

## **Implementation of the India-United States Joint Statement of July 18, 2005: India's Separation Plan**

The resumption of full civilian nuclear energy cooperation between India and the United States arose in the context of India's requirement for adequate and affordable energy supplies to sustain its accelerating economic growth rate and as recognition of its growing technological prowess. It was preceded by discussions between the two Governments, particularly between President Bush and Prime Minister Manmohan Singh, of the global energy scenario and the long-term implications of increasing pressure on hydrocarbon resources and rising oil prices. These developments led to the announcement in April 2005 of an Indo-US Energy Dialogue that encompassed the entire spectrum of energy options ranging from oil and gas to coal, alternative fuels and civilian nuclear energy. Through the initiation of a sustained dialogue to address energy security concerns, the two countries sought to promote stable, efficient, predictable and cost effective solutions for India's growing requirements. At the same time, they also agreed on the need to develop and deploy cleaner, more efficient, affordable and diversified energy technologies to deal with the environmental implications of energy consumption. India had developed proven and wide ranging capabilities in the nuclear sector, including over the entire nuclear fuel cycle. It is internationally recognized that India has unique contributions to make to international efforts towards meeting these objectives. India has become a full partner in ITER, with the full support of the US and other partners. India also accepted the US invitation to join the initiative on Clean Development Partnership.

2. Noting the centrality of civilian nuclear energy to the twin challenges of energy security and safeguarding the environment, the two Governments agreed on 18 July 2005 to undertake reciprocal commitments and responsibilities that would create a framework for the resumption of full cooperation in this field. On its part, the United States undertook to:

- Seek agreement from the Congress to adjust US laws and policies to achieve full civil nuclear energy cooperation.
- Work with friends and allies to adjust international regimes to enable full civil nuclear energy cooperation and trade with India, including but not limited to expeditious consideration of fuel supplies for safeguarded nuclear reactors at Tarapur.
- In the meantime, encourage its partners to consider fuel supply to Tarapur expeditiously.
- To consult with its partners to consider India's participation in ITER.
- To consult with other participants in the Generation IV International Forum with a view towards India's inclusion.

3. India had conveyed its readiness to assume the same responsibilities and practices and acquire the same benefits and advantages as other leading countries with advanced nuclear technology, such as the United States. Accordingly, India for its part undertook the following commitments:

- Identifying and separating civilian and military nuclear facilities and programmes in a phased manner.
- Filing a declaration regarding its civilian facilities with the IAEA.
- Taking a decision to place voluntarily its civilian nuclear facilities under IAEA safeguards, and
- Signing and adhering to an Additional Protocol with respect to civilian nuclear facilities.

4. Other commitments undertaken by India have already been fulfilled in the last year. Among them are:

- India's responsible non-proliferation record, recognized by the US, continues and is reflected in its policies and actions.
- The harmonization of India's export controls with NSG and MTCR Guidelines even though India is not a member of either group. These guidelines and control lists have been notified and are being implemented.
- A significant upgrading of India's non-proliferation regulations and export controls has taken place as a result of Weapons of Mass Destruction Act of May 2005. Inter-Ministerial consultations are ongoing to examine and amend other relevant Acts as well as framing appropriate rules and regulations.
- Refrain from transfer of enrichment and reprocessing technologies to states that do not have them and supporting international efforts to limit their spread. This has guided our policy on non-proliferation.
- Continued unilateral moratorium on nuclear testing, and
- Willingness to work with the United States for the conclusion of a multilateral Fissile Material Cut-Off Treaty.

5. The Joint Statement of 18 July 2005, recognized that India is ready to assume the same responsibilities and practices as other leading countries with advanced nuclear technology, such as the United States. India has an impeccable record in non-proliferation. The Joint Statement acknowledges that India's nuclear programme has both a military and a civilian component. Both sides had agreed that the purpose was not to constrain India's strategic programme but to enable resumption of full civil nuclear energy cooperation in order to enhance global energy and environmental security. Such cooperation was predicated on the assumption that any international civil nuclear energy cooperation (including by the US) offered to India in the civilian sector should, firstly, not be diverted away from civilian purposes, and secondly, should not be transferred from India to third countries without safeguards. These concepts will be reflected in the Safeguards Agreement to be negotiated by India with IAEA.

6. India's nuclear programme is unique as it is the only state with nuclear weapons not to have begun with a dedicated military programme. It must be appreciated that the strategic programme is an offshoot of research on nuclear power programme and consequently, it is embedded in a larger undifferentiated programme. Identification

of purely civilian facilities and programmes that have no strategic implications poses a particular challenge. Therefore, facilities identified as civilian in the Separation Plan will be offered for safeguards in phases to be decided by India. The nature of the facility concerned, the activities undertaken in it, the national security significance of materials and the location of the facilities are factors taken into account in undertaking the separation process. This is solely an Indian determination.

7. The nuclear establishment in India not only built nuclear reactors but promoted the growth of a national industrial infrastructure. Nuclear power generation was envisaged as a three-stage programme with PHWRs chosen for deployment in the first stage. As indigenous reactors were set up, several innovative design improvements were carried out based on Indian R&D and a standardized design was evolved. The research and technology development spanned the entire spectrum of the nuclear fuel cycle including the front end and the back end. Success in the technologies for the back end of the fuel cycle allowed us to launch the second stage of the programme by constructing a Fast Breeder Test Reactor. This reactor has operated for 20 years based on a unique carbide fuel and has achieved all technology objectives. We have now proceeded further and are constructing a 500 MWe Prototype Fast Breeder Reactor. Simultaneously, we have launched design and development of reactors aimed at thorium utilization and incorporating inherent safety features.

8. Concepts such as grid connectivity are not relevant to the separation exercise. Issues related to fuel resource sustainability, technical design and economic viability, as well as smooth operation of reactors are relevant factors. This would necessitate grid connectivity irrespective of whether the reactor concerned is civilian or not civilian.

9. It must be recognized that the Indian nuclear programme still has a relatively narrow base and cannot be expected to adopt solutions that might be deemed viable by much larger programmes. A comparison of the number of reactors and the total installed capacity between India and the P-5 brings this out graphically:

<b>Country</b>	<b>Number of Reactors</b>	<b>Total Installed Capacity</b>
India	15	3.04 GWe (2.8% of the total production)
USA	104 (103 operational)	99.21 GWe (19.9% of the total production)
France	59	63.36 GWe (78.1% of the total production)
UK	23	11.85 GWe (19.4% of the total production)
Russia	31	21.74 GWe (15.6% of the total production)
China	9	6.602 GWe (2.2% of the total production)

*Source: Nuclear Energy Institute, Washington DC*

10. Another factor to be taken into account is the small capacity of the reactors produced indigenously by India, some of which would remain outside safeguards. Therefore, in assessing the extent of safeguards coverage, it would be important to look at both the number of reactors and the percentage of installed capacity covered.

An average Indian reactor is of 220 MW and its output is significantly smaller than the standard reactor in a P-5 economy. The chart below illustrates this aspect:

Country	Most Common reactor	Number of such reactors
India	PHWRs 220 MWe	12
USA	69 PWRs and 34 BWRs. Most plants are in the range of 1000-1250 MWe	51 Reactors in the range of 1000 MWe to 1250 MWe
France	PWRs of 900 MWe and 1300 MWe size	34 PWRs of 900 MWe and 20 PWRs of 1300 MWe
UK	No standard size. AGR is the most common in the range of 600-700 MWe	14 AGRs
Russia	3 <sup>rd</sup> Generation VVER-1000 PWRs and RBMK 1000 Light, Water Graphite Reactors	9 third Generation VVER-1000 PWRs and 11 RBMK 1000 Light Water Graphite Reactors
China	PWRs 984 MWe	Four

*Source: Uranium Information Centre, Melbourne*

11. The complexity of the separation process is further enhanced by the limited resources that India has devoted to its nuclear programme as compared to P-5 nations. Moreover, as India expands international cooperation, the percentage of its thermal power reactor installed capacity under safeguards would rise significantly as fresh capacity is added through such cooperation.

12. India's approach to the separation of its civilian nuclear facilities is guided by the following principles:

- Credible, feasible, and implementable in a transparent manner;
- Consistent with the understandings of the 18 July Statement;
- Consistent with India's national security and R&D requirements as well as not prejudicial to the three-stage nuclear programme in India;
- Must be cost effective in its implementation; and
- Must be acceptable to Parliament and public opinion.

13. Based on these principles, India will:

- Include in the civilian list only those facilities offered for safeguards that, after separation, will no longer be engaged in activities of strategic significance.
- The overarching criterion would be a judgement whether subjecting a facility to IAEA safeguards would impact adversely on India's national security.
- However, a facility will be excluded from the civilian list if it is located in a larger hub of strategic significance, notwithstanding the fact that it may not be normally engaged in activities of strategic significance.

- A civilian facility would therefore, be one that India has determined not to be relevant to its strategic programme.

14. Taking the above into account, India, on the basis of reciprocal actions by the US, will adopt the following approach:

**i) Thermal Power Reactors:** India will identify and offer for safeguards 14 thermal power reactors between 2006 and 2014. This will include the 4 presently safeguarded reactors (TAPS 1&2, RAPS 1&2) and in addition KK 1&2 that are under construction. 8 other PHWRs, each of a capacity of 220MW, will also be offered. Phasing of specific thermal power reactors, being offered for safeguards would be indicated separately by India. Such an offer would, in effect, cover 14 out of the 22 thermal power reactors in operation or currently under construction to be placed under safeguards, and would raise the total installed Thermal Power capacity by MWs under safeguards from the present 19% to 65% by 2014.

**ii) Fast Breeder Reactors:** India is not in a position to accept safeguards on the Prototype Fast Breeder Reactors (PFBR) and the Fast Breeder Test Reactor (FBTR), both located at Kalpakkam. The Fast Breeder Programme is at the R&D stage and its technology will take time to mature and reach an advanced stage of development.

**iii) Future Reactors:** India has decided to place under safeguards all future civilian thermal power reactors and civilian breeder reactors, and the Government of India retains the sole right to determine such reactors as civilian.

**iv) Research Reactors:** India will permanently shut down the CIRUS reactor, in 2010. It will also be prepared to shift the fuel core of the APSARA reactor that was purchased from France outside BARC and make the fuel core available to be placed under safeguards in 2010.

**v) Upstream facilities:** The following upstream facilities would be identified and separated as civilian:

- List of those specific facilities in the Nuclear Fuel Complex, which will be offered for safeguards by 2008 will be indicated separately.
- The Heavy Water Production plants at Thal, Tuticorin and Hazira are proposed to be designated for civilian use between 2006-2009. We do not consider these plants as relevant for safeguards purposes.

**vi) Downstream facilities:** The following downstream facilities would be identified and separated as civilian:

- India is willing to accept safeguards in the 'campaign' mode after 2010 in respect of the Tarapur Power Reactor Fuel Reprocessing Plant.
- The Tarapur and Rajasthan 'Away From Reactors' spent fuel storage pools would be made available for safeguards with appropriate phasing between 2006-2009.

**vii) Research Facilities:** India will declare the following facilities as civilian:

- (a) Tata Institute of Fundamental research
- (b) Variable Energy Cyclotron Centre

- (c) Saha Institute of Nuclear Physics
- (d) Institute for Plasma Research
- (e) Institute of Mathematics Science
- (f) Institute of Physics
- (g) Tata Memorial Centre
- (h) Board of Radiation and Isotope Technology
- (i) Harish Chandra Research Institute

These facilities are safeguards-irrelevant. It is our expectation that they will play a prominent role in international cooperation.

#### 15. **Safeguards:**

a) The United States has conveyed its commitment to the reliable supply of fuel to India. Consistent with the July 18, 2005, Joint Statement, the United States has also reaffirmed its assurance to create the necessary conditions for India to have assured and full access to fuel for its reactors. As part of its implementation of the July 18, 2005, Joint Statement the United States is committed to seeking agreement from the U.S. Congress to amend its domestic laws and to work with friends and allies to adjust the practices of the Nuclear Suppliers Group to create the necessary conditions for India to obtain full access to the international fuel market, including reliable, uninterrupted and continual access to fuel supplies from firms in several nations.

b) To further guard against any disruption of fuel supplies, the United States is prepared to take the following additional steps:

- i) The United States is willing to incorporate assurances regarding fuel supply in the bilateral U.S.-India agreement on peaceful uses of nuclear energy under Section 123 of the U.S. Atomic Energy Act, which would be submitted to the U.S. Congress.
- ii) The United States will join India in seeking to negotiate with the IAEA an India-specific fuel supply agreement.
- iii) The United States will support an Indian effort to develop a strategic reserve of nuclear fuel to guard against any disruption of supply over the lifetime of India's reactors.
- iv) If despite these arrangements, a disruption of fuel supplies to India occurs, the United States and India would jointly convene a group of friendly supplier countries to include countries such as Russia, France and the United Kingdom to pursue such measures as would restore fuel supply to India.

c) In light of the above understandings with the United States, an India-specific safeguards agreement will be negotiated between India and the IAEA providing for safeguards to guard against withdrawal of safeguarded nuclear material from civilian use at any time as well as providing for corrective measures that India may take to ensure uninterrupted operation of its civilian nuclear reactors in the event of disruption of foreign fuel supplies. Taking this into account, India will place its civilian nuclear facilities under India-specific safeguards in perpetuity and negotiate an appropriate safeguards agreement to this end with the IAEA.

16. This plan is in conformity with the commitments made to Parliament by the Government.