

## INDIA'S CREDIBLE MINIMUM DETERRENCE A REPORT

*(Report of the IPCS Panel Discussion held on 7 February 2006, with Air Cmde Jasjit Singh, Lt Gen BM Kapur and Prof Rajaraman as panelists)*

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The draft nuclear doctrine of India spoke about a 'credible minimum' nuclear deterrent. The Cabinet Committee on Security finalised India's nuclear doctrine which also spoke about maintaining a 'credible minimum' nuclear deterrent. However, the 2002-03 annual report of the Ministry of External Affairs dropped the word 'minimum'. The Hindu, on 6 September 2004 in a report cited Pranab Mukherjee saying that India needs a credible nuclear deterrence. Why has 'minimum' been dropped? Besides, the size of India's arsenal and what is credible and minimum also needs to be taken into account while discussing India's security and nuclear doctrine.

Also the following needs to be discussed on the domestic constituencies: What is India's force structure and basic principle underlying them? How do they work with doctrines such as Limited War and Cold Start? Are the Armed forces satisfied with the nuclear doctrine and deterrence? How about the political leadership and the nuclear scientists? What prompted Anil Kakodkar to make the statement about fast breeder reactors? What are the strategic purposes of fast breeder reactors?

**Air Cmde Jasjit Singh**

There is a need to constantly review the purpose of nuclear weapons. India needs nuclear weapons only for one contingency; that is against the threat of nuclear weapons targeted at India. Sixty years of nuclear weapons and deterrence shows that credibility was based on a second strike capability.

The doctrine of counterstrike has not been adequately examined in India. Deterrence has to be looked at theoretically. Politically, deterrence is available and nuclear weapon is a political tool; militarily it has no utility. As regards the quantity and quality of nuclear weapons, two to three dozens of nuclear warheads are sufficient for India and there is no need to pursue megaton range capabilities to strengthen deterrence credibility.

The main issue however is the delivery system. The missile defence is unlikely to work and one can expect it would address only one fourth of the problem. The focus should rather be on the delivery systems. While more attention has been paid to the warheads and the delivery system has been ignored. India is twenty five years away from an operationally deployed Submarine Launched Ballistic Missile (SLBM) system.

The doctrine of No-First-Use (NFU) is negative. It is based on losing one city or more, which is not acceptable. Also including the biological and chemical weapons attack in the nuclear doctrine has diluted the same. India should address these questions to finalize the kind of nuclear doctrine it is looking for. On deterrence, India should focus on 'recessed deterrence' which would be politically available at any given time, but militarily recessed.

On the question of how minimum is minimum, as Jaswant Singh stated, the question is only an academic one. The nuclear doctrine, as mentioned earlier is dynamic and cannot be defined in permanent terms. Besides, the numbers also depend on the point of reference – whether the weapons are defined against Pakistan or China. If the point of reference is Pakistan, then India should have signed the NPT long back; if it is China, then there is much to be discussed.

In terms of quantity, if the deterrence is against China, then two to three dozens of weapons would be acceptable. As time progress, one may need less number of nuclear weapons. Expansion in terms of quantity would only make a country more vulnerable. India, after thirty years, perhaps may need less nuclear weapons. While discussing the number, what is important is the survivability factor. Even two dozens would be sufficient if the rate of survivability remains high. Hence the number is dynamic.

On the quality of nuclear weapons, a section in India has argued for thermo nuclear bombs. In practical terms, weapons of 40-50 k ton would be sufficient and as mentioned earlier it would depend on the delivery systems and their effectiveness. On this issue,

India is almost fifteen years away from getting a credible delivery vehicle.

India needs a triad and should especially have a credible SLBM. SLBM is essential for survivability.

On force structure and tactical nuclear weapons, there is no such thing as a tactical nuclear weapon. Any nuclear weapon used anywhere will have a strategic effect. It is not in anybody's interest to allow nuclear weapons to be used and implications are very clear. Ensuring survivability depends on the targeting philosophy and as regards testing, it is desirable but not necessary. Disarmament is a national security interest but disarmament purely on defense and security policies is important.

#### **Lt Gen Kapur**

Nuclear deterrence works only for responsible nation-states and not "outer" state actors. Deterrence would work against Pakistan and China. Hence, credibility comes based on India's doctrine of no-first use (NFU) if a proper second-strike capability is available. Analysis shows that the second strike has to be credible. The fact of the matter is that for the second strike to be credible, the following ingredients are necessary.

First, is the capability of protecting one's weapons after the enemy's strike. Silos won't work in the Indian context and the triad becomes important. Multiple delivery systems such as the triad is important in terms of the range whether it is the air or naval launched weapons or mobile army platforms. Deterrence is the capability of striking Beijing and beyond. As far as the range of the surface launched missile is concerned, India should go for Agni V with a range of 5,000 km, which can go

beyond the North China Sea. Aircraft and air refueling capabilities and nuclear submarines are needed to work beyond the Straits of Malacca.

As far as destruction of the enemy is concerned, assured destruction is necessary and herein comes the probability of arrival. Probability of arrival on target is dependent on technical flaws, prelaunched problems and problems of the first strike hitting some of our own delivery means. The other is getting through the enemy's defences and the type of targets. Also, the number of weapons needed to deter the enemy. The weather conditions and the desired ground-zero, i.e., how much of circular error of probability India has in the systems and aiming points. If the range, target, yield, mobility can be made known to the enemy, which is the beginning of deterrence. Openness is itself deterrence.

Second, inter-service rivalry is good and not bad. The Air Force might need the Army and the Navy and vice versa. The future is in the combined three services synergizing together and multiplicity is necessary. The triad or the capability in all three services adds to the deterrence.

### **Prof Rajaraman**

The concept of nuclear deterrence has been around ever since the creation of the nuclear bomb. The notion of deterrence is a very complicated and subtle notion. It is as much psychological as is logical and involves major elements of guess work. The United States and the Soviet Union never calculated their arsenals based on deterrence. During the Cold War, there were mixed strategies of war winning and demolishing

communism for United States and Soviet Union was merely acting in response to the United States with the absence of a single minded deterrence principle. By 1998 it was India's turn to determine the size of our nuclear arsenal. The size of the arsenal doesn't depend on the concept of deterrence alone.

Obviously, deterrence has to be credible but 'minimum' is a very important word. Minimum deterrence does not call for an open ended boundless arsenal but is the capability to inflict unacceptable damage to the other side in a second strike. The question is how much damage the other side is willing to take as a possible retaliation from India for an unprovoked attack on their part for purely military or geopolitical or economic or strategic reasons. The extent of the acceptability of the damage depends on the nature of the provocation and on the situation. India has repeatedly said that its nuclear force is certainly for deterrence. Therefore India is worried about other parties attacking her in an unprovoked manner. Also, the concept of deterrence does not work for adversaries beyond the pale of rationality because a government always plans to survive and continue after an adventure.

In the past there was little thought over how big India's arsenal should be but for the Indo-US nuclear deal. There is a serious talk about the ceiling now. It is true that greater the arsenal, greater the level of deterrence but India wants a minimum deterrence and also having more weapons is not cost free in terms of instability, security of arsenal, bucking the international trend and lastly, the

amount of fissile material needed. The issue of the amount of fissile material needed is coming into play in terms of the Indo-US nuclear deal. And therefore 'minimum' is important. In practical terms just about a dozen weapons are sufficient.

But, India has to work on survivability factor as well. Nuclear weapons include delivery vehicles also. The chance of a nuclear submarine built by India is very far probably about two decades. It is better to have submarines built than allowing the weapons to stay on land for long. Probably scientists could work on a temporary arrangement while waiting for uranium enrichment and building our own nuclear submarine. The Chinese are already working on that.

Finally, the concept of deterrence is the most important dynamic element and a missile defence can completely screw up these calculations. It is one of the most destabilizing thing in the region. There has to be diplomatic measures to curb any such moves for a missile defence. Chinese are most worried about the National Missile Defense (NMD). These can change India's calculations but barring that minimal deterrence is very important.

### **Main Interventions** **PR Chari**

On the technical side, according to R Ramachandran's calculations, Indian stocks of reactor grade plutonium in the unseparated fuel is about 10 tonnes and to make a 15-20 kilo tonne weapon, 3-8 kg of weapons grade plutonium is required. This is keeping in mind the design skills and technical skill level available. As far as a weapon made of reactor grade plutonium is concerned, the consensus is that more plutonium than the earlier estimate of 3-8 kg is needed; it could

be 8-10 kg and again, it depends on the skill-levels available. Hence, all these are flexible numbers, but the considered opinion is that the amount of plutonium already available is enough for a reasonable arsenal.

### **Speaker A**

At the outset, the implosion-explosion misconception over the nature of nuclear weapons testing must be put paid to. It is a nuclear explosion that is set-off by chemical reaction as the trigger. The US Army still maintains the field testing range due to the exigency of testing in the future due to the unreliability of computer simulations. Moving on, to maintain credible nuclear deterrence with China, 425 nuclear warheads are needed. To acquire 425 warheads, India requires its breeder reactors as it doubles the amount of fuel consumption. R. Ramachandran's calculations that 9 tonnes (Rajaraman arrived at a two tonne figure) are available are wrong because the figure is arrived at after taking into consideration the procured plutonium from dismantled American warheads and, provided that India puts the breeder under safeguards.

But, the breeder is required not so much for plutonium weaponry but for the thorium, which acts as propulsion for the nuclear submarines. It is used because thorium concentrates the core, hence reducing the size of the reactor and submarine. The breeder is also required because it converts thorium 232 to uranium 233 in case a trigger is required for a thermonuclear bomb. The moment the breeder is put under safeguards, the propulsion for the N-submarines is compromised.

Bhabha had envisaged a thermal breeder in 1944, and made a mistake of pursuing the fast breeder

programme under the influence of Dr Ramanna. The J-Rod experiments conducted by Dr Rodriguez can be reworked and redesigned to get a breeding ration of 0.9. The debate over the number (ranging from Rajaraman's 12 to Bharat Karnad's 1,000 warheads to inflict "unacceptable damage" is contentious. Robert McNamara was the only person who quantified unacceptable damage by pegging the figure at 200 million fatalities, leading to wide subscription for Mao's bluff that China's six nuclear bombs were enough to attack its adversaries. Hence, realistically 400 warheads can be considered to be "credible" deterrence.

The need for further testing is compelling. Technical aspects of testing are as follows. If accuracy is improved by a factor of 10, the need for thermonuclear weapons does not arise. This argument can be extended to assert that with an accuracy rate of 10, even conventional weapons will be effective and there is no need for nuclear weapons. If this were the case, India can stop pursuing nuclear weapons and concede to US demands over the Indo-US deal and hence devote those resources to other areas of concern. Conversely, India can also adopt a cautious approach owing to the uncertainties of future administrations' commitment to the deal.

The notion of using reprocessed fuel for Tarapur is false due to the principle of joint determination, which, since 1956, the Americans have used to deny such transfers from taking place. Dr Kakodkar has done a wise thing by insisting that the breeder must be out of safeguards

based on this logic that seeks to stay clear of the perpetuity clause.

### **Speaker B**

The issue of number of warheads needs to be investigated further. In terms of adequacies, there is enough plutonium for N-weapons. Several factors affect the determination of the number of warheads a country like India possesses.

First, the yield level and technology of the warhead. If India has a 200KT warhead (Dr Chidambaram is on record saying that India's 0.2KT thermonuclear warhead can be extrapolated into a 200 KT warhead) then it requires lesser number of warheads as compared to the number needed if the yield is a mere 10-20 KT. This is because targets like cities (or counter-values) being large, more than one warhead is necessary for its destruction.

Second, the technology of the delivery systems of these warheads. India's missiles are relatively inadequate, as they have not been tested adequately. To offset the inaccuracy of missiles there is a need for more number of missiles and hence, in the number of warheads to cap these missiles.

Third, the air and missile defence capability of the adversary. After all, aircrafts, along with missiles may get shot down. Here aerial and ground air defence capability becomes important. Detectability also matters here. Possession of cruise missiles changes the scenario. India possesses the Brahmos, but it is not capable of carrying nuclear warheads, for now. The adversary's future missile defence capability is another factor. It might be feasible to cap the number of

warheads in the current scenario, but it might not be an option in the future due to better missile defence capability of the adversary. Hence, greater number of warheads will be necessary then.

Lastly, the capability of the adversary to absorb a nuclear strike. This N-strike absorption capability varies for different countries. For example, the US might be deterred due to threat to two of its major cities, but China will not be deterred. Mao had stated that in case of World War III, 120 million Chinese would survive to rebuild a glorious civilization. It is difficult to ascertain whether China still follows the same logic.

The calculation for the number of warheads can be determined by taking these factors into account. Instead of striking two cities, India needs to have the credible capability to strike 10 locations/cities in China. Given India's low kilo tonne yield capability; four warheads are needed per target. That makes it 40 warheads. These 40 must survive a first strike and if the adversary can destroy 50 per cent of India's nukes and delivery systems then 80 warheads are necessary initially. The systems assurance level as a composite system (i.e. warhead, missile, and command and control structure) must also be taken into account. Taking this assurance level at 50 per cent, India now needs 160 warheads. Therefore, India needs 160 warheads in its arsenal, but reserves also need to be kept for unforeseen eventualities, escalation dominance, etc. A prudent level of reserve is one-third. This takes the number to 200 warheads in total for India to have a credible deterrent that is also a minimum deterrent.

### **Speaker C**

When talking about credibility, it appears that India is a "reluctant" nuclear weapon power. For e.g. a former Army chief has opined that Pakistan can be "obliterated" or something to that affect. But, is that the capability India wants? Further, credibility means second-strike/counter-strike capability and different governments take that decision. Also, different numbers for a credible minimum deterrence have been presented. As mentioned, the nuclear doctrine is dynamic and must account for contingencies in the future, for e.g. Iran is not a threat today but will be a threat when it eventually acquires nuclear weapons.

It is difficult to quantify the number of warheads. Instead, what is required is to focus on the capability that needs to be developed in order to reach a position to develop a credible deterrence. Credibility also depends on whether the weapons are deployed or not. China for example has 20 warheads as a credible deterrent against the US. Instead of debating facts like yield of the weapon, technology, etc. what is necessary is to debate "how" many warheads India wants? India is not in a position to take that decision today, as it is subject to revision by both, current and future governments. Although it is desirable to proceed on a path where the number of warheads decreases, it is not possible for now.

On testing, apart from technological requirements, the Chair's question about the comfort level of the armed forces to accept a weapon that is only tested in computer simulations needs further debate. Traditionally, the military is loath to accepting any weapons system that has not been tested. Also, the unilateral moratorium on testing that India has accepted to in

a bilateral deal like the Indo-US deal can be viewed as a semi permanent treaty, and hence is a cause for concern, especially the armed forces as it would prefer further testing. This issue is all right in the short-run.

The nuclear doctrine that the CCS outlined on 4 January 2003 is precisely because the doctrine is dynamic. No other country has a permanent doctrine and reviews it periodically. For a comprehensive structure, there has to be a general agreement among different constituencies to agree that we are not a reluctant nuclear weapons state. It is not a moral issue since other countries continue to possess it without any significant reduction in numbers. Disarmament is an ideal and eventual goal that needs to be strived towards.

#### **DISCUSSION**

- The issues that are being discussed have a direct bearing to the Indo-US nuclear deal and how it affects India's nuclear deterrence. Hence the focus must be on broader issues like India's threat perception in determining its arsenal, rationale behind India's nuclear submarines programme, whether India's arsenal is being capped and the question about the possibility of India's future testing options.

- Does the new UPA government subscribe to the CCS doctrine of 4 January 2003? They'd like to subscribe to it, only a few members of the Consultative Committee from the Congress have discussed this and are not willing to divulge any information. The government Defence Consultative Committee has not been allowed to discuss it and hence the

whole process is very dynamic as of now.

- As a brief reference to context, in addressing the question as to whether stable nuclear deterrence feasibility can be worked at, the answer has always been negative. Wide discussions were held after the nuclear doctrine was formulated over what constitutes "credibility," "minimum," and the factors that will contribute to both. Three factors contribute to credibility: Transparency, Survivability and Time factor.

- A second strike infers that India will wait for a first strike and the clock starts to tick for India's counter-strike. A dichotomous situation arises here between time frame and defining "unacceptable damage." Does one expect India be ready for this time factor for unacceptable damage? This does not happen anywhere in the world. How many warheads does one need to deploy in such a situation?

- The deletion of the word "minimum" is intentional in light of the ambiguity over the definition of "unacceptable damage." But, targeting also needs deliberation. The principle of targeting in a nuclear environment is to inflict damage to the 'will' of the adversary country. How much damage needs to be inflicted to this 'will'? Is it 'unacceptable' damage or 'acceptable/adequate' damage? Once this is resolved, the deployment question is automatically resolved. Therefore, India is considering two time factors. First, when it will respond when attacked and second, India will inflict damage to the 'will' of the adversary depending upon the situation and environment. These factors will never be constants.

Therefore, the crux of the matter is the time frame vis-à-vis definition and thereof, continuing on a policy either based on inflicting adequate or unacceptable damage to the adversary's will. Unacceptable damage discounts the time factor. On the other hand, time factor merges when there is a steady build-up of precautionary stages leading to a nuclear exchange. Therefore, what is deployed here is a 'cold scenario'.

- Taking the issue of survivability of the arsenals, it is clear that the Navy (viz. the submarines) is the safest option to carry these arsenals, but it strains the command and control (C&C) structure relative to its communication ability with the Army, Air Force or even the national command authority.

- With regard to anti-ballistic missiles, it is an open question. However, restricted ABM systems must be available to India to ensure its survivability and counter-strike capability. Similarly, the option of testing must be kept open irrespective of the authenticity of the computer-tested nuclear simulations.

- It is clear that delivery systems have to be developed and tested, particularly long-range missiles. When talking of nuclear weapons, it must consist of both, the warhead and delivery system.

- The Indian government's nuclear doctrine is clearly elucidated in the 4 January 2003 paper issued by the CCS and it clearly states "credible minimum nuclear deterrence." This policy also has a national consensus, which has been built over the years. The definition of "minimum" can be debated. The "No First Use" policy is another issue needing further inquiry.

Once again, we are debating these issues with the Indo-US deal as the backdrop. Needless to say this deal is critical to the shaping of India's foreign policy. Also, the debate must factor in the robustness of the Indian economy and India's comparative advantages and disadvantages vis-à-vis China and India's energy security to drive its economy. This requires adoption of a farsighted policy based on a realistic assessment of national interests.

- The omission of the word "minimum" is deliberate and highlights that greater weightage is being attached to "credibility." Regarding the NFU, is it now the case that India is considering abrogating this commitment in keeping with the dynamism of the nuclear doctrine? Official sources privy to the CCS decisions in the late-1990s called the NFU a political statement that would be reviewed periodically. If so, how does it affect India's missile stocks?

- Is India capping its weapons programme by including the FBRs in the civilian list? How does this affect the calculations if a future government decides that more warheads are necessary for a credible deterrence?

### **Final Comments**

#### **Jasjit Singh**

The word doctrine by definition only lays down the principles and not the policy. But will the principle change with the change in government. For e.g. if NFU is dropped, how credible is the deterrence with a less than optimal delivery system? For India, a counter-strike strategy based on a credible deterrence defined by NFU, and which in turn is based on survivability will remain the best doctrine to adopt for any policy options for the future. Using the word "minimum" causes



confusion, but just using the “credible deterrence” leaves the question open-ended. Is this the desired objective?

The ballpark figure of two to three dozens of warheads is not the initial number that India possesses but the final number that reaches the enemy based on its survivability and the capability of the enemy. Both these factors are non-static. Also, what are the political circumstances today or in the foreseeable future where there will be a necessity to use nuclear weapons.

A closer look at the doctrine also reveals the change in the wordings too. There are two changes in subparagraph three. One, in the 4 January document, a “massive” response is assured to a first strike. In the first document, the word was “assured retaliation.” The latter indicated both transparency and resolve to act while the definition of the former is murky. The initial document also stressed on the “resolve.” Secondly, there is a difference between “unacceptable damage” and “unacceptable punishment.” Further, the 4 January 2003 document came close on the heels of Operation Parakram, a factor that must be factored in.

The delivery system is the most critical element in the nuclear weapons programme in terms of range, reliability, operational readiness and numbers. India just does not have enough of all these and needs to be worked upon. Similarly, testing is another area with significant ramifications not only to the country but to the region and the world, especially in today's political environment. Therefore, testing is desirable but not necessary for credible deterrence.

The question of numbers is also crucial as it will continue to remain a dynamic number. The presence of ABM missiles will surely destabilize the region. However, an argument can be made for a ‘limited’ missile defence to limit the damage to crucial locations. When taking missile defence into account, its stability, cost and time factor are important. It must not be rejected outright but it's an illusion that it will provide complete protection.

In conclusion, the survivability and resolve of the nation and the transparency in showing that resolve is paramount and there seems to be a disagreement over the fundamentals amongst the security establishment in India.

#### **Lt Gen Kapur**

India's nuclear technology is ahead of its delivery system technology. India does not need ICBMs, yet. India needs to be careful about what it commits to the US over the nuclear deal. India must retain all options for achieving credible deterrence not only today but in the future too. Doctrines and policy are dynamic but must not change drastically. Finally, missile defence is necessary because it is used to minimize the effect of the enemy's strike. If procurement of such a system means an increase in the number of enemy's arsenal then so be it.

#### **Prof Rajaraman**

With regard to the question of whether India's weapons programme is being capped by including the FBRs in the civilian list, it must be kept in mind that if all the spent fuel available till date is set aside for warheads then 10-11 tonnes are available. This reactor

grade plutonium can provide for 1000 warheads but it is unlikely that this number is necessary. The physical difficulties of separating weapons-grade plutonium from the spent fuel are great, but can be achieved. Hypothetically, even if that number is not enough 10 years from now then the Indo-US deal does not preclude setting up weapons-grade plutonium facilities. Of course, construction of these facilities will be time bound. Therefore, India's programme is not capped. But if the FBRs are being excluded from the civilian list then it raises doubts about India's future military plans in the US Congress, which considers this deal to be an energy pact.

Even if FBRs are put under safeguards, the thorium propulsion for the N-submarines will not be compromised because although the submarine is a military object, it is not a proliferating object and therefore in principle, this aspect must not draw opposition from the IAEA and even if it does it can be negotiated with the IAEA during the bilateral negotiations. The safeguards permit India to use the output of the FBRs for use in the submarines. The Canadian and Brazilian proposal to plug this option of allowing nuclear propulsion as peaceful activity at the next IAEA meeting is another issue.

The number of warheads is controversial because it is a matter of magnitude. More so, it is also the cost India is paying for having an open-ended unstated fuel levels and it is coming under strain from the Indo-US deal.