

International Nuclear Control Regimes and India's Participation in Civilian Nuclear Trade: Key Issues

G Balachandran

Abstract

Much of the current debate on India's decision to evolve a set of agreements with the United States and engage the international nuclear technology control regimes in order to promote civilian nuclear cooperation unfortunately has not focused on some of the key questions involved and the available options before the country. Clearly, the country needs to take decisions from a subset of options that are i) politically feasible and ii) most desirable/least undesirable from the viewpoint of national interests. It is necessary, therefore, that the policy-makers understand the key questions and grasp the major issues that only the government has the necessary information to answer fully.

India's decision to evolve a set of agreements with the United States and engage the international nuclear technology control regimes in order to promote civilian nuclear cooperation and trade has been in public focus and much debated in recent months. Several issues have been raised: Is the July 18, 2005 Indo-US nuclear agreement beneficial to India's energy interests; would it undermine the country's nuclear deterrence capability; will separation of civilian and military nuclear facilities easy to attain and the costs manageable; will the new safeguards system that India would have to negotiate with the IAEA have any negative impact on India's nuclear deterrence capabilities and would it be on terms that are similar to that which the IAEA has for other nuclear weapon states? These questions relate to the broader issues of India's need, rationale, and desirability of engaging in civilian nuclear trade, and whether the country can do without it to attain its nuclear power generation goals. Much of the current debate unfortunately has not been very focused on some of the key questions

Strategic Analysis, Vol. 29, No. 4, Oct-Dec 2005

© Institute for Defence Studies and Analyses

involved and the available options before the country. Clearly, the country needs to take decisions from a subset of options that are i) politically feasible and ii) most desirable/least undesirable from the viewpoint of national interests.

In the present context the discussion will be on the key issues relating to the implementation of the Indo-US statement on nuclear cooperation. The attempt is to raise the questions and issues that need to be understood and clarified by the policy makers rather than in answering them, since only the government has the necessary information to answer them fully.

1) Is there need for any commerce between India and the nuclear suppliers? After all for the past three decades India had been subjected to export restrictions without much apparent detriment to the Indian indigenous nuclear programme – both strategic and civil.

The answer depends on the following objective and subjective elements.

Objective Elements

If one or more of the following statements hold true then there is a need for changing the rules of international commerce in nuclear technology for India to attain its long run national objectives:

- a) The Indian reserves of natural uranium are insufficient to sustain the projected Indian nuclear programme? *or*
- b) Tarapur 1 & 2 cannot be operated beyond 2006 without external supply of low enriched uranium. *or*
- c) India cannot raise the share of nuclear power in its national energy plans to a substantial degree without external financial, technological and fissile material assistance.

Even if there is a need for a change in the Nuclear Suppliers Group (NSG) Guidelines to accommodate India so that it can trade in nuclear material and technology, including reactors, there won't be any immediate urgency to operationalise the changes unless either reason (b) above is true or politically it is felt that given the necessity of a firm commitment by an US administration to changes in NSG Guidelines this is the best opportunity.

Subjective Elements

The subjective/political reasons may be many amongst which one or more of the following may apply:

- a) With increasing global concern over nuclear proliferation and related matters, it would be preferable to clear for once and all the legitimacy of the Indian strategic nuclear programme and get it accepted internationally – in a quasi-formal manner – through a change in NSG Guidelines so that India is treated differently from a Non- Nuclear Weapon State (NNWS)
- b) The US and international technology control regimes have been a major irritant and obstacle in India's efforts to establish full trade relations with US and others in high technology. In particular, advances/improvements in Indo-US relations have been hostage to the subject of export control laws and the rules of the four international technology control regimes: the NSG, the MTCR (Missile Technology Control Regime), the AG (Australia group) and the Wassenaar Arrangement. In the view of the expected changes in the international security environment in the coming decades it would be useful to find an accommodation between India and these regimes.

An evaluation of the reasons for change outlined above will dictate if there is any urgency in implementation of the agreement in the near future, or if it can wait for some time to be worked out, i.e., in the short term of one to two years.

Assumption 1:

The agreement needs to be put into effect as early as possible for political and other reasons.

What are the boundary conditions that need to be enforced?

First the implementation should not in any manner affect India's strategic nuclear programme in any of the following aspects:

- a) India's minimum deterrence levels under the Indian nuclear doctrine;
- b) production of fissile material considered essential for India's minimum deterrence;

- c) The indigenous nuclear programme, especially the long term power programme.

The international community, on its part, may like to be assured that the Indian strategic nuclear programme is not an open-ended one without any restraints on the level of strategic forces and assets and that India conforms to some of the current international norms on nuclear proliferation.

To reconcile the Indian and international community's interests and views, the July 18 agreement between India and the US states that in return for relaxation of the NSG Guidelines to accommodate India's interests, India would also agree to the following:

- 1) Separation of the Indian nuclear activities into peaceful and military activities;
- 2) Concluding an safeguards agreement with IAEA covering all of its peaceful activities; and
- 3) Concluding an Additional Protocol with the IAEA.

II) *Given the primary and overriding requirement for the Indian decision-maker to ensure that these actions do not in any manner compromise its nuclear assets and in particular does not cap or restrict its nuclear assets required to be consistent with its nuclear doctrine, how does one go about implementing its part of the bargain?*

Two points merit attention here. First, these requirements are not static but dependent on the international environment and hence can vary depending on circumstances and future developments. At this point we have to deal with the current environment. Secondly, since the Indian strategic assets will be primarily plutonium based, the issues relating to fissile material for the Indian assets should be first clinched.

The **first question** therefore is:

Will the Indian nuclear assets rely on both weapons grade and reactor grade plutonium?

If the answer to this question is **yes**, then more than 100 reactor years operation of power reactors and more than 20 years of research reactors - Dhruva and Cirus - would have enabled to India to accumulate sufficient stock of plutonium to cater for any foreseeable need for fissile material for

weapons purposes. The issue of degree of separation i.e., how many and which facilities should be designated as civil and which ones as military, etc., should pose no serious problem.

If the *answer to the first question is negative*, and India's nuclear assets will be based on weapons grade plutonium, the **second question** is:

Is India's current nuclear material stock consistent with the current requirements for maintaining nuclear assets of the type, size and number required to be in line with its nuclear doctrine?

If the answer to the question is *yes*, then the **third question** is:

Would the annual accretion to the Indian fissile material stock from the operations of Dhruva and Cirus - commonly accepted as being essential for the Indian strategic nuclear materials - be sufficient to respond to any projected future scenario with a high level of confidence- say 90 percent or more?

If the answer to the third question is *yes*, then the separation of the Indian nuclear activities will be comparatively an easy task to accomplish.

If however, the answer to the *third question is negative*, then certain hard decisions have to be taken. Without a third research reactor for producing weapons grade Pu, the options open to satisfy future projected need for weapons grade Pu will be either to build a new Dhruva type reactor or run one or more of the power reactors in weapons grade Pu production mode. Since construction of another Dhruva will take time, it may be advisable to divert one or more of the power reactors in a weapons grade mode. In that case, the **fourth question** will be:

How many power reactors will have to be designated as military and for how long?

Depending on the type of safeguards agreement and its implementation negotiated with the IAEA for application of fullscope safeguards on Indian civil nuclear programmes and nuclear materials, and the answer to question above one can then properly time the sequencing of power reactors as civil and military.

If the safeguards agreement is exactly of the type between the US and the IAEA or between any of the other four NPT recognized nuclear weapon states (NWS) and the IAEA, India can designate the maximum number of

power reactors, consistent with *current needs and projections*, as being civil in character.

If, however, the IAEA-India safeguards agreement is different from the ones negotiated by IAEA with the NPT NWS, then the degree of separation will be dependent on the safeguards agreement and require lot more work.

What if the *answer to the second question is negative*, i.e., India's current holdings of fissile material is insufficient to assure a deterrent force level consistent with its nuclear doctrine?

We will be back to *question four*, i.e., *How many power reactors will have to be designated as military and how many as civil?*

As before the answer to this question will be dependent on the type of safeguards agreement and its implementation negotiated with the IAEA.

Therefore, even if the process or methodology of separation does not pose many problems, the actual separation i.e. designation of facilities for safeguards will be dependent on the type of IAEA-India safeguards agreement.

Therefore, unless it is planned that the Indian strategic nuclear assets will be based on both weapons grade and reactors grade Pu, the separation process cannot be completed without an understanding of the Indo-IAEA safeguards agreement.

What about the separation process itself? How difficult would it be?

The separation has to be in respect of two components: nuclear facilities and nuclear programmes- the former primarily in respect of the safeguards agreement and the latter in respect of the Additional Protocol.

The facilities are comparatively easier to separate than the programmes. This can be done to some degree by identifying the facilities associated with the major processes involved in a strategic nuclear programme.

These processes are:

- i) Uranium mining, milling and refining
- ii) Isotope separation
- iii) Fuel and Target fabrication

- iv) Production reactor operations
- v) Chemical separation
- vi) Component fabrication
- vii) Weapons operations
- viii) Research and development.

i) Uranium Mining, Milling and Refining

The uranium mining and associated operations are carried out under the aegis of the Uranium Corporation of India Ltd. (UCIL), which operates a number of mines and associated facilities. UCIL's operations would not fall under the purview of the safeguards agreement.

ii) Isotope Separation.

Isotope separation is carried out at one facility, the Rare Materials Project (RMP) at Mysore under the supervision of BARC. The enrichment facilities here are meant for both India's strategic nuclear program and the nuclear-powered submarine project under way at another site. Therefore, the RMP will have to be classified as being a military facility.

iii) Fuel and Target Fabrication

It is not entirely clear where these operations are carried out for the strategic nuclear programme. For the civil nuclear operations these are carried out at the Nuclear Fuel Complex (NFC), Hyderabad. If the strategic nuclear programme also utilises the NFC facilities, then NFC may have to be categorised as military. It must be mentioned, however, that even at present the NFC does come under IAEA safeguards when it processes nuclear materials subject to IAEA safeguards. Therefore, classifying NFC as military and yet having it under IAEA safeguards for specific purposes should not present any major problems for either IAEA or India.

iv) Production Reactor Operations.

Nuclear explosive devices can be fueled by either enriched uranium or plutonium. Enriched uranium is produced at Isotope separation facilities, already covered earlier. India's strategic nuclear program is based on Plutonium (Pu), a nuclear material not occurring naturally and which has

to be obtained from conventional reactor operations. The spent fuels from these reactor operations provide Pu after some separation processes. The reactors devoted primarily to Pu for strategic program are the two research reactors Dhruva and Cirus. Both are operated by BARC. *These would be classified as military.* The other sources for PU are the various power reactors operated by the Nuclear power Corporation of India Ltd (NPCIL). Currently there are 14 reactors under NPCL of which 3 are already under IAEA safeguards namely Tarapur Atomic Power Station (TAPS) I and II and the Rajasthan Atomic Power Station (RAPS) II. All the remaining 11 nuclear power plants currently operated by NPCIL are PHWR (Pressurised Heavy Water Reactors) not under any IAEA safeguards agreement except for RAPS I which is under IAEA safeguards. As discussed earlier depending on the type of IAEA fullscope safeguards finally negotiated with India and the current stock of fissile materials for strategic programmes and the amount needed for the Indian deterrence, *all or most of these unsafeguarded reactors can be classified as civil* in character.

The research reactor APSARA can be classified as civil without any detriment to the strategic nuclear program. The research reactor PFBR (Prototype Fast Breeder Reactor) at the IGCAR (Indira Gandhi Center for Atomic Research) Kalpakkam needs some further study before its classification can be finalised.

v) Chemical Separation

While the research and other reactors can be a source for Pu, the spent fuels from these reactors have to be chemically processed for the extraction of Pu. Currently there are two such reprocessing plants in operation: i) The Power Reactor Fuel Reprocessing Plant (PREFRE) at Tarapur, ii) The Kalpakkam Fuel Reprocessing Plant at Kalpakkam. Depending on the requirements for reprocessing of spent fuel for strategic purposes one or both of these reprocessing plants can be classified as military.

vi) Component Fabrication

Apart from fissile material the process of weaponising requires a number of other component operations – both nuclear and non-nuclear. Once the fissile material usable for strategic purpose is ready, either after isotope separation or chemical separation, it has to be machined, finished etc for ready use. It is not known where such work is done in India for the

strategic program, perhaps at NFC, which has been already discussed. If on the other hand these activities are carried out at other facilities these would have to be classified as military. Tritium would be another of these nuclear related component operations. The facilities used for tritium extraction would have to be declared as military.

Non-nuclear component operations involve the design of explosive configurations, triggering devices etc. However these would not come under any IAEA or related safeguards arrangements.

vii) Weapons Operations

Once the nuclear weapons have been assembled and fabricated they would be stored at either operational sites or other facilities. All facilities which would have such weapons at their site for any amount of time for whatever reason- operational reasons, for maintenance requirements etc would have to be classified as military.

It must be stated here that India is only required to designate and inform the IAEA of the civil nuclear facilities. It does not have to inform IAEA about the military facilities. Any facility which has at any time source or special fissile material at their site and which has not been clearly designated to the IAEA as civil are presumed to be military in nature.

viii) Research and Development Activities

Needless to say research and development on various aspects of the strategic nuclear programmes will continue be part of the programme and may or may not involve the storage and use of source and special nuclear materials. All such facilities will have to be classified as military in nature and hence outside of IAEA safeguards.

Note: India operates eight (8) heavy water plants none of which is under IAEA safeguards. Heavy water is not one of the materials which come under the purview of safeguards. However, heavy water is essential for the operation of India's PHWRs.

Separation – the Conditions in Place

On the issue of separation the following boundary conditions/givens may be taken as fixed:

1) The relaxation/modification of US/NSG Guidelines for peaceful nuclear commerce is specific to India, i.e., such offers will not be available to the two other non-NPT signatories with significant nuclear activities namely Israel and Pakistan. As Under Secretary Joseph testified at the Senate hearings “the United States proposes that the NSG take a policy decision to treat India as an exceptional case, given its energy needs, its nuclear non-proliferation record and the non-proliferation commitment it has now undertaken.” He had also said that “Israel has not expressed any desire to have this same sort of level cooperation and that of course is, I think, directly attributable to the fact that Israel does not have the same sort of energy requirements that India does.” Pakistan is excluded from a similar treatment because of its record of nuclear proliferation.

2) In turn it could be said that India, too, had taken on obligations beyond those required by NSG for nuclear commerce. For example, India has agreed that it will “refrain from transfer of enrichment and reprocessing technologies to states that do not have them and support international efforts to limit their spread.” - something that is not part of NSG Guidelines. India has agreed to do so in view of the special exemption for India that has been agreed to by the U.S. and is being considered by the NSG.

3) It is agreed to by both U.S. and India- and hopefully understood by other NSG members- that India’s commitment to separation of its civil and military nuclear facilities will be within the parameters of its national security and its nuclear doctrine of no-first use and minimum deterrence and determined solely by India.

4) Pakistan’s nuclear doctrine does not subscribe to no first-use concept and China has not formally or informally at any time indicated that it has a moratorium on production of fissile material for weapon purposes.

5) India has currently only two facilities producing weapons grade Pu- the research reactors Dhruva and Cirus. According to analysts and experts (David Albright, for instance) Pakistan’s capacity to increase its nuclear weapons is about 5-6 per year while that of India is 4. Also according to the same estimates the current stock of such weapons is 55-115 in case of India and Pakistan 55-90. While Pakistan has both established uranium enrichment facilities and Pu producing facilities for weapons purposes, India has only Pu producing reactors. The rating of Pakistan’s Khushab reactor is estimated at 50 MWTh while the capacity of the two Indian Pu producing reactors is estimated to be around 100 MWTh. Further China’s

estimated stock of weapons grade fissile material is at least two orders of magnitude more than that of India. (China: 21 MT of HEU and 4 MT of Pu. India: 0.4 MT of Pu only).

6) China and Pakistan are India's immediate neighbours who are nuclear weapon states and also with whom India has in the past engaged in hostilities on issues which are yet to be resolved. India will have to respond adequately to any increase in the fissile material stock of Pakistan. In case of China while India will not engage equally forcefully to increases in China's fissile material stocks, it cannot remain indifferent either.

7) Pakistan will not agree to a fissile material moratorium unless it too is offered the same treatment as India as regards nuclear commerce.

Given the above factors it is apparent that not only is India's stock of weapons grade fissile material inadequate to ensure minimum deterrence with no-first strike nuclear doctrine at current levels of holdings of its two adversaries, the annual increase in the stock of weapons of even its smaller adversary will be more than the increase in its own stock of such weapons with its current production of fissile material with the help of its two research reactors – Dhruva and Cirus.

Proposition 1: Therefore, to ensure continued minimum deterrence with a no-first strike doctrine, India will have to declare at least one or more of its currently unsafeguarded nuclear power stations as military or build a new production reactors.

That brings us to the second proposition. An IAEA safeguards agreement of the type between the NPT NWS and IAEA- which allows for redesignating facilities listed as civil to military will allow India to designate the maximum number of such facilities consistent with current requirements as civil since if any unforeseen contingencies arise -such as Pakistan building more fissile material producing facilities or augmenting existing facilities or China withdrawing its alleged moratorium on fissile material production - corrective actions can be taken to maintain Indian national security.

Proposition II: An IAEA safeguards agreement of the type between the NPT NWS and IAEA will help India designate the "least" number of such plants as being military, possibly one such nuclear power plant.

But according to Under Secretary Joseph's testimony "We indicated at the recent G-8 and NSG meetings that we would not view a voluntary offer (of the type in place in the five internationally recognized nuclear weapon States) as defensible from a non-proliferation standpoint or consistent with the Joint Statement and therefore do not believe that it would constitute an acceptable safeguards arrangement."

Therefore in separating its nuclear facilities into civil and military, India will have to factor in i) the nature of the India-IAEA safeguard agreement; ii) the continued, or even accelerated, production of weapons usable fissile material by Pakistan; and iii) the possible restart of such material production by China by the withdrawal of its alleged fissile material moratorium. That leads to the third proposition,

Proposition III: In the context of a rigid and tight IAEA safeguards agreement, India will have to list the "maximum" of fissile material producing facilities as military consistent with its national security interests.

Note: The question has been raised as to how to transfer the power from a nuclear power plant designated as military into the national power grid which is clearly civil.

The answer to this is: i) the fact that while a civil facility may not be used for military purposes there is nothing that prohibits a military facility from contributing to civil needs, ii) if a nuclear power plant is designated as military then its operations are outside the purview of IAEA and hence what happens to the power generated by such facilities are not within the scope of its mandate and iii) in 1962 the US Congress passed the Atomic Energy Commission 1963 Authorization Bill - a portion of which made it possible for the steam produced by the Hanford new production reactor - a military facility - to be transformed into electricity and distributed to the homes and factories of the Pacific Northwest. According to reports a similar practice was followed in the other NWS as well.

III) How should the two parties i.e., India and the US go about taking steps to give effect to the agreement?

The US should table its proposals for changing both NSG Guidelines and US domestic laws before the NSG and the US Congress respectively. These need not be definitive or specific in details - they can be generic or

indicative given the need for discussion and resolution of the issue at the NSG and the US Congress.

For its part India should also, in tandem, give an indication of its separation efforts. Here again these indications need not be facility or programme specific- they can merely outline the broad contours of the factors that will determine the final separation efforts. As indicated earlier, a definitive Indian separation will have to wait the details of the India-IAEA safeguards and Additional Protocol agreements. For example, an outline that a) India will not declare a moratorium on fissile material production till it is assured of sufficient fissile material for its strategic programme consistent with its nuclear doctrine and till such time as there is a universal moratorium agreed to by all nuclear weapon states and b) that consistent with (a) it would be willing to declare as civil, in a phased manner, all its grid-connected reactors, which would assure both the US and its NSG partners that India is not pursuing an open-ended strategic nuclear programme.

G Balachandran is an independent consultant. He has authored a number of commissioned reports for the Government of India, including those on Indo-US relations and Indian defence expenditure.