences and some years' back an Additional Safeguards Protocol was attached to the Treaty to be signed voluntarily by member states but was then used viz Iran to compel it to sign.

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So, if the international community wants to bring Pakistan and India into the NPT regime then it needs to attach yet another Additional Protocol which recognises Pakistan and India as two NWS Parties to the Treaty. Then the rights and obligations become compulsory for both countries including implementation of Article VI of the NPT.

Meanwhile, even as the NPT is being undermined, another discriminatory measure is being contemplated in the guise of a FMCT. This issue has now come to centre stage in the nuclear issue area, with Pakistan being accused of stonewalling any progress on the FMCT in the CD in Geneva. So what is this whole FMCT issue about?

FMCT's origins lie in UN General Assembly Resolution 48/75L of 16th December 1993, which sought negotiations for a non-discriminatory, multilateral and internationally and effectively verifiable fissile material treaty (FMT). The issue was taken up then by the Conference on Disarmament (CD) in January 1994, and by March 1995 a weak and incomplete mandate, which fudged over major issues of difference, was agreed to and reflected in the subsequent Report of the Special Coordinator Gerald Shannon of Canada. However, major differences prevented the adoption of any other UN GA resolution from 1994-1997. It was only in December 1998 that the GA resolution 53/77I was adopted by consensus – so the CD resumed negotiations on a FMT during its 1999 session on the basis of the Shannon Report and its mandate.

Unfortunately since then the CD remained in deadlock not because of Pakistan – as the propaganda goes – and not only for the last three years but for almost fifteen years (with a few positive breaks), because the major powers, especially the US, refused to accept the notion of effective verifiable procedures as part of a FMT. It

was only the Obama Administration that accepted the demand for effective verification.

The other reason for the stalemate in the CD since the last decade and a half has been the US refusal to move equally urgently on the other three major issues linked to a FMT in the CD: that is, nuclear disarmament, negative security guarantees and prevention of an arms race in outer space (PAROS). Ironically there is already a growing international consensus on these three issues.

As for the FMT itself, while the UNGA resolution of 1993 called for a non-discriminatory FMT, the US and its allies have tended to move away from this international consensus by seeking merely a fissile material cut off treaty with no movement on reducing existing fissile material stockpiles – so the haves will always be at an advantage over the have-nots.

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Pakistan, contrary to charges of being a spoiler, actually floated a proposal to break the deadlock in the CD earlier in February 2011 and reinvigorate its working by suggesting that it take up three agenda items first on which there is an evolving consensus – while leaving aside the FMCT on which there is still no approaching consensus.

So what are the facts relating to the FMT presently?

1. The Conference on Disarmament (CD) in Geneva has been debating the FMCT for some time and the issue has been held up for over a decade primarily because of the US and not Pakistan. Also countries like China want to see equal progress on other issues like PAROS. Therefore for the UN Secretary General and the US to declare that ONE country is holding up the FMCT in the CD is factually incorrect unless it is a reference to the last twelve years and US machinations on dealing with the four related issues together in the CD.
2. The Pakistani position is clear cut: we will sign a Fissile Material Treaty (FMT) which first seeks reductions in existing stockpiles of nuclear material before the cut-off. Since the CD works on consensus, every country has an equal say on any agreement that comes out of it.
3. The US has certainly been contemplating bringing only an FMCT – delinked from other interlinked issues of the CD – to the UN General Assembly. If it does so, there will be a debate and finally voting to get a text passed. But here one must recall the original UNGA consensus on negotiations for an FMT and that may not suit US interests.

4. Even if the US was to manage to pass a FMT text of its choosing through the UNGA, countries have a choice of whether to sign it as a Treaty or not, when it is opened for signatures. The Non Proliferation Treaty followed the Irish Resolution in the UN General Assembly and Pakistan like India used her right to remain outside of the Treaty.
5. In fact, an FMCT following a UNGA resolution should be welcomed by Pakistan because it would take the pressure off us in terms of consensus seeking that is bringing it under pressure in the CD in Geneva. Officially Pakistan has already stated that if the FMCT issue is taken out of the CD, Pakistan will stay away. Once an FMCT resolution goes through in the UNGA – where consensus is not required – it can take potential Treaty form and be opened for signatures. All Pakistan has to do is to refrain from signing – since this is critical for its future. If the issue is dealt with by the US in this manner, it actually takes off pressure from Pakistan in the CD so let the US shift the FMCT issue from the CD to the UNGA.
6. Incidentally, UNGA resolutions are not binding either – unlike UNSC resolutions under Chapter VII of the UN Charter.

So let us not assume that Pakistan is about to be cornered in the UN by the US on the FMCT. In fact the reverse is true: taking the FMCT out of the CD and to the UNGA actually removes the tremendous pressure Pakistan is under presently in the CD in Geneva. So we should encourage the US on this count.

<p>The Pakistani position is clear cut: we will sign a Fissile Material Treaty (FMT) which first seeks reductions in existing stockpiles of nuclear material before the cut-off.</p>	<p>The US is well aware of the problems and unintended consequences it may confront if it took the issue of the FMT out of the CD and into the UNGA. That is why, after the initial threats to do this, the Obama Administration now opposes attempts to move FMT negotiations out of the CD and into the UNGA – as Elaine M. Grossman pointed out in her article dated 4th August 2011 in the <i>Global Security Newswire</i>.</p>
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Last December (2012) the UNGA's First Committee on Disarmament approved a resolution put forward by Canada seeking to break the CD deadlock. There were 2 main points in this resolution: One, the UNSG was asked to put out a report in 2013 on how to move forward on FMCT negotiations based on inputs from member states. Two, the members called on the UNSG to establish a group of government experts, comprising 25 member states, to discuss how to advance negotiations on a FMCT and what technical aspects to include

in the treaty. These experts would meet for two sessions of two weeks each in 2014 and 2015.

There were 20 abstentions while Pakistan voted against. Some of the countries that abstained, like China and Iran expressed concern that by shifting the FMCT issue to the UNGA and the SG would have a negative impact on the legitimacy of the CD. There were also concerns of moving the issue away from the 65 members of the CD to 25 states only.

From Pakistan's perspective, now that this has happened it can legitimately demand that the CD wait for the SG's report and that of the group of experts – especially since the latter will not be ready till after 2015!

The move to use the UN increasingly as a forum for nuclear issue conflicts is unfortunate because especially in the case of the UNSC, issues become acutely politicised and hard lines are drawn. The Iran nuclear issue is one such case – to try and remove it from the IAEA where it was framed in technical terms and therefore more amenable to resolution and bring it to the UNSC with a focus on punitive measures was a sure recipe for exacerbation of the issue.

The FMCT issue is critical to sustaining our credible minimum nuclear deterrence for the future which is why Pakistan is seeking an FMT which would include reductions in existing stockpiles before a cut-off date to create a more balanced situation for Pakistan. Actually the fissile material issue is primarily critical for Pakistan – not the other five nuclear weapons states or India, although India itself will not sign an FMCT so easily since it still has a disadvantage with regard to fissile material stockpiles in comparison with the P 5.

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Of course in about five to seven years down the road we may accept a FMCT because by then we will have built up a proportional fissile reserve to India's as a result of our plutonium production picking up. But right now we can only go for a FMT as an FMCT would be suicidal.

Plutonium development is very essential for Pakistan as it allows greater flexibility of weapons production in terms of smaller yields etc. As for the issue of why Pakistan is isolating itself – this is at one level irrelevant because for vital issues of survival, isolation is no reason to undermine our future. But in fact Pakistan is not isolated at all – after all, India was one of only three countries that opposed the CTBT

resolution in the UNGA (Pak, US etc. all voted for it) and no one thought India was isolated on the CTBT issue. On the FMCT, there are other states which are not comfortable with it but are letting Pakistan be the frontline state. However, even if we are alone we have to go this route on the fissile material issue.

Beyond the FMCT, there is some interest again in the CTBT which is not a discriminatory treaty as explained earlier. However right now the issue is irrelevant as long as the US Congress does not give its assent to the Treaty.

Issues of Nuclear Power Safety: Let us now move on to the second trend prevalent in today's debate on nuclear issues: the nuclear power safety issue especially in the aftermath of the Japanese power reactor crisis post the earthquake and Tsunami that followed in 2011.

First we need to understand that there is a major difference between power reactors and other reactors (research and military) - the latter operate at low pressure and temperature because they do not need to produce steam and electricity. So, there was little danger of a total meltdown. If an accident occurs it is of a low magnitude and contained locally. However even such an accident can upset the system so safety still has to be paramount.

While there are many recorded nuclear-related accidents, three major ones now stand out - all relating to nuclear power plants. Chernobyl - this happened because some systems were deliberately turned off for some tests and they lost control of power and there was a mismatch between heat generation and cooling. Two people were sentenced for this.

Three Mile Island in US - Lost capability to remove heat. Japanese case was different. Its reactors factor in 4.5 G and the earthquake led to an automatic shut down - so the diesel generators went on and then the batteries as is the case - all in all gives eight hours to rectify any fault that can occur. It was the Tsunami that proved lethal - moving at 500 km per hour and 20 metres high - it simply destroyed the back-up systems.

What are the sensitive operations involved in power plants: the capability to remove heat determines the power - coolant has to run at high temps so high pressure needed. While most nuclear power plants are Pressurized Water Reactors (PWRs), the Japanese ones in question were Boiling Water Reactors (BWRs) with small containment which allows heat to gather more quickly in case of crisis.

On 11 March 2011 an earthquake and tsunami caused power outages across northern Japan - including at the Daiichi plant, which comprises six separate reactors. That in turn caused a failure of the reactors' cooling systems, which are needed to keep the nuclear fuel

from overheating and melting down and/or triggering an explosion, releasing poisonous radiation into the atmosphere.

So what happened in Japan was a unique combination of a severe earthquake and Tsunami plus the type of reactors in use in Japan. Certainly there was concern about power reactors across the world but by and large nuclear power continues to be vital in the power generation option of some states.

Pakistan and its power reactors: Amongst our non-power generation reactors are the Pinstech facility at Nilore (only 10 MW) and another very small one nearby of 27 kW only – as well as the Khushab reprocessing project.

Coming to the power reactors, there is the oldest one which is KANUPP (130 MW) in Karachi but because of its age this is not operated at full. It is now able to structurally cope with 23G. A study was done on possible effect of a tsunami and it was found that the operational equipment is much higher than sea level even though Karachi has not shown a proclivity towards Tsunamis. The last recorded Tsunami was in 1945 off the Makran coast with waves of 4 metres – not much seismic activity. In any case, KANUPP is located on a rock 40 feet above main sea level and protected by a rock piece jutting out to sea adjacent to its location. Also, because KANUPP was one of the early CANDU reactors its containment is very big for its size/capacity.

Then come the four Chashma reactors which are based on Westinghouse design but with additional improvements such as hydrogen recombiners – C I (325 MW) and C II (340 MW) – this was connected to the national grid in 2011. The C II has hydrogen recombiners of the passive type so don't need any power source. C III (340 MW) is supposed to come online around 2016 or perhaps a little earlier while C IV will come online 10 months after that. The IAEA safeguards agreement (one for both the plants, which is unusual but shows the credibility of Pakistan's civil nuclear programme) has been signed and in fact took less than 5 minutes to get through the IAEA BOG. We did not ask for the India-style agreement although in my view we should have done so as it has escape clauses and other points to the benefit of the state – but Pakistan has to also consider the Chinese position on these issues. These reactors have a .25 G impact factor – and were constructed to cope with seismic activity upto 6.5 immediately under it as a result of the Khisor Fault present in the area.

How safe are the Chashma reactors based in Mianwali? Interestingly this site is the most studied site since Pakistan could not get anyone to give it civilian reactors or help it build them for about 20 years but during that time numerous studies were done – with the IAEA, with the Italians and so on – anywhere we thought we could acquire a power plant from. So all the aspects of the site are well studied including the earthquake expectations from the faultline in the

area. One major threat that was anticipated was that emanating from the minute possibility of big dams bursting at full capacity – like Tarbela or Kalabagh (if built) so the base level was raised by 2 metres after the threat was studied.

So what have we done in terms of safety?

The Japanese earthquake was beyond seismic expectations and beyond design which catered to 8.2 level on the Richter scale allowing for 4.5 G. The Japanese earthquake was 9 on the Richter scale – even then the buildings survived – it was the Tsunami that caused the main damage.

The most important lesson from Japan is that everything failed – all backup systems and precautions in the wake of the Tsunami. So one should be prepared for this and practice for such a situation which may be almost totally unlikely but even if there is an iota of a chance that it could happen. Of course now the generation 3 power plants will have passive safety systems.

Incidentally there are 20 radiation monitoring centres in Pakistan also – so far nothing unusual has been noticed by any of them. In addition, there are now seven sampler centres - from Quetta to Peshawar.

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The PNRA oversees licensing of the PAEC reactors and monitors safety standards etc. They have instructed the PAEC to revisit the safety of designs in the wake of the Japanese crisis. Their standard emergency exercises are divided into two: on-site and off-site - each performed annually. Small drills are more frequent. Four emergency levels are identified: standby, plant, site and General.

But one major problem is that there is no coordinated emergency plan yet – between NDMA and the nuclear set up – that is despite the fact that the PNRA submitted a Nuclear Radiological Emergency Plan to the NDMA in 2010. Why has the NDMA been sleeping on this is anyone's guess. Whatever may be the reason this lacuna in safety preparedness needs to be overcome.

Apart from reactor safety, of course there is the newly emerging issue of nuclear theft and linked to that the provision of safe nuclear fuel for reactors through a fuel bank so states can have benefits of nuclear energy without there being any danger of diversion to weapons production. The IAEA has also been floating an idea of a nuclear fuel

bank under its supervision. LEU fuel banks are one way to fulfil commitment made in NPT to aid provision of nuclear energy to countries. However, if one looks at the proliferation of nuclear states – barring the case of North Korea (I do not have issues with the Iranian civil nuclear development as other NPT states are also even closer to taking step towards NWS production), the NPT despite its non-fulfilment has not lost any Party even though states like the US are weakening it.

Theft: As for nuclear theft and terrorism, that non-state actors – primarily terrorists or other groups using violence for their political ends – would want to acquire nuclear weapons is a highly contentious assumption. Nuclear weapons are difficult to manage and given the political agenda of the non-state actors in question, may have such a devastating destructive effect that the end for which they were to be used would be destroyed. Also, small nukes have still to be perfected even by the US in the sense that they want to resume nuclear testing post-9/11, especially in the context of such weapons – as reflected in the Nuclear Posture Review of 2002. In addition, purely from the operational point of view, in the context of terrorism, the target and victim are separate entities and destruction of the victim is intended to send a message to the target. But with the fallout from the use of nuclear weapons, the separation will be difficult to sustain. Even more important, one has to remember that terrorists are on the move and have a mobile strategic doctrine. Nuclear weapons are not like guns or other small conventional arms that can simply be carried around endlessly. Nor can the nuts and bolts of nuclear weapons be acquired locally so that the weapon can be assembled wherever the non-state actors happen to be placed at any given time. So, logic suggests that nuclear weapons would not be a weapon of choice for terrorists. This is not to say that other WMD, especially chemical weapons, as happened in Japan in the 90s, do not hold an attraction for terrorist groups.

That non-state actors – primarily terrorists or other groups using violence for their political ends – would want to acquire nuclear weapons is a highly contentious assumption.

Finally, terrorists already have access to enough destructive capability within conventional means, so their need for nuclear weapons is simply not there. In fact, the manner in which the US is conducting its global war on terror, with a focus on a military-centric strategy, it is itself creating increasing space for terrorists across the globe – instead of denying them space. From my vantage point, this whole cacophony of non-state actors seeking and acquiring nuclear weapons, that has arisen from the US and been taken up by its allies, is more a strategy of victimising particular states, seen as untrustworthy in terms of

loyalty to the US and its interests, who are looking to independence in civil nuclear power capability or who have acquired nuclear weapons capability.¹

So, let me state at the outset, that in my view non-state actors are not a major concern in the nuclear proliferation context. However, nuclear installations can be targeted by non-state actors, which is why there are related issues that should be of concern to all states with nuclear facilities – civil and/or military. These are issues of nuclear safety, missing fissile material and illicit trafficking of the same. The issue of safety of nuclear installations is especially critical in terms of sabotage. So far, major reported nuclear installation accidents have occurred in the former Soviet Union and in the US. Where does Asia stand in relation to these issues?

Of the 44 states who are recognised as having nuclear research reactors and whose ratification is required for the operationalisation of the CTBT, 10 are located in Asia – if one leaves out Turkey and Israel. Of these ten states, four, if one counts North Korea, are nuclear weapon states and another has a substantive nuclear capability including a large fast breeder and reprocessing capacity. Barring a few reported incidents of leakage or radiation in the early stages of the development of some of these countries' nuclear programmes, no major accident has occurred in Asia similar to Three Mile Island or Chernobyl till the case of Japan.

China, Japan and India have by far the largest nuclear programmes in Asia. Like the US and Russia, China has also had to contend with some safety issues in terms of its nuclear plants². Nuclear

¹ The sheer absurdity of the US position was highlighted in November 2007 at the East West Dialogue in Barcelona organized by Casa Asia through the statement made by William Perry, former Defence Secretary of the US (1994-97) as a member of a panel on The Nuclear Debate. He declared that there was a very real nuclear threat to the US Homeland from non-state actors in Afghanistan/Pakistan. When I asked him that even if we were to assume rather absurdly that these actors had acquired a nuclear weapon how would they target the US homeland from West Asia – by sending the bomb through mail or having a courier carry it through all the security checks into the US? After all, traditional delivery systems would imply the use of an ICBM which even the states of the region had not acquired yet. At this, he retorted that he envisaged a terrorist nuclear attack to be carried out by a non-state actor using a truck as the delivery vehicle! On hearing this, I advised him to then look to home grown terrorists within the US and the safety of US nuclear installations.

² *The New York Times*, citing *China Daily*, reported in August, 1989, that the Chinese government reported 20 people killed and more than 1,200 injured in accidents involving radioactive materials in China between 1980 and 1985. Again, in July 1999, BBC reported that Chinese nuclear officials admitted that an accident a year ago at the country's first home-grown nuclear power plant had left it crippled for more than 12 months. The 300 megawatt Qinshan 1 plant in Zhejiang province was shut down in July 1998 after what one nuclear safety official described as a "welding problem". *Chinese Nuclear Accident Revealed*, BBC, July 5, 1999.

safety issues have been more acute in Japan which has had a series of nuclear accidents.³

Despite being a signatory to the NPT, because Japan continues to expand its civil nuclear base, issues of safety will be a source of concern within its immediate Asian neighbourhood. Moreover, in the context of the threat of nuclear terror from non-state actors, Japan can be extremely vulnerable because it was in Japan that chemical weapons terrorist attacks took place in 1994 and 1995 by a group calling itself Aum Shinrikyo.⁴ In June 1994 an incident of a Sarin gas attack took place in Tokyo's Matsumoto prefecture and initially the suspect was seen as one of the victims of the attack in which 7 people were killed and 200 injured. However, after the Tokyo subway terrorist incident in March 1995, the Aum Shinrikyo group was held responsible for the earlier attack also. In the subway incident, the group released Sarin gas in five coordinated attacks in peak morning rush hour killing 12 commuters and injuring 1,034.⁵

Apart from Japan, the use of chemical terrorism by non-state actors has only been either in the context of various suspected anthrax attacks primarily in the US post-9/11, or in Iraq in October 2006 when a terrorist detonated a car bomb which also contained two 100 pound chlorine tanks and in 2007 there were apparently 12 documented uses of chlorine gas in both suicide attacks and car bombs in Iraq.⁶ However, no such incidents involving non-state actors have been collated in the highly volatile region of West and South Asia.

In the Indian context, the fast pace and largely indigenous inputs into its nuclear facilities did create some safety issues in the

³Calendar of Nuclear Accidents and Events, Greenpeace, <http://archive.greenpeace.org/comms/nukes/chernob/rep02.html>

⁴ 'Aum' is from the Hindi word meaning universe and the Japanese word 'Shinrikyo' means religion of truth. This group was founded by Shoko Asahara and as of 2004 it has about 2000 members. Presently it is on the US terrorist groups' list.

⁵ The attacks were directed at trains passing through areas of Tokyo that serve as the seat of the national government. Ten men perpetrated the attack - 5 of whom released the gas and the other five served as getaway drivers. The 5 men involved in the attack carried 2 packages containing sarin and umbrellas with sharpened tips, dropping the packages on appointed trains they then punctured holes in the packages which released the sarin into the environment, after which they disembarked and got into getaway cars. This was the more famous of the two Sarin attacks because it was in the process of investigating this incident that the nature of the organization, now labelled 'terrorist', was revealed. Sarin's only application is that of a nerve agent and is classified by the UN as a 'weapon of mass destruction' through UN resolution 687. Though it is colloquially referred as a gas at room temperature it is an odourless colourless liquid. Production and stockpiling of Sarin was made illegal by the chemical weapons convention of 1993. Even at very low concentrations Sarin gas can be fatal causing death in minutes. It is 500 times more toxic than cyanide.

⁶Data collated from the following sites: <http://www.msnbc.msn.com/id/17254507>; http://news.bbc.co.uk/2/hi/middle_east/6385033.stm; <http://edition.cnn.com/2007/WORLD/meast/02/22/iraq.main/>

early decades. For instance, according to an Indian parliamentary report, 147 mishaps or safety-related unusual occurrences were reported during 1995-1998 in Indian atomic energy plants.⁷ Of these, 28 were of an acute nature and 9 of these 28 occurred in the nuclear power installations.⁸ In a paper presented at the IDSA, New Delhi, on October 10, 1988, Leventhal and Chellaney pointed to structural design and operational problems that were troubling India at that time.⁹ In the context of nuclear material theft, the last reported uranium theft was on 27 August 2001 when police in West Bengal revealed that they had arrested two men with more than 200 grams of semi-processed uranium. According to Indian press reports, Indian intelligence officials believed that a uranium smuggling gang was operating in West Bengal.¹⁰ Earlier, there had also been reports of seizure of stolen uranium from hospitals in India, especially from scrap buyers.¹¹

However, on all these counts it would appear that as the Indian program has evolved, especially post-1998, there have been no reports

The US and Russia are reducing some stockpiles of old weaponry but the US is busy making small tactical nukes also.

of major safety issues within India's nuclear facilities nor of any theft of material post-2001. Additionally, the Indian government enacted its law on 'The Weapons of Mass Destruction and Their Delivery System (Prohibition of Unlawful Activities) Act 2005', a year and a half after the adoption of UNSCR 1540 and in the backdrop of the NPT Review Conference 2005. This law covers all those areas which are required to be taken care of as national obligations under UNSCR 1540 (production, possession, transportation, stockpiling and exports etc).

Pakistan has not reported any nuclear theft or accidents to date.

Nuclear Disarmament: Now on to the third trend – that of nuclear disarmament – and then we will come to some specifics about Pakistan.

Obama rode into power first time round on a number of promises which disappeared once he was in the Oval Office. We had his notion of Global Zero and we also have the 2010 Iranian notion of Nuclear Energy for all and Nuclear Weapons for None which is reflective

⁷Ritu Sarin, 'Hunt for yellow cake', The Indian Express, June 4, 1998, see e.g. www.expresidia.com

⁸Ibid.

⁹Paul Leventhal & Brahma Chellaney, 'Nuclear Terrorism: Threat, Perception and Response in South Asia'.

¹⁰'Uranium smugglers caught in India', news.bbc.co.uk/hi/English/world/south_asia/newsid_1512000/1512077.stm

¹¹For details, derived from international and Indian sources, of nuclear safety and theft of nuclear material in the context of India, see Mazari & Sultan, "Nuclear Safety & Terrorism: A Case Study of India", Islamabad Paper No. 19, ISSI, November 2001.

of the spirit of the NPT. Nuclear disarmament in my view is not going to happen – as simple as that. The US and Russia are reducing some stockpiles of old weaponry but the US is busy making small tactical nukes also. In any case it is always more a matter of economic rationality and removal of outdated weapons than a genuine move to nuclear disarmament. As for UK and France still having nuclear arsenals – that is increasingly puzzling in the present state of affairs!

One way in which nuclear weapons stability was achieved was through the concept of nuclear deterrence and MAD. This deliberately maintained vulnerability kept the system stable. However with US plans for Missile Defence, which actually shifts the focus away from deterrence to nuclear war fighting, stability in the nuclear context may be undermined. MD consists of two components including TMD – spread out in allied countries, including India, possibly Australia and Japan as well as Poland in Europe.

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For Pakistan the Missile Defence (MD) issue has a direct relevancy because India is already developing a MD system with the aid and assistance of the US and Israel. This means that for Pakistan the option is to increase its nuclear arsenal and spread out its deployment. India's testing of AGNI VI also is part of its program to MRV its delivery systems which again destabilises the bilateral deterrence along with raising the nuclear arsenal in the region.

Let us now move on to Pakistan and some crucial issues for it in the context of its nuclear capability.

Maintenance of the deterrence & its credibility

Weapons development & doctrine: Pakistan initially focused on medium and intermediate range missiles seeking to improve their payload capacities and ranges plus trying to move to solid fuel from liquid fuel. This meant we built up a strategic missile force which could target deep into enemy territory in terms of counter value targets alongside counter force targets. The logic was that nuclear weapons are a weapon of last resort and the deterrence could be sustained at a credible level by focusing on these delivery systems. Even I was convinced we should have a one-rung escalation ladder to maintain credibility of our deterrence. However two developments by India altered the missile development and doctrinal frameworks:

One, India's attempts to around the nuclear deterrence constraints by seeking to evolve doctrines of limited war such as Cold Start; and, two, India developing Missile Defence in cooperation with the US. We have now evolved our responses in the form of the Short range Nasr missile to fill the strategic vacuum created by Cold Start; and our cruise missile to deal with India's development of missile defence.

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Pakistan's development of the Nasr missile is in the Hatf short range ballistic missile (SRBM) series. The Hatf II (Abdali) with a range of 180 kms and the Hatf III (Ghaznavi) with a range of 290 kms are already part of Pakistan's missile arsenal. We have come into criticism from the US in the development of the Hatf IX (Nasr) with a range of 60 kms - which in the US context is regarded as primarily a battlefield weapon. Just Last autumn we had the nuke gurus of the US think tanks Stimson Centre and Carnegie descend on Islamabad to discuss this new development with largely US-sympathetic (and often funded) Pakistani analysts/retired civil and military bureaucrats.

So what is Pakistan's rationale for developing the Nasr 60 km solid fuelled missile? Well, the situation has altered qualitatively now in a manner which makes the one-rung escalation ladder to strategic nuclear weapon use irrational and non-credible. Hence for reasons stated below, the testing of the Nasr was a necessary and well-timed move. In April 2011 the surface-to-surface (SSBM) Nasr was first tested and there have been subsequent tests also - all successful.

One: It needs to be remembered that the Hatf IX Nasr is so far a technology-demonstrative missile - that is, we are signaling our acquisition of tactical missile capability and miniaturization technology. This will allow our already developed cruise missiles - the Hatf VIII (Ra'ad) which is air-launched cruise missile (ALCM) and the Hatf VII (Babur) which is a ground-launched cruise missile (GLCM) - to be miniaturized for sea-launched submarine capability in order to move on to second-strike capability. This would help stabilize the nuclear deterrence and its credibility.

Two: The dynamics of maintaining a credible minimum nuclear deterrence altered with the Indo-US nuclear deal and its fallout, especially India's enhanced weapons grade fissile stockpiles.

Three: India's development of a Missile Defence capability also directly impacted Pakistan's nuclear deterrence. Our cruise missiles are critical because they can fly under the radar or missile defence shield.

Four: India's ColdStart Doctrine, now rejected in name but sustained conceptually and simply reformulated as various war-fighting formulations demonstrated in military exercises which envisage the use of rapid deployment of armed brigades and divisions in surprise and rapid attacks directly undermined Pakistan's ability to rationalize a one-rung escalation ladder as it now lacked credibility. After all, a short but limited conventional military attack on Pakistan in 72 hours could hardly rationalize a strategic nuclear attack in response by Pakistan. The Nasr is Pakistan's counter to India's Limited War doctrine. That the Nasr has not yet been inducted allows both countries to bring the issue of doctrines to the table of a strategic dialogue, along with other issues.

Five: The Nasr is wrongly being perceived primarily as a battlefield weapon only by US analysts who clearly are not familiar with the geography of Pakistan. It can be deployed along the Eastern border against counter-force targets on Indian not Pakistani soil. So Nasr does not signal a shift to war fighting from deterrence. On the contrary, Nasr's deterrence value lies precisely in deterring "rapid deployment" conventional attacks. The development of Nasr and our cruise missiles have given Pakistan the essential capability to bolster its deterrence in view of India's nuclear and missile defence developments in order to sustain its credibility and eventually move it to a more stabilizing second strike capability.

Maintaining a certain level of ambiguity on the assumption that it provides for a more effective deterrence is debatable given that one needs to communicate the threat as unambiguously as possible in a deterrence situation.

So how can one read Pakistan's nuclear posture today? Pakistan has chosen not to publicly enunciate a comprehensive nuclear doctrine partly because it does not see a political/status utility for the nuclear capability – rather, it envisages the nuclear capability as having a purely defensive, security-related purpose. Pakistan has chosen to keep its options open on the NFU, like NATO, but it has declared its intent of using nuclear weapons as a weapon of last resort.

But our present position of maintaining a certain level of ambiguity on the assumption that it provides for a more effective deterrence is debatable given that one needs to communicate the threat as unambiguously as possible in a deterrence situation. Also, fudgy red lines can keep moving further back when it comes to the

crunch and in Pakistan's situation, perhaps clearly enunciated escalation rungs, especially because of the asymmetries, may be more useful. While Pakistan may not have enunciated a comprehensive doctrine, it has made clear the major principles underlying its doctrine – which in turn give shape to its nuclear strategy and arsenal development.

Principles Underlying Pakistan's Doctrine

I - The first principle is a commitment to deterrence against aggression and in defence of the country's sovereignty – and the maintenance of it at a **credible minimum** level. This juxtaposition of "credible minimum" is very crucial because it defines the level of minimum at any given time in terms of what is seen as credible. So in light of the

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developments like the Indo-US nuclear deal and the Indian Missile Defence programme, the minimum has altered – as explained earlier – because stability of the deterrence is linked to ensuring that Pakistan does not find itself in a position of strategic vulnerability in areas such as fissile materials, ballistic missiles and conventional forces – hence its positioning on a future Fissile Material Treaty as well as its development of the Hatf IX missile and cruise missile

developments.

In the context of conventional forces, India's nuclear doctrine made it clear that India's nuclear build up would be bolstered by a build-up of India's conventional warfare capabilities. And, because the bulk of India's conventional forces are deployed against Pakistan, the latter's deterrence comes under direct threat if this capability accentuates the asymmetry of forces. This increasing conventional imbalance does make Pakistan's reliance on its nuclear capabilities more acute.

Though India has also stressed "minimum deterrence", its doctrine and arsenal development hardly subscribe to any traditional notion of minimum. Pakistan, on the other hand, has displayed a commitment to a low level of deterrence, which has led it to focus primarily on land-based missile delivery systems, centring on medium range missiles, with an emphasis on improving the Circular Error Probabilities (CEPs) and solid fuel capabilities of its existing missile categories. The Ghauri I and Ghauri II - the former with a 1500 kilometre range with a 700 kg payload, and the latter with a 2000 - 2300 km range with a 1,000 kg payload - offer an attractive base for

Pakistan's first generation of nuclear weapons' delivery systems. In addition, Pakistan has also developed, and is improving, the Shaheen series, which are solid fuelled as are the Ghaznavi and Abdali SRBMs. Pakistan first tested its cruise missile in 2005 in response to Indian Missile Defence plans.

This first principle of deterrence against aggression continues and the Nasr fits into this posture by sustaining the credibility of the deterrence in the earlier gap of the Limited War aggression context.

II - This brings up the second principle of Pakistan's nuclear doctrine – that of a **strategic restraint regime**. Pakistan has traditionally seen this as comprising reciprocal agreements with India on nuclear, missile and conventional restraint, comprising the following:

One: not to deploy ballistic missiles

Two: not to operationally weaponise nuclear capable missile systems

Three: formalize the understanding to provide prior and adequate notification of flight-tests of missile

Four: to declare a moratorium on the development, acquisition or deployment of Agni Ballistic Missile systems, since these can destabilize 'minimum credible deterrence'.

However, except for point Three which has been operationalised, the others seem difficult to implement now – would require backtracking on both sides.

But in principle a new formulation of the components of a strategic restraint regime should be put forward to include conventional force reductions and number crunching in terms of missile deployments and developments. Here the Nasr which has yet to be deployed could also be put on the negotiating table.

III - Third principle is survivability and credibility of the deterrence, which is why it would not be rational for Pakistan to quantify its "minimum" level of nuclear deterrence. Rather than quantifying in "static numbers", the minimum will depend on the other side's build-up. To ensure the survivability and credibility of the deterrence, Pakistan will always have to maintain and upgrade its capability.

Rather than quantifying in "static numbers", the minimum will depend on the other side's build-up

Future course

Given these developments, if Pakistan is determined to sustain a credible and stable nuclear deterrence it will have to push for a strategic dialogue on the nuclear issue with India, including moves towards nuclear risk reduction. At one level, political conflicts, from Kashmir to Siachin to Sir Creek to the growing Water disputes, resolution is needed as that in itself reduces nuclear war risks. The security route to cooperation is the only viable route to a stable and durable peace. In this context let me simply put forward one critical security CSBM – joint nuclear power generation.

Second, at the technical level there has to be in place a strategic nuclear dialogue which focuses on numbers' balancing, transparency, technical nuclear cooperation and other CSBMs – that is confidence and security building measures. Amongst other issues identified above, within an overall nuclear strategic balance, both Pakistan and India would need to move towards mutual conventional force reductions, especially of offensive systems on the ground, which in the Indian case are Pakistan-specific because of the terrain in relation to Indian neighbours like China and Bangladesh. The Paris Treaty for Conventional Force Reductions in Europe can be one appropriate model for Pakistan and India to examine – premised on the principle of mutual balanced reductions.

Both Pakistan and India need to realise that nuclear antagonists cannot be locked in a zero sum game environment. Their survival is linked together now. So nuclear deterrence requires the prevalence of conflict and common interest between the two sides. This can push in either of two directions: First, compel the stronger side to take advantage by taking calculated risks knowing the nuclear-related concerns that prevail. This course is dangerous and potentially fatal. Second, move both actors towards cooperation –without the smaller state being overwhelmed by the larger one - and away from risk-ridden policies like limited war and first strike. Finally, it has to be remembered that within the context of South Asia, it is not technology denial that will address the issue of nuclear stability, but political will.