



**Nuclear Proliferation  
International  
History Project**

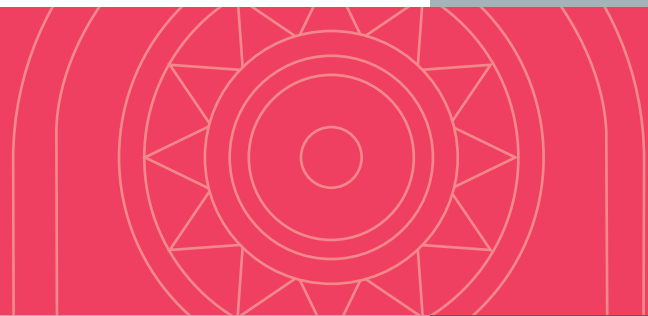


**Woodrow Wilson  
International  
Center  
for Scholars**

## **Nuclear Proliferation International History Project**

**From the Peaceful Atom to the Peaceful Explosion:  
Indo-French nuclear relations during the Cold War, 1950–1974**

By Jayita Sarkar  
NPIHP Working Paper #3  
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**Christian F. Ostermann, Leopoldo Nuti and Evan Pikulski, Series Editors**

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## The paper's key findings include

- France and India negotiated the first ever nuclear cooperation agreement (NCA) in reactor technology in 1951, prior to President Eisenhower's 1953 "Atoms for Peace" proposal.
  - This was the first NCA to be negotiated outside the Manhattan Project powers, i.e. the United States, the United Kingdom and Canada.
  - This was the first such agreement between a developed and developing country. France supplied technology while India supplied mineral resources and the two countries conducted joint technical studies on beryllium-moderated reactor technology, sharing their findings with each other.
  - The NCA was unique against the backdrop of U.S.-led postwar censorship of information on atomic energy.
- While maintaining an exports embargo on its strategic minerals, including beryllium since 1948, India granted priority access to its beryllium to France, under this NCA.
  - This resulted from India's perception of U.S. and British attempts at accessing India's strategic minerals as "neo-colonial" While London resented the loss of control over the resources of its former colony, Washington attempted to gain access to strategic minerals all over the world. Neither of the two countries wanted to provide technology to India for the processing of its strategic minerals, which India strongly desired.
  - The 1951 Indo-French NCA, which outlined equal partnership between the two atomic energy commissions, alleviated India's insecurities over losing control of its own resources. The joint research and technical studies stipulated within the NCA were favorable to India's quest for nuclear technology.
- The obstruction to atomic energy research that the Indian Atomic Energy Commission (AEC) and the French Commissariat à l'Énergie Atomique (CEA) faced from the U.S.-led postwar information censorship facilitated their technological cooperation. The "Manhattan complex" played an important role in French cooperation, as did India's postcolonial quest to catch up with the West. In addition to this, the personal proximity of scientists from the two countries enabled Indo-French nuclear relations to continue despite diplomatic differences between their foreign ministries, namely the South Block and Quai d'Orsay.
  - While the personal relations between scientists attached to the two national atomic energy bodies were important, nuclear cooperation was also influenced by hard, materialistic factors like economic costs. As the 1963 Tarapur agreement demonstrated, India abandoned the French offer for unsafeguarded reactors for partially safeguarded U.S. reactors, owing to the favorable Exim Bank loan offered by the United States.
- The election of Valéry Giscard d'Estaing in May 1974, soon after India's underground nuclear test, led to a disagreement between the Gaullist backed CEA and the Giscardists.
  - This led to the contradictory French reaction to India's test—while the CEA sent a congratulatory telegram to the AEC, Quai d'Orsay began to renegotiate its nuclear technology contracts with the South Block.
- The main challenge for Giscard d'Estaing was meeting non-proliferation goals without hurting the economic interests of the French nuclear industry.
  - As the case of the plutonium reprocessing plant in Pakistan demonstrated, France refused to publicize its decision to abrogate the agreement in 1978, fearing domestic backlash.
  - While Quai d'Orsay renegotiated its contracts, the Indian ambassador to France, Dwarka Nath Chatterjee, advised South Block to readily accept French demands for strict safeguards. He argued that lax safeguards for India would mean lax safeguards for Pakistan's plutonium reprocessing plant.





# From the Peaceful Atom to the Peaceful Explosion: Indo-French nuclear relations during the Cold War, 1950–1974<sup>1</sup>

By Jayita Sarkar<sup>2</sup>

## Introduction

On 11 February 1949, Homi J. Bhabha, the chairman of the Indian Atomic Energy Commission (AEC), wrote to Frédéric Joliot-Curie, the chief of the Commissariat à l'Énergie Atomique (CEA) expressing his delight at the recently concluded agreement between Indian Rare Earths and the French firm Société de Produits Chimiques des Terres Rares for the construction of a monazite processing plant in India.<sup>3</sup> Bhabha hoped that the agreement “will further promote cooperation in scientific and industrial matters between the two countries”<sup>4</sup> (**Documents 1, 2**). France, he added, was a country that he personally had a great affection for. Six months later in August 1949, the Soviet nuclear explosion ended the atomic monopoly held by the United States, leading the latter to be all the more insistent on the continuation of wartime information censorship of nuclear research.<sup>5</sup> France, which as a

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<sup>1</sup> The author is grateful to Robert S. Anderson, Christian Ostermann, Leopoldo Nuti, Joseph F. Pilat, Maurice Vaïsse, Gabrielle Hecht, François de Massot, Federico Romero, Svetozar Rajak, M.V. Ramana, Piers Ludlow, James G. Hershberg, Tanya Harmer, Francis J. Gavin, Amy Oakes, John Krige, Timothy McDonnell, Frédéric Gloriant, and Evan Pikulski for helpful comments on earlier drafts.

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<sup>3</sup> The monazite sands on India's Travancore coast are a source of radioactive thorium and of strategic minerals such as cerium. In the absence of large uranium reserves, India values its thorium deposits as a future alternative to uranium for use in nuclear fuel. Cerium's use in the construction of jet engines led the U.S. Atomic Energy Commission to label it as of direct and immediate significance to defense effort in the 1940s. India's strategic minerals also include beryllium, which is used in the defense industry in copper alloys and can be used in the atomic energy industry as a reactor moderator. The 1951 Indo-French agreement aimed to conduct joint technical studies in the domain of beryllium research. For more detail on the politics surrounding India's strategic minerals see Andrew J. Rotter, *Comrades at Odds: The United States and India, 1947-1964* (Ithaca, NY: Cornell University Press, 2000), 97-108, and Itty Abraham, “Rare Earths: The Cold War in the annals of Travancore,” in Gabrielle Hecht, ed., *Entangled Geographies: Empire and Technopolitics in the Global Cold War* (Cambridge, MA: MIT Press, 2011), 101-124.

<sup>4</sup> Confidential letter from Homi J. Bhabha to Frédéric Joliot-Curie, 11 February 1949, Carton F-86, CEA: Relations avec l'Inde (1948-50), Fonds Joliot-Curie, BnF, Paris, France.

<sup>5</sup> The Quebec Agreement signed between the United States and the United Kingdom in August 1943 was the first instrument created by the Allied Powers to censor information related to nuclear technology. The agreement allowed both countries to veto the communication of nuclear-related information to a third party. The Quebec Agreement established the Common Policy Committee (CPC) to supervise the arrangements of cooperation between the United States, the United Kingdom and Canada. The Combined Development Trust (CDT), formed in June 1944 as a subsidiary to the CPC, handled the procurement of ores. The control of atomic energy

country had remained outside the Manhattan Project, and India, then a newly-independent country with a substantial technological base, found significant potential in each other for cooperation in atomic energy.

In 1951, the AEC became the first foreign atomic energy organization with which the CEA had entered into a bilateral cooperation. This agreement, which involved the study and construction of a beryllium-moderated low-power reactor, was unique since it came at a time when U.S.-led worldwide information censorship made such cooperation implausible. The fact that Franco-Indian nuclear cooperation commenced prior to the Eisenhower's 1953 Atoms for Peace proposal makes it all the more noteworthy. France and India both began their atomic energy programs for explicitly peaceful purposes, notwithstanding their eventual turn towards weapons.<sup>6</sup> In 1968, both countries criticized the Nuclear Non-Proliferation Treaty (NPT) as discriminatory and refused to sign it.<sup>7</sup> This nuclear relationship between a former British colony and a European power fighting violent wars in its colonies has been largely understudied, despite its significance. Authoritative studies have been written on their individual nuclear programs,<sup>8</sup> but there remains no published historical analysis of Franco-Indian nuclear cooperation.<sup>9</sup> This research attempts to address this lacuna in the prevailing literature.

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therefore involved preventing dissemination of information on one hand, and establishing priority access to the relevant raw materials on the other. Within the United States, the McMahon Act of 1946 went further in placing strict limits on the dissemination of American nuclear know-how, even to allies. The *Modus Vivendi* of January 7, 1948 that superseded the Quebec Agreement prevented the United Kingdom from disseminating classified information concerning atomic energy without the prior consultation of the United States. See Memorandum by the Special Assistant to the Secretary of State for Atomic Energy Affairs (Arneson), 3 December 1953, <http://history.state.gov/historicaldocuments/frus1952-54v02p2/d123> (last accessed August 24, 2013)

<sup>6</sup> According to Itty Abraham, the nuclear programs of both France and India involved much more than the mere acquisition of nuclear weapons—they were about restoring national pride through the acquisition of technological prowess. Atomic energy involved technology that only a few countries in the world had access to, making it a desirable symbol for national progress and uniqueness. See Itty Abraham, “Contra-proliferation: Interpreting the Meanings of India’s Nuclear Tests in 1974 and 1998,” in *Inside Nuclear South Asia*, ed. Scott Sagan (Stanford, CA: Stanford University Press, 2009), 120-2. See also Gabrielle Hecht, *The Radiance of France: Nuclear Power and National Identity after World War II* (Cambridge, MA: MIT Press, 1998).

<sup>7</sup> France signed the NPT in August 1992, while India remains a non-signatory.

<sup>8</sup> For French nuclear historiography see Maurice Vaisse, “L’historiographie française relative au nucléaire” *Revue historique des armées* 262 (2011): 3-8. Main scholarly works on the history of India’s nuclear program include George Perkovich, *India’s Nuclear Bomb: The Impact on Global Proliferation* (Berkeley and Los Angeles: University of California Press, 1999), Raj Chengappa, *Weapons of Peace: Secret Story of India’s Quest to be a Nuclear Power* (New Delhi: Harper Collins, 2000), and Itty Abraham, *The Making of the Indian Atomic Bomb: Science, Secrecy and the Postcolonial State* (London and New York: Zed Books, 1998). For scholarly works on the French nuclear program and national identity see Gabrielle Hecht, *The Radiance of France: Nuclear Power and National Identity after World War II* (Cambridge, MA: MIT Press, 1998.. See also Jacques Hymans, *The Psychology of Nuclear Proliferation: Identity, Emotions and Foreign Policy* (Cambridge and New York: Cambridge University Press, 2006), 85-113.

<sup>9</sup> Jean-Luc Racine, Sanjay Gupta and Constance Roger have explored the Indo-French defense relationship in contemporary times. Manpreet Sethi, in her occasional paper for the *Centre de Sciences Humaines* in New Delhi, called upon the Indian atomic energy establishment to derive lessons from the French nuclear energy

Recent studies by political scientists such as Matthew Kroenig and Matthew Fuhrmann on nuclear cooperation agreements (NCAs) have underlined the strategic calculations of supplier states when arranging NCAs.<sup>10</sup> While Kroenig focuses on sensitive nuclear assistance, Fuhrmann argues that the dual-use nature of nuclear technology makes it difficult to ascertain whether a state is pursuing a purely peaceful nuclear program or planning to build weapons. According to Fuhrmann, nuclear technology supplied by states committed to nuclear non-proliferation for peaceful purposes can lead to proliferation. While both scholars make very compelling arguments, they tend to view the state as a “black box,” thereby ignoring the multiplicity of actors (often with contradictory goals and perceptions) involved in the decision-making process leading to the final policy.<sup>11</sup> It is more difficult than believed to ascertain who has the ultimate say on a country’s nuclear policy. The opinions of national political elites may be fragmented. Domestic political calculations can override long-term foreign policy goals. The technical expertise required to comprehend the significance of NCAs may lead to scientists wielding more influence than politicians and diplomats. The strategic reasons<sup>12</sup> that drive the NCAs are therefore derived through a process more complex than these studies capture. It is important to understand the process in order to perceive the outcome.

In the Franco-Indian case, during both the 1950s and the 1970s, the CEA continued its cooperation with the AEC, while Quai d’Orsay disputed with the South Block. Between 1947 and 1954, the fate of the French colonial possessions in the Indian subcontinent became a

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experience. With the exception of Racine, none of these studies are in-depth and almost none of them are historical analysis. Nor do they underline the CEA-AEC relationship in the backdrop of the Cold War bloc rivalry. See Jean-Luc Racine, “The Indo-French strategic dialogue: bilateralism and world perceptions,” *Journal of Strategic Studies* 25 (Dec. 2002): 157-191, Sanjay Gupta, “The changing patterns of Indo-French relations: From Cold War estrangement to strategic partnership in the twenty-first century,” *French Politics* 7 (Sep.-Dec.2009): 243-262, Constance Roger, “Indo-French Defence Cooperation: Friends in Need or Friends Indeed?” *IPCS Research Paper no.7*, March 2007, and Manpreet Sethi, “The French Nuclear Energy Experience: Lessons for India,” *CSH Occasional Paper no.28*, Dec. 2010.

<sup>10</sup> See Matthew Kroenig, *Exporting the Bomb: Technology Transfer and the Spread of Nuclear Weapons* (Ithaca and London: Cornell University Press, 2010) and Matthew Fuhrmann, *Atomic Assistance: How “Atoms for Peace” programs cause Nuclear Insecurity* (Ithaca and London: Cornell University Press, 2012).

<sup>11</sup> A fitting example of analysis of decision-making involving multiple actors is Graham T. Allison’s work on the 1962 Cuban Missile Crisis first published in 1971, with its second edition published in 1999. See Graham T. Allison and Philip Zelikow, *Essence of Decision: Explaining the Cuban Missile Crisis*, 2<sup>nd</sup> ed. (New York: Longman, 1999).

<sup>12</sup> According to Matthew Kroenig, states provide sensitive nuclear assistance to other states when the supplier state has low relative power vis-à-vis the recipient state, when both states have a shared enemy, and in the absence of a superpower patron. Matthew Fuhrmann underlines military alliances, common democratic values and a common enemy as conditions under which states agree to provide nuclear technology and resources to other states.

major irritant in Franco-Indian diplomacy.<sup>13</sup> Jawaharlal Nehru's friendship with Ho Chi Minh and his support for the liberation movements in North Africa made the officials at Quai d'Orsay even more anxious. However, the relationship between the CEA and the AEC did not cool. This was evident two decades later in the wake of India's first nuclear test in May 1974, when the CEA congratulated the AEC but Quai d'Orsay insisted on renegotiating the technological agreements with New Delhi to ensure that French supplied technology and materials would not be used in future Indian nuclear explosions.<sup>14</sup>

I argue that strong personal relationships between the CEA and AEC scientists proved instrumental in sustaining the cooperation. I also argue that the quest for foreign policy independence by Paris and New Delhi during the Cold War helped to iron out Franco-Indian bilateral differences, as both countries found their autonomy compromised amidst superpower politics. Nehru's policy of non-alignment and Charles de Gaulle's 1966 decision to withdraw France from the integrated command structure of the NATO are cases in point. In the following sections, I briefly underline the historical background to French and Indian nuclear programs, the details of the beryllium agreement signed in August 1951, and the CEA-Quai d'Orsay disagreement after May 1974. I then explain that the CEA-AEC camaraderie and the French and Indian quest for foreign policy agency during the Cold War were significant factors behind the sustained Franco-Indian nuclear cooperation. Finally, I conclude by summarizing the findings of this research.

### **The Manhattan Complex and de Gaulle's "Grandeur"**

Charles de Gaulle once said, "France cannot be France without grandeur."<sup>15</sup> The concept of this grandeur remained the cornerstone of Gaullist foreign policy after World War II. De Gaulle's aspiration to establish France as a "major member of the family of nations" could

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<sup>13</sup> These five *établissements français* were Pondicherry, Karikal and Yanaon on the Coromandel coast, Chandernagore in Bengal and Mahé on the Malabar coast. The Resolution of the Indian National Congress of December 1948 noted that all foreign possessions on the Indian subcontinent were an anomaly and that the independent Indian state should establish its authority over all such territory, as no other solution is conceivable. While Chandernagore voted in favor of joining the Indian Union, the referendum in Pondicherry resulted in the contrary, leading to a severe dispute between Paris and New Delhi. It was not until October 1954 that an accord was finalized between the two countries confirming de facto transfer of the French possessions to the Indian Republic, and the final treaty of de jure cession was signed in 1956. See Baldev Arora, "Les établissements français de l'Inde," *Revue française de science politique* 18 (1968): 362-375.

<sup>14</sup> Valéry Giscard d'Estaing, the first non-Gaullist president of the Fifth Republic, insisted that France should increase its commitment to nuclear non-proliferation, despite being a non-signatory to the NPT. While his policy was highly appreciated in Washington, it had its critics at home, notably the Gaullist faction in the French parliament and many in the upper echelons of the CEA. See Florent Pouponneau, "Les changements de la politique française d'exportations nucléaires (1974-1976): Un triple double jeu" *Critique internationale* n°58 2013, p. 95-116.

<sup>15</sup> Charles de Gaulle, *Mémoires de Guerre : L'Appel 1940-1942* (Paris : Plon, 1954),1.

not be satisfied “by partial compromises or by symbolic concessions.”<sup>16</sup> The notion of grandeur, being central to French postwar foreign policy, also extended to France’s atomic energy program.<sup>17</sup> Raoul Dautry, the first administrator-general of the CEA, stated in October 1945 that “to have this stupendous invention metamorphose itself into a humane discovery through the filter of our national genius, this would bring honor to our country.”<sup>18</sup>

In France, Pierre and Marie Curie had conducted pioneering work in radioactivity leading to their discovery of polonium and radium in 1898. Until the outbreak of the Second World War, Frédéric Joliot-Curie and his wife Irène Joliot-Curie conducted research on artificial radioactivity. In April 1940, just before Oslo fell to Nazi occupation, Joliot-Curie was able to secure 185 kilograms of heavy water from the Norwegian hydroelectric power company Norsk Hydroelektrisk Kjelstofaktielkab, which represented all the heavy water available in Europe at the time. However, with the fall of Paris to Nazi forces in June 1940,<sup>19</sup> the stock of heavy water was shipped to Bordeaux, and then on to England, to prevent it from falling into German hands.<sup>20</sup>

The subsequent Nazi occupation of France meant that France as a country remained outside the Allied bomb project, notwithstanding the participation of five French scientists.<sup>21</sup> France viewed the Manhattan Project as an essentially Anglo-Saxon endeavor.<sup>22</sup> The Free French Committee led by General Charles de Gaulle was never officially informed of the progress made on atomic bomb research. As a result, Pierre Auger, Jules Guéron and Bertrand Goldschmidt took the initiative in appraising the General of the significance of this “new

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<sup>16</sup> “France must be, and must be recognized as a proud, sovereign, and independent great power participating as an equal among the leading world powers—in short, France must live up to de Gaulle’s mystical concept of French grandeur.” Secret Intelligence Report Prepared in the Bureau of Intelligence and Research, 9 December 1960, INR Files, U.S. Department of State. For an overview of “grandeur” see Maurice Vaisse, *La grandeur: Politique étrangère de Général de Gaulle, 1958-69* (Paris: Fayard, 1998) and Frédéric Bozo, *La politique étrangère de la France depuis 1945* (Paris : Flammarion, 2012).

<sup>17</sup> See Gabrielle Hecht, *Le rayonnement de la France: Energie nucléaire et identité nationale après la Seconde Guerre Mondiale* (Paris: La Découverte, 2004).. See also Beatrice Heuser, *Nuclear Mentalities? Strategies and Beliefs in Britain, France and the FRG* (London: Macmillan, 1998), 75-178.

<sup>18</sup> Quoted in “Le ministre atomique,” *Normandie*, 22 October 1945, cited from Hecht, *The Radiance of France: Nuclear Power and National Identity after World War II* (Cambridge, MA: MIT Press, 1998), 1.

<sup>19</sup> Frédéric Joliot-Curie remained and continued his research in Paris throughout the Second World War. In 1945, the CEA was created with Joliot as its first Haut-Commissaire.

<sup>20</sup> Top secret letter from Jacques Allier to President of the Council of French Ministers, 30 April 1945, Carton F-15, Defense Nationale, Fonds Joliot-Curie, BnF, Paris, France.

<sup>21</sup> They were Bertrand Goldschmidt, Jules Guéron and Pierre Auger, Hans Halban and Lew Kowarski.

<sup>22</sup> French physicist Bertrand Goldschmidt wrote, “Although the total French contribution was important and out of proportion to our tiny number, it could never represent a real political asset for France for were not grouped in a coherent unit with a recognized leader who could have negotiated with the British on our behalf. Had Joliot-Curie gone to England, he would have naturally assumed this role.” Goldschmidt, *The Atomic Complex*, 60.

element in world politics”<sup>23</sup> during the latter’s visit to Ottawa in July 1944—a year before the Trinity test. The French physicists requested that de Gaulle recommence nuclear research in France as soon as possible and initiate the search for uranium in French Madagascar. On 10 August 1945, a day after the second nuclear bomb was dropped on Japan, Joliot-Curie wrote an article titled “Regarding the Atomic Bomb” in the Communist journal *L’Humanité*, underlining French contributions made to the research on nuclear chain reactions.<sup>24</sup> Two years later, at a press conference in Paris in 1947, Joliot-Curie criticized Henry DeWolf Smyth of Princeton University for omitting in his landmark Report on Atomic Energy for Military Purposes, “vital contributions of French science to the discoveries leading to the making of atomic bombs”<sup>25</sup> (**Document 3**).

The postwar feeling that the French contribution to nuclear research had gone underappreciated, coupled with feelings of hurt national pride owing to the experience of the Second World War, contributed to what I call the “Manhattan complex.” As a result, the national nuclear program was conferred greater vitality in liberated France and Anglo-American information censorship was viewed as an attempt to impede French nuclear resurgence during the Cold War.<sup>26</sup> The CEA was established in October 1945 and within three years France’s first atomic pile, Zoé, achieved criticality in Fort de Châtillon.<sup>27</sup> Pierre Auger, member of the CEA’s Executive Committee and former participant in the Manhattan Project, praised French efforts at making a comeback in the domain of atomic energy research.<sup>28</sup> On his visit to Zoé, French President Vincent Auriol remarked that this achievement would augment the “radiance” of France.<sup>29</sup>

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<sup>23</sup> Ibid.

<sup>24</sup> He wrote, “S’il faut admirer l’effort gigantesque de recherches et de fabrication réalisé par les Etats-Unis, il n’en reste pas moins vrai que c’est en France que les premiers principes de réalisation ont été trouvés, ils constituent un appoint de première importance à cette nouvelle conquête de l’homme sur la nature.” Frédéric Joliot-Curie, “A propos de la bombe atomique,” *L’Humanité*, 12 August 1945, Carton F-31(46), Fonds Joliot-Curie, BnF, Paris, France.

<sup>25</sup> Vincent Bugeja, “Joliot-Curie Rips America for Atomic Energy Report” *New York Herald Tribune*, European edition, 15 June 1947, Carton F-87, CEA, Fonds Joliot-Curie, BnF, Paris, France.

<sup>26</sup> Bertrand Goldschmidt, a participant in the Manhattan project and later the head of the International Relations Division of the CEA, noted lamentingly that without the research undertaken by Hans Halban and Lew Kowarski on heavy water in Montréal, Canadian predominance in pressurized heavy water reactors would have never materialized. Goldschmidt, *The Atomic Complex*, 65.

<sup>27</sup> Press Communiqué of CEA signed by Frédéric Joliot-Curie and Raoul Dautry, 15 December 1948, Carton F-76(300), Fonds Joliot-Curie, BnF, Paris, France.

<sup>28</sup> Note prepared by Francis Perrin titled, “La pile atomique de Chatillon,” 1949, Carton F-76 (300), Fonds Joliot-Curie, BnF, Paris, France.

<sup>29</sup> Hecht, *The Radiance of France*, 2.

### **India's science-driven catch-up and the politics over strategic minerals**

Historian Michael Adas writes that while in the 16<sup>th</sup> and 17<sup>th</sup> centuries, European travelers viewed their Christian faith as the source of their superiority over non-Western populations, from the early 19<sup>th</sup> century onwards, science and technology became the measure of universal modernity with Europe in the lead.<sup>30</sup> This attitude was reflected in the British colonial enterprise in India, which tended to represent the natives as non-scientific and backward. In response and protest, nationalist Indian elites attempted to portray their country's cultural underpinnings as progressive and modern, and tried to represent Indian traditions as scientific and rational.<sup>31</sup> Jawaharlal Nehru, the country's first prime minister, wrote in *The Discovery of India* that "the scientific approach and temper are, or should be, a way of life... It is the temper of a free man."<sup>32</sup> As independence neared, the Indian nationalist leadership increasingly felt that India could not afford the luxury of pure scientific research—Indian science had to serve industry<sup>33</sup> and Indian scientists had to work for the benefit of the community.<sup>34</sup> Science was thus hailed as the antidote to India's underdevelopment—it would promote industrialization and modernize both the economy and the society.

Industrialization required large-scale generation of power. With limited coal and oil reserves in India, physicists such as Homi J. Bhabha and Meghnad Saha began to call for atomic energy as the key alternative.<sup>35</sup> In 1946, one year prior to independence, the Council of Scientific and Industrial Research in India established a Board of Atomic Energy Research with Homi J. Bhabha as its chair. Bhabha, who was trained as an experimental physicist at the Cavendish Laboratory in Cambridge, had returned to India at the outbreak of the Second World War. In 1944, he requested funds from the Dorab Tata Trust for the establishment of an institute for fundamental research, eventually leading to the establishment of the Tata Institute

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<sup>30</sup> Michael Adas, *Machines as the Measure of Men: Science, Technology and Ideologies of Western Dominance* (Ithaca and London: Cornell University Press, 1989), 71.

<sup>31</sup> Hindu revivalist groups like the Arya Samaj began to reinterpret ancient Hindu texts in their quest for a "Hindu science." Gyan Prakash writes that it was a "historical compulsion that drove the Hindu intelligentsia of British India to negotiate the relationship of classical knowledge with Western science and to represent their traditions as scientific." Gyan Prakash, *Another Reason: Science and the Imagination of Modern India* (Princeton, NJ: Princeton University Press, 1999), 118.

<sup>32</sup> For an overview of Nehru's vision of a science-led modernity as part of the national development project of India see Jawaharlal Nehru, *The Discovery of India* (Delhi: Oxford University Press, 1948).

<sup>33</sup> Gyan Prakash, *Another Reason*, 193.

<sup>34</sup> Itty Abraham, *The Making of the Indian Atomic Bomb: Science, Secrecy and the Postcolonial Bomb* (London: Zed Books, 1998), 46.

<sup>35</sup> Meghnad Saha. "Industrial utilization of atomic power in India," *Science and Culture* 1947, In *Collected Works of Meghnad Saha* ed., Santimoy Chatterjee (Calcutta: Orient Longman, 1984).

of Fundamental Research (TIFR) in Bombay.<sup>36</sup> In the years that followed, the TIFR grew with close ties to the AEC. Although Nehru believed that science could be used for both constructive and destructive ends<sup>37</sup> and when he introduced the Atomic Energy Bill to the Constituent Assembly in April 1948, he stated that India would embrace nuclear energy for peaceful purposes only.<sup>38</sup>

In the postwar years, the United States attempted to preserve the censorship of atomic energy information and to secure the control of strategic minerals around the world. This included Indian monazite in Travancore—a source of radioactive thorium. However, Washington met stiff resistance from New Delhi, which had been quick to identify the potential of its strategic minerals and imposed an embargo on their export. The Indian ban on monazite exports also affected the British, leading to a shortage of cerium in the United Kingdom.<sup>39</sup> The UK Board of Manufacture was keen on raising the matter with India, requesting that India release commercial quantities of monazite for the production of cerium in May 1949.<sup>40</sup> Because Travancore was a princely state, hence not legally part of the Indian Union, the British kept a close eye on the provisions of the Indian Atomic Energy Act of 1948 and how it pertained to Travancore.<sup>41</sup> However, the ambiguity was alleviated in July 1949 when Travancore joined the Indian Union to form the province of Travancore-Cochin. The following year, the Governments of India and Travancore-Cochin instituted a corporation for the joint exploitation of monazite in the state, effectively ending British hopes of renewed access.<sup>42</sup> Against the Cold War backdrop of strategic dyads and Anglo-American efforts to control its strategic minerals, India felt a strong need for an alternative. Fortunately for India, the CEA filled these shoes well.

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<sup>36</sup> Letter from Homi J. Bhabha to Sir Sorab Saklatvala, Chairman of the Dorab Tata Trust, March 12, 1944, IDSA-NPIHP Documents. <http://digitalarchive.wilsoncenter.org/document/114188> (last accessed 3 February 2013)

<sup>37</sup> Itty Abraham, 1998, 47.

<sup>38</sup> Ibid.

<sup>39</sup> Cerium is a rare earth metal used in projector lights, studio lighting and more importantly, in the construction of jet engines. It is produced from monazite ores, which are also a source of radioactive thorium.

<sup>40</sup> Telegram from the Commonwealth Relations Office's Trade and Transport Department to the UK High Commissioner in India, 17 May 1949, AB 16/515, Commonwealth Relations, India: Research and Supplies, 1947-53, National Archives, Kew, UK.

<sup>41</sup> Letter from Gibson to Pierson, 7 April 1948, AB 16/515, Commonwealth Relations, India: Research and Supplies, 1947-53, National Archives, Kew, UK. For a historical overview of the monazite question with regard to Travancore in the years following Indian independence see Itty Abraham, "Rare Earths: The Cold War in the annals of Travancore," in Gabrielle Hecht, ed., *Entangled Geographies: Empire and Technopolitics in the Global Cold War* (Cambridge, MA: MIT Press, 2011), 101-124.

<sup>42</sup> Press release by the Indian Home Ministry in New Delhi, 1 June 1950, AB 16/515, Commonwealth Relations, India: Research and Supplies, 1947-53, National Archives, Kew, UK.



### **January 1950–August 1951: The beryllium agreement**

In January 1950, Frédéric and Irène Joliot-Curie visited India at the invitation of the Indian Science Association Congress. During their tour, Frédéric Joliot-Curie met the members of the AEC and made offers for a bilateral agreement with the CEA concerning strategic minerals such as beryllium and thorium, the agreement was eventually finalized in 1951. This Franco-Indian cooperation, unprecedented in its closeness and character, partially subverted U.S.-led information censorship and nuclear technology controls while deeply upsetting the British, who regretted losing advantage over their former colony to their historic rivals.

At a special meeting of the AEC held in New Delhi on 17 January 1950<sup>43</sup> (**Documents 5, 6**), Joliot-Curie offered to share technical information on the purification of uranium,<sup>44</sup> graphite reprocessing, and designs of a low power reactor in exchange for India's export to France of thorium, beryllium, and mineral oil for the manufacture of graphite. The offer included the sale of uranium, should it be discovered in ample quantities at a later date. This meeting was held in the presence of the three-member AEC, namely, Homi J. Bhabha, K.S. Krishnan and S.S. Bhatnagar and was held at Bhatnagar's home. Such an offer was highly unusual at a time when the United States was keen on maintaining control over nuclear technology and information while the United Kingdom and Canada adhered to a similar approach themselves, although not without disquiet.

Despite Joliot-Curie's removal from his position as the haut-commissaire of the CEA in April 1950, the proposed agreement with the French continued to develop. A contract was drawn between the CEA and the AEC on beryllium-reprocessing in March 1950<sup>45</sup> and in July 1950, Jules Guéron met Homi Bhabha in London to negotiate the details of the agreement<sup>46</sup> (**Document 7**). Francis Perrin, who had succeeded Joliot-Curie at the CEA, visited Bombay in December 1950 and met the AEC officials for further negotiations. According to British estimates, the Franco-Indian negotiations took place over a period of 15 months<sup>47</sup> and the French Foreign Ministry informed the British and American embassies in Paris in August

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<sup>43</sup> Minutes of a Secret Special Meeting of the Atomic Energy Commission held on January 17, 1950 3pm, in the House of SS Bhatnagar, 4 York Place, New Delhi, Carton F-86, Fonds Joliot-Curie, BnF, Paris, France.

<sup>44</sup> The purification of uranium was to be to the degree necessary for use in a reactor. The deal would include complete designs and blueprints of the plant and all technical information about its operation. Ibid.

<sup>45</sup> Letter from Raoul Dautry, Administrator-General of the CEA to René Lescop, Secretary-General of the CEA, 14 September 1950, 307 AP 203, June-December 1950, Papers of Raoul Dautry, French National Archives, Paris 3e, France.

<sup>46</sup> Secret envelope from Jules Guéron to Raoul Dautry containing resumé of discussions with Homi J. Bhabha in London, 2 July 1950, 307 AP 225, 1950-1, Papers of Raoul Dautry, French National Archives, Paris 3e, France.

<sup>47</sup> Letter from Oliver Harvey, British Embassy in Paris to the British Government, 30 October 1951, AB16/565, Technical cooperation with India, 1947-54, National Archives, Kew, UK.

1951 that an agreement had been reached between the Indian and French governments concerning beryllium<sup>48</sup> (**Documents 8, 10, 11**). This was the first bilateral agreement that the CEA signed with the atomic energy commission of another country.<sup>49</sup> The same year, the French began the construction of the monazite processing plant in Alwaye, Kerala.

The Indo-French agreement called for two stages of bilateral co-operation.<sup>50</sup> In the first stage, preliminary theoretical studies were to be conducted on the construction of a nuclear reactor of moderate power, which would be beryllium-moderated and use natural uranium as its fuel. This first stage would take place in France. In the second stage, the reactor would be constructed in India over a period of five years. At the end of the five-year period, it was decided that the CEA would pass on the authority of the reactor to the AEC. During the same five-year period, the AEC would supply beryllium to the CEA for the construction of a similar reactor in France. Since the original reactor in India would become the property of the AEC, the construction costs would either be paid directly or eventually reimbursed by the AEC. Each party would be responsible for the expenses related to their personnel involved and for the material costs for the studies undertaken in their own countries. The agreement required the CEA and the AEC to cooperate fully in all appropriate scientific and technological domains.

Throughout this period, the British remained increasingly apprehensive of Franco-Indian nuclear proximity. On one hand, they regretted the loss of their former colony to the French and on the other, resented the strict classification rules imposed by the United States in the nuclear domain which, according to London, hampered its cooperation with the Commonwealth<sup>51</sup> (**Document 4**). From the British point of view, “it was undesirable that the

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<sup>48</sup> Beryllium is a toxic rare metal, which is extremely lightweight and considered a critical strategic mineral useful for national security purposes. It can be used as a neutron moderator and as part of a neutron source for both reactors and weapons. The Indian embargo on exports of strategic minerals instituted since the late 1940s included beryllium, making India’s willingness to allow an exception for France all the more noteworthy.

<sup>49</sup> Bertrand Goldschmidt, “Les problèmes nucléaires indiens,” *Politique étrangère* 47 (1982) : 619

<sup>50</sup> Secret envelope from Jules Guéron to Raoul Dautry containing résumé of discussions with Homi J. Bhabha in London, 2 July 1950, 307 AP 225, 1950-1, Papers of Raoul Dautry, French National Archives, Paris, France.

<sup>51</sup> On 7 January 1948, United States, United Kingdom and Canada agreed at the meeting of the Combined Policy Committee on a *modus vivendi* involving exchange of scientific and technological information on matters related to common concern. Article 7 of this *modus vivendi* stated, “In the interest of mutual security, classified information in the field of atomic energy will not be disclosed to other governments or authorities or persons in countries in other countries without due prior consultation.” In 1954, Roger Makins of the British Foreign Office tried to convince Lewis Strauss of the U.S. AEC to allow Britain to share nuclear information with members of British Commonwealth—information that has had not originated from any exchange with the United States or Canada. Text of letter from Sir Roger Makins to Lewis L. Strauss, 21 April 1954, AB16/565, Technical cooperation with India, 1947-54, National Archives, Kew, UK.

Indians should pursue their atomic energy activities under French tutelage...and it was desirable to wean them [away].”<sup>52</sup>

Declassified documents reveal that Bhabha was in the midst of negotiating a similar deal with the British at the same time. When Sir John D. Cockcroft, director of the UK Atomic Energy Research Establishment, found out about the arrangements Bhabha had made with the CEA, he informed the British Cabinet Committee on Atomic Energy that there was no need for the United Kingdom to negotiate a beryllium agreement with India. However, this decision was not immediately communicated to the AEC in July 1951 (**Document 9**). In reply to Roger Makins’ insistence on providing a timely reply to Bhabha, Ministry of Supply official F.C. How retorted in colonialist-tinged exasperation (**Document 12**):

(A)n Oriental should not regard a delay of less than three months in answering a letter as being abnormal! I do not think it was our delay in answering his earlier approaches which caused him to turn to the French, because it appears from Cockcroft’s paper that Bhabha had made his arrangements with the French at a time when he was still amicably discussing possible similar arrangements with us.<sup>53</sup>

The Franco-Indian agreement was unprecedented in that it involved joint theoretical work between French and Indian technical teams at a time when Anglo-American information censorship rendered such exchanges extremely difficult. By May 1951, information regarding low-power reactors was declassified by the United States, but the required security clearances from the U.S. Joint Congressional Committee prevented any personnel who had served at the U.S. Atomic Energy Commission from participating in research in another country.<sup>54</sup> Furthermore, the *Modus Vivendi* of 7 January 1948 prevented the British from engaging in such exchanges of information and personnel without prior consultation with the United States. Cockcroft was therefore hardly overstating the case when he observed with regret that the American policy of information censorship has “left the field largely to the French.”<sup>55</sup>

Beryllium-moderated natural uranium reactors held several advantages for India. First, since these reactors used natural uranium, India did not need to master enrichment

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<sup>52</sup> Report by F.W. Marten in Washington D.C. to W. Harpham at the Foreign Office in London, on debates at the U.S. Senate and at the House of Representatives on loaning wheat to India, 31 May 1951, AB 16/565, Technical cooperation with India 1947-54, National Archives, Kew, UK.

<sup>53</sup> Letter from F.C. How to Roger Makins, 18 August 1951, File AB 16/565, Technical co-operation with India, 1947-54, National Archives, Kew, UK.

<sup>54</sup> Report by F.W. Marten in Washington D.C. to W. Harpham at the Foreign Office in London, on debates at the U.S. Senate and at the House of Representatives on loaning wheat to India, 31 May 1951, AB 16/565, Technical cooperation with India 1947-54, National Archives, Kew, UK.

<sup>55</sup> Report prepared by Sir John D. Cockcroft on the French atomic energy project, July 1951, File AB 16/565, Technical co-operation with India, 1947-54, National Archives, Kew, UK.

technology in order to operate them. Second, being beryllium-moderated, these reactors theoretically required smaller quantities of natural uranium, thereby allowing India to circumvent the disadvantage posed by its lack of uranium deposits.<sup>56</sup> Under the 1951 bilateral agreement, France was responsible for supplying all the uranium required for research and construction of the reactor, while India was responsible for supplying the beryllium. In fact, the AEC granted the CEA priority-access to Indian beryllium.<sup>57</sup> In the face of the U.S. monopoly over strategic minerals, notably uranium in Belgian Congo,<sup>58</sup> the CEA sought out international partners. Finding itself at the receiving end of U.S. and British attempts at controlling its own strategic minerals, the AEC gravitated towards bilateral cooperation with the CEA.

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In February 1960, France exploded its first nuclear bomb in the French Sahara, followed by two more in April and December of that year. Differences intensified between Paris and Washington, as the latter refused to readily admit France into the exclusive nuclear club.<sup>59</sup> In 1961–2, the AEC began to explore the possibility of importing an unsafeguarded natural uranium reactor from France. However, this agreement failed to materialize by 1963. Owing to the attractive Exim Bank loan terms arranged by Washington, the AEC accepted the U.S. offer instead, which involved the construction of two boiling water reactors in Tarapur as part of a turn-key project.<sup>60</sup>

France refused to sign the Partial Test Ban Treaty (PTBT) in 1964 on the grounds that the treaty was discriminatory, and refused to participate in the Eighteen-Nation Disarmament Committee (ENDC) in Geneva that began negotiations for a nuclear non-proliferation treaty

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<sup>56</sup> Bertrand Goldschmidt, who headed the CEA mission to India in December 1951, indicated this potential benefit of beryllium-moderated reactors to Indian scientists. Cited in Rudy Mahut, “Entre atomes et diplomatie: les premiers heures du développement international du CEA,” *Revue d’histoire diplomatique*, vol. 123, n°1, 2009, p. 59.

<sup>57</sup> *Ibid.*

<sup>58</sup> In May 1939, Joliot-Curie tried to conclude an agreement with the Union minière du Haut-Katanga to secure French access to uranium deposits in Belgian Congo. The Nazi invasion of Paris in 1940 stalled all progress. In 1942, the United States signed an agreement with the Belgian firm leading to exclusive U.S. access to Congolese uranium. For a detailed account of these pre-war French attempts see Bertrand Goldschmidt, *Atomic Rivals*, trans. Georges M. Tanner (New Brunswick and London: Rutgers University Press, 1990), 45-59. See also Bertrand Goldschmidt, *L’aventure atomique: Ses aspects politiques et techniques* (Paris : Fayard, 1962).

<sup>59</sup> On 22 April 1960, days after the second French nuclear test, the U.S. Secretary of Defense Thomas Gates was quoted in *The New York Times* as saying that, “the United States did not regard two nuclear explosions as qualification for French admission into the nuclear club”. Cited in Albert Wohlstetter, “Nuclear sharing: NATO and the N+1 country,” *Foreign Affairs* 39 (April 1961): 356.

<sup>60</sup> B. Goldschmidt, “Les problèmes nucléaires indiens,” *Politique étrangère* 3(1982): 620.

in 1965. While India signed the PTBT and played an active role within the ENDC, French and Indian representatives were amongst those that abstained when the text of the NPT was adopted by the United Nations General Assembly in June 1968.<sup>61</sup> Although the NPT did not directly impede France and even established France's status as a nuclear weapon state, French ambassador Armand Bérard stated that France would not sign the NPT since the treaty failed to address disarmament and was instead an instrument for the "non-armament of unarmed countries."<sup>62</sup> India refused to sign the NPT on the grounds that it only prevented "horizontal proliferation" but not "vertical proliferation" by the nuclear weapon states, and therefore was discriminatory in nature. The following year, in 1969, the CEA and the AEC signed a bilateral agreement by which, India obtained the design of the French Rapsodie test reactor and the steam generator of the Phénix reactor. Based on the design of the Rapsodie reactor, India's fast breeder test reactor in Kalpakkam is India's first and only operational breeder reactor.<sup>63</sup>

#### **May 1974: India's nuclear test and Giscard d'Estaing's non-proliferation policy**

On 18 May 1974, India conducted its first nuclear test in Pokhran in the Rajasthan desert. This underground explosion, codenamed "Smiling Buddha," was accomplished with the plutonium produced as a by-product from the Canadian-supplied CIRUS reactor in Trombay.<sup>64</sup> Although India claimed this test to be a "peaceful nuclear explosion" (PNE), Washington refused to accept it. The United States instead accused India of building nuclear weapons and imposed technological sanctions on New Delhi.<sup>65</sup> India's rebuttal was reflected in the paper submitted by Indian physicists Raja Ramanna and R. Chidambaram<sup>66</sup> to the IAEA Technical Committee's January 1975 meeting in Vienna. The IAEA paper explained that the 12 kiloton implosion experiment was necessary for studying the potential industrial

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<sup>61</sup> B. Goldschmidt, "The Negotiation of the Non-Proliferation Treaty," *IAEA Bulletin* 22 (3-4):74, accessed 9 May 2013. [http://www.iaea.org/Publications/Magazines/Bulletin/Bull223\\_4/223\\_403587380.pdf](http://www.iaea.org/Publications/Magazines/Bulletin/Bull223_4/223_403587380.pdf)

<sup>62</sup> Ibid.

<sup>63</sup> M.V. Ramana, "The Indian Nuclear Industry: Status and Prospects," *Nuclear Energy Futures Papers* 9 (Dec.2009)

<sup>64</sup> It is alternatively called the CIR or the Canada-India Reactor. The acronym "US" stands for the American-supplied heavy water used to operate it.

<sup>65</sup> The Soviet Union's response to India's PNE was muted. For the Soviet silence on India's 1974 nuclear test see Balazs Szalontai, "The Elephant in the Room: The Soviet Union and India's Nuclear Program," *NPIHP Working Paper#1* <http://www.wilsoncenter.org/publication/the-elephant-the-room-the-soviet-union-and-india%E2%80%99s-nuclear-program-1967-1989> (last accessed January 3, 2013)

<sup>66</sup> Raja Ramanna and R. Chidambaram were part of the small group of scientists from the Bhabha Atomic Research Centre (BARC), which was responsible for the PNE of 1974.

and engineering uses of PNEs that have been already “recognized” by the IAEA.<sup>67</sup> The superpowers argued that nuclear explosions for peaceful purposes are indistinguishable from those conducted for military purposes.<sup>68</sup>

Amidst the generally hostile reactions from the international community, especially from the United States, Canada, Australia and Japan, India was much relieved by CEA’s response. Soon after the test, André Giraud, the administrator-general of the CEA sent a telegram to Homi N. Sethna, the chairman of the AEC, conveying his congratulations on behalf of the CEA. When interviewed by *Le Monde* on 27 May 1974, Giraud justified his telegram in the following terms (**Document 13**):

The AEC and the CEA have shared friendly relations since the end of the 1940s, a period when no other foreign organization agreed to cooperate with the CEA. We are aware of the difficulties involving underground nuclear explosions like the one conducted by the Indians, since they involve a sophisticated technology... The CEA has therefore congratulated Mr. Sethna and his colleagues for this technological mastery, as is common to do so between friendly atomic energy organizations in similar circumstances... To not congratulate, would have meant doubting the peaceful intentions expressed by the Government of India, which did not seem desirable to us.<sup>69</sup>

In his conversation with a U.S. diplomat in July 1974, Bertrand Goldschmidt, then Director of International Relations of the CEA, described the Indian explosion as “hardly surprising” and “inevitable.”<sup>70</sup> Goldschmidt wrote many years later, “If the Indian explosion had taken place, like the Chinese one, before the entry into force of the NPT, it would certainly have created less commotion. For the first time, such an operation had proved counterproductive for a country—at least in the short term...”<sup>71</sup> A vocal supporter in France of India’s 1974 test was military strategist General Pierre-Marie Gallois. It was not India’s

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<sup>67</sup> PNEs played an important role in the discussions that took place at the IAEA throughout the 1960s and which came to be addressed also in Article V of the NPT. For India’s response at the IAEA see Raja Ramanna and R. Chidambaram, “Some studies on India’s Peaceful Nuclear Explosion Experiment,” in *Proceedings of a Technical Committee on Peaceful Uses of Nuclear Explosions January 20-24, 1975*, (Vienna: IAEA, 1975), 421-36.

<sup>68</sup> For the challenges that India’s PNE posed to the non-proliferation efforts of the superpowers see Jayita Sarkar, “India’s Nuclear Limbo and the Fatalism of the Nuclear Non-Proliferation Regime, 1974-1983,” *Strategic Analysis* vol. 37 n°3 (2013): 322-337.

<sup>69</sup> “Nos voisins et les autres pays n’ont rien à craindre de l’Inde déclare Mme Gandhi,” *Le Monde*, 28 May 1974, Carton 2252, Questions atomiques : explosion indienne, 1973 – June 1980, Ministère des Affaires Étrangères (hereafter MAE), La Courneuve, France. Excerpt translated from French by author.

<sup>70</sup> U.S. embassy in New Delhi, “Dr. Omenn’s Trip, Meeting 2 July in Paris with Dr. Bertrand Goldschmidt, Commission d’Energie Atomique”, 1974NEWDE09099, 9 July 1974 (AAD). Cited in Florent Pouponneau, “Les changements de la politique française d’exportations nucléaires (1974-1976) : un triple double jeu,” *Critique internationale* n 58, 2013, p. 103.

<sup>71</sup> Bertrand Goldschmidt. *The Atomic Complex: A Worldwide Political History of Nuclear Energy* (La Grange Park, IL: American Nuclear Society, 1982), 404.

fault, argued General Gallois, that there was no distinction between nuclear explosions for peaceful uses and those for military purposes.<sup>72</sup> He was confident that if India would develop nuclear weapons in the future, it would not be for coercive goals but for the pacifist intention of deterrence. Summarizing the Indian response to the inimical international reactions, Jean-Daniel Jurgensen, the French ambassador to New Delhi, wrote in his telegram to the Foreign Ministry in Paris, that the “Indians are particularly pleased because France has abstained from all unfriendly judgments and they believe that France is herself well-placed to understand the Indian position in this domain”<sup>73</sup> (**Document 14**). It was to little surprise that in June 1974, AEC chairman Homi Sethna wrote to Valéry Giscard d’Estaing, congratulating him on being elected president of the Fifth Republic.<sup>74</sup>

Giscard d’Estaing’s non-proliferation policy, however, made sure that Quai d’Orsay did not share the ecstasy of the CEA.<sup>75</sup> Instead, it insisted on renegotiating its agreements with India so that French-supplied nuclear technology and materials could not be used in future Indian nuclear explosions<sup>76</sup> (**Document 15**). One of the main steps taken by the superpowers after India’s PNE was the formation of the “Nuclear Suppliers Group” (NSG) from the previously existing London Club, to control nuclear-related exports. Between 1975 and 1976, Giscard d’Estaing’s non-proliferation policy revolved around French participation in the NSG.<sup>77</sup> It was, however, not easy for the first non-Gaullist president of the Fifth Republic to impose his will, owing to opposition not only from the CEA but also from his Prime Minister Jacques Chirac, the leader of the Gaullist faction in the French parliament. Unlike the Gaullist view that multiplication of nuclear powers would balance the superpower nuclear hegemony, “Giscardists” believed that the rise of smaller nuclear states in the world

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<sup>72</sup> Pierre-Marie Gallois, “L’Inde et le droit à la sécurité,” *Politique étrangère* (1975): 295

<sup>73</sup> Telegram from Jurgensen in New Delhi to the Ministère des Affaires Étrangères in Paris dated 23 May 1974, Carton 2252, Questions atomiques: explosion indienne, 1973- June 1980, MAE, La Courneuve, France.

<sup>74</sup> Letter from Homi N. Sethna to Giscard d’Estaing, 12 June 1974, Carton 2253, Questions atomiques : explosion indienne, 1973 – June 1980, MAE, La Courneuve, France.

<sup>75</sup> For an overview of the evolution of French non-proliferation policy until contemporary times see Bruno Tertrais, “France and nuclear non-proliferation: From benign neglect to active promotion,” in *Nuclear Proliferation and International Order: Challenges to the Non-Proliferation Treaty*, ed. Olav Njolstad (New York: Routledge, 2011), 217-226.

<sup>76</sup> Confidential note prepared for the Minister by Pierre Laurent, 27 May 1974, Carton 2253, Questions atomiques: explosion indienne, 1973 – June 1980, MAE, La Courneuve, France.

<sup>77</sup> France became the only non-NPT state to be participating in the NSG. For the differences between the diplomats at Quai d’Orsay and the CEA scientists over French participation in the NSG and the subsequent adherence to the NSG guidelines in French nuclear export policy, see Florent Pouponneau, “Les changements de la politique française d’exportations nucléaires (1974-1976): un triple double jeu,” *Critique internationale* n°58, 2013, p.95-116.

would undermine French nuclear prowess.<sup>78</sup> This, coupled with the election of Jimmy Carter to the White House in 1976, engendered a new direction in French policy towards non-proliferation. France eventually renegotiated its 1972 agreement with India relating to the fast breeder test reactor in Kalpakkam—it was jointly agreed that only France would provide the enriched uranium for this breeder reactor.<sup>79</sup> The Indian ambassador to France, Dwarka Nath Chatterjee, who was particularly close to Jacques Chirac, continuously advised New Delhi to accept French demands for safeguards.<sup>80</sup> He argued that lax safeguards for India would mean lax safeguards for Pakistan's plutonium reprocessing plant.<sup>81</sup> The latter would become a test case for Giscard d'Estaing's non-proliferation policy in the following years.

In December 1974, Pakistan signed a contract with French firm St. Gobain Nouvelle Technique for the construction of a prototype plutonium separation plant. In early 1975, the French Foreign Ministry stepped in and insisted on a tripartite agreement involving France, Pakistan and the IAEA, which was signed in March 1976.<sup>82</sup> As the Ford administration kept applying pressure on Paris to end the agreement owing to the high proliferation risk it constituted, Prime Minister Jacques Chirac publicly rejected the idea of discussing anything with Washington in the name of French national sovereignty.<sup>83</sup> Chirac's replacement in late August 1976 by Raymond Barre, who was loyal to the President, and the subsequent exit of the Gaullists from the government, removed many of the obstacles for Giscard d'Estaing. In September that year, the Conseil de politique nucléaire extérieure (CPNE) was established to serve two purposes: first, to redefine French nuclear export policy according to the NSG guidelines, and second, to establish coherence and cohesion in the national nuclear export

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<sup>78</sup> Georges-Henri Soutou, "La France et la non-prolifération nucléaire," *Revue historique des armées* 262 (2011), <http://rha.revues.org/index7154.html> (last accessed 25 December 2012)

<sup>79</sup> Bertrand Goldschmidt, "Les problèmes nucléaires indiens," *Politique étrangère* 47 (1982) : 623

<sup>80</sup> Safeguards are a range of technical measures subject to verification to prevent diversion of nuclear materials and technology by states from peaceful to military uses. These can be demanded by the supplier state to the recipient state through bilateral safeguards, or trilaterally with the involvement of the International Atomic Energy Agency (IAEA). Since the 1978 Nuclear Non-Proliferation Act, the United States is bound by domestic legislation to demand full-scope IAEA safeguards on any civil nuclear cooperation agreement with a foreign country.

<sup>81</sup> "(I)t may not harm us if the French insist on and enforce a fairly rigorous system of safeguards as a matter of principle...This is, in my view, a good thing. We should not give any "argument" to Pakistan to be used to weaken the French position." Top secret letter from Dwarka Nath Chatterjee to Kewal Singh, 6 June 1975, P.N. Haksar Files, IIIrd instalment, Correspondence with D.N. Chatterjee, Nehru Memorial Museum and Library, New Delhi.

<sup>82</sup> Text of Safeguards Agreement of 18 March 1976 between the Agency, France and Pakistan, IAEA INFCIRC/239 <http://www.iaea.org/Publications/Documents/Infcircs/Infcirc239.pdf> (last accessed 21 November 2012)

<sup>83</sup> "M. Jacques Chirac rejette la proposition américaine d'une négociation tripartite sur l'accord franco-pakistanaï," *Le Monde* 12 Aug. 1976, p.1-4. Cited in Florent Pouponneau, "Les changements de la politique française d'exportations nucléaires (1974-1976): un triple double jeu," *Critique internationale* n°58, 2013, p. 112.



policy.<sup>84</sup> In December 1976, the CPNE declared that the French government would not authorize any sale of new reprocessing plants to foreign countries, though it would take nearly two years to finally terminate the agreement.<sup>85</sup>

Nonetheless, Andre Jacomet, the French diplomat who handled the negotiations with Pakistan, informed Gerard C. Smith, U.S. special envoy on non-proliferation, that although the French decision to cancel its contract with Pakistan was final, France could not provide any “official assurance of cancellation that U.S. could use in Congressional consultations,” as that could lead to “trouble from the Gaullists”,<sup>86</sup> who complained that France was losing business owing to its new non-proliferation policy.<sup>87</sup> In the decades that followed, it became imperative for France to demonstrate at home and abroad that it could pursue the goal of nuclear non-proliferation without making financial compromises.<sup>88</sup>

### **CEA-AEC camaraderie and the quest for foreign policy agency**

In spite of disputes between Quai d’Orsay and South Block, Franco-Indian ties were never on the verge of a breakdown. Even when tensions ran high, a diplomatic rupture was unlikely. A note prepared by the French Foreign Ministry prior to Nehru’s visit to Paris in February 1955, two months prior to the Bandung Conference, observed that France could find in India a cooperative partner in Asia, despite their outstanding disagreements.<sup>89</sup> (**Document 16**). In addition, amicable personal relationships between CEA and AEC scientists ensured that foreign policy differences did not take a toll on their nuclear cooperation. Frédéric Joliot-Curie and Indian scientists such as Homi J. Bhabha, K.S. Krishnan, S.S. Bhatnagar and Meghnad Saha frequently corresponded since the end of the Second World War and Bhabha

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<sup>84</sup> Georges Le Guelte, *Histoire de la menace nucléaire* (Paris: Hachette, 1997), 213.

<sup>85</sup> Florent Pouponneau, « Les changements de la politique française d’exportations nucléaires (1974-1976): un triple double jeu, » p.113. See also secret cable 8167 from U.S. Embassy Islamabad State Department, "Reprocessing Plant," 21 August 1978, National Security Archive <http://www.gwu.edu/~nsarchiv/nukevault/ebb333/doc14.pdf> (last accessed 21 December 2012)

<sup>86</sup> Secret Telegram 08200 from U.S. embassy in Vienna to State Department, 13 September 1978, Wilson Center Archives <http://digitalarchive.wilsoncenter.org/document/112841> (last accessed 21 December 2012)

<sup>87</sup> Over the three decades since the 1950s until the 1970s, France had signed nuclear cooperation agreements with 34 countries, and began to successfully compete with U.S. firms like Westinghouse and General Electric. For a study on French nuclear cooperation until present times see Mycle Schneider, *Nuclear France Abroad: History, Status and Prospects of French nuclear activities in Foreign countries* (Paris: Centre for International Governance Innovation, 2009). See also Benoît Pelopidas, “French nuclear idiosyncrasy: how it affects French nuclear policies towards the United Arab Emirates and Iran,” *Cambridge Review of International Affairs* 25 (Mar.2012): 143-169.

<sup>88</sup> The predominant concern for Paris after the adoption of the Nuclear Non-Proliferation Act by the Carter administration in March 1978, was how to preserve the economic interests of the French nuclear industry without risking a rupture with Washington. See Georges Le Guelte, *Histoire de la menace nucléaire*, 87-92, 214.

<sup>89</sup> Note on Indian foreign policy and Franco-Indian relations, 1 February 1955, Direction Asie Océanie, French Foreign Ministry, Carton 65, Inde : Relations avec la France, 1944-72, MAE, La Courneuve, France.

shared good personal relations with Bertrand Goldschmidt. Bhabha's successor, Vikram Sarabhai, is known to have been invited by the CEA to witness the French nuclear tests in the Mururoa atolls in the South Pacific in early 1972, though he passed away suddenly at the end of 1971.<sup>90</sup> In later years, Raja Ramanna and Homi Sethna maintained good relations with the CEA. The fact that both France and India were non-signatories to the NPT further whetted their interest for nuclear cooperation.

During much of the Cold War, France and India insisted on preserving their foreign policy independence, irking Washington in the process. Franco-American disagreements over the military integration of Europe constitute a classic example in this case. The NATO military integration was "unacceptable" to President Charles de Gaulle, who stated that it "deprives France, her people, her Government, and her Command, of the responsibility for her own defense."<sup>91</sup> Speaking to U.S. Under Secretary of State George W. Ball on the issue of nuclear-sharing in Europe, Edward Biegel remarked:

"The real reason we do not share with the French is that we do not trust them—as we do the British. We are that fearful they will trigger us into a nuclear war, since they, unlike the British, follow a foreign policy of their own making... When we and the British differ, the British align themselves with us. When we and the French differ, the French go their own way."<sup>92</sup>

Differences persisted between Paris and Washington and eventually led to de Gaulle's 1966 decision to withdraw France from the integrated command structure of the Atlantic Alliance.

Between 1969 and 1975, Washington is said to have provided secret help to the French nuclear weapons program, likely devised as part of the European leg of the Nixon-Kissinger backdoor diplomacy to allay opposition to U.S. foreign policy goals worldwide.<sup>93</sup> In the summer of 1973, amidst Franco-American tensions over Kissinger's "Year of Europe"

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<sup>90</sup> Shivanand Kanavi, "How Indian PMs reacted to nuclear ambitions: Interview with K. Subrahmanyam," *Rediff News*, 10 February 2011 <http://www.rediff.com/news/slide-show/slide-show-1-an-interview-with-k-subrahmanyam/20110210.htm#3> (last accessed 23 December 2012)

<sup>91</sup> Letter from President de Gaulle to President Eisenhower, 9 August 1960, Eisenhower Library, U.S. Department of State, Central Files, 396.1/8-960

<sup>92</sup> Edward Biegel of the Bureau of Western European Affairs of the U.S. Department of State answers Undersecretary George W. Ball's on French nuclear ambitions and Western European collective security, 28 May 1962, National Archives, Record Group 59, Bureau of European Affairs. NATO and Atlantic Politico-Military Affairs, Records Relating to NATO, 1959-1966, box 7, Ref 12 Nuclear France 1962.

<sup>93</sup> This covert U.S.-French nuclear relationship was uncovered for the first time by Robert Ullman in a 1989 *Foreign Policy* article. Richard Ullman, "The Covert French Connection," *Foreign Policy* (Summer 1989): 3-33. For more on this cooperation with declassified archival documents see Will Burr, "U.S. Secret Assistance to the French Nuclear Program 1969-1975: From 'Fourth Country' to Strategic Partner" *Nuclear Proliferation International History Project Research Update*, Washington, D.C.: Woodrow Wilson International Center for Scholars, accessed April 9, 2013. <http://www.wilsoncenter.org/publication/us-secret-assistance-to-the-french-nuclear-program-1969-1975-fourth-country-to-strategic#1>

initiative, French defense minister Robert Galley made a direct request to the United States for “negative guidance” on the trigger of a French nuclear warhead, i.e. information on whether the French were on the right track with their weapons design. While it is unknown what exactly the American scientists told their French colleagues, Kissinger’s aim was to engage with the French to make them feel that they were ahead of the British, although in reality the goal was to “keep them even.”<sup>94</sup>

After independence in 1947, India adopted the policy of non-alignment in an attempt to maintain its foreign policy agency amidst superpower bloc rivalries. Washington’s skepticism of non-aligned nations was revealed in 1956, when U.S. Secretary of State John Foster Dulles called non-alignment “immoral” and “short-sighted.” According to Dulles, remaining non-aligned in a conflict was contradictory to the principle of collective security of the United Nations.<sup>95</sup> India’s relationship with the United States suffered owing to the latter’s proximity to Pakistan—a Cold War ally of the United States under the Central Treaty Organization (CENTO) and the Southeast Asia Treaty Organization (SEATO). In later years, New Delhi’s opposition to the Vietnam War became a bone of contention between the two democracies. This was also a time when India was largely dependent on U.S. food aid under PL480. Indo-U.S. relations reached a nadir in the mid-1960s, when the Johnson administration suspended the PL480 aid amidst severe food shortages in India.<sup>96</sup>

The Sino-U.S. rapprochement of the 1970s made New Delhi increasingly anxious about an emerging U.S.-China-Pakistan axis, and intensified the anxieties of the Cold War in the subcontinent. New Delhi’s insecurities led to the conclusion of the Treaty of Peace, Friendship and Co-operation with the Soviet Union in August 1971. Four months later, during the India-Pakistan war in December 1971, President Nixon sent the U.S. Seventh Fleet, which included the nuclear-powered USS *Enterprise*, into the Bay of Bengal, as a move to deter India’s intervention in East Pakistan. Apart from claiming that India’s 1974 nuclear

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<sup>94</sup> Top secret memorandum of conversation of Henry Kissinger and James Schlesinger, Ford Presidential Library, Gerald R. Ford Papers, National Security Adviser, Memoranda of Conversation, box 2, September 5, 1973.

<sup>95</sup> Cited in Attar Chand, *Nuclear Policy and National Security* (New Delhi: Mittal), 1993), 123.

<sup>96</sup> Stephen P. Cohen, “India and America: An Emerging Relationship,” paper presented at the Conference on The Nation-State System and Transnational Forces in South Asia, Kyoto, Japan, 8-10 December, 2000, accessed 6 April 2013.

<http://dspace.cigilibrary.org/jspui/bitstream/123456789/18255/1/India%20and%20America%20An%20Emerging%20Relationship.pdf?1>

explosion was “a bomb no matter how India described it,”<sup>97</sup> the Ford administration continued to supply arms to Pakistan like the preceding Nixon administration, further upsetting India.

The individual quest for foreign policy agency amidst superpower rivalry lent a certain degree of convergence to the behaviors of Paris and New Delhi. Their Cold War foreign policy dissidence led them to view each other as countries engaged in a similar struggle against a constrictive bipolar order.

## **Conclusion**

The common opposition of the CEA and the AEC to the postwar U.S.-led information censorship in atomic energy, and the shared goal of Quai d’Orsay and South Block of preserving their foreign policy independence during the Cold War, ensured that the Franco-Indian atomic camaraderie persisted over time. The “Manhattan Complex” drove the French to cooperate with India, while India’s post-colonial ambitions encouraged them to seek out an atomic partner in France. Their shared status as non-signatories to the NPT, together with the personal amity between high-ranking CEA and AEC scientists, positively contributed to this nuclear cooperation. Additionally, the timely diplomatic resolution of the colonial problem between Paris and New Delhi demonstrated that outstanding differences could be overcome. This study represents a first step in investigating the historical significance of the unprecedented technological cooperation between France and India, two democracies in different stages of economic development. It does so by underlining the multiplicity of actors and the factors, both international and domestic, that were involved in the process and opens the door for further scholarly research in this underexplored area of international nuclear history.

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<sup>97</sup> Memorandum From the President's Deputy Assistant for National Security Affairs (Scowcroft) to President Ford, Washington, 28 October 1974, Ford Library, National Security Adviser, Trip Briefing Books and Cables for Henry Kissinger, Box 2, 20 October - 9 November, HAK Messages for President.

## Document Appendix

### Document 1

#### **Confidential letter from Homi J. Bhabha to Frédéric Joliot-Curie, February 11th, 1949**

*Source: Institut Curie Archives, Paris, Carton F-86, CEA: Relations avec l'Inde (1948-50),*

*Papers of Frédéric Joliot-Curie*

*Bibliothèque Nationale de France (BnF), 'avec l'aimable autorisation des ayants droits'*

ATOMIC ENERGY COMMISSION  
GOVERNMENT OF INDIA  
Confidential

February 11, 1949

My dear Joliot,

I am writing to tell you that, on the recommendation of the Atomic Energy Commission, the Government of India have decided to set up a factory for the processing of monazite. The factory will be run by an independent Government owned company under the auspices of the Atomic Energy Commission.

For the purpose of setting up this factory, it was decided to come to a suitable agreement with a foreign firm possessing the required experience and knowledge of the subject instead of expending our own scientific resources on developing processes which had already been worked out elsewhere. You will be glad to know that, after contacting several firms in a number of European countries, the Atomic Energy Commission decided to recommend that an agreement be made with a French firm for the purpose namely the Société de Produits Chimiques des Terres Rares. I understand that this firm is already well known to you and set up the factory at Boucher for the purification of Uranium Oxide for the French Atomic Energy Commission.

As I believe you are aware, Doctors Blumenfeld and de Rohden have come to India at our invitation and will be returning to France today after completing the details of the agreement. It gives me great pleasure to know that this agreement will further promote cooperation in scientific and industrial matters between India and France a country for which I personally have a great affection, and I trust that with the years this cooperation will grow in extent.

I wrote to you some time ago about inviting you to visit India during the next cold weather commencing in November of this year, and I hope to write to you more definitely in the near future about the arrangements.

With kind regards to you and me Joliot.

Yours Sincerely,

H.J. Bhabha

**Document 2**

**Secret Letter from Santi Swarup Bhatnagar to Frédéric Joliot-Curie, 21 June 1949**

Source: Institut Curie Archives, Paris, Carton F-86, CEA: Relations avec l'Inde (1948-50),  
Papiers of Frédéric Joliot-Curie

Bibliothèque Nationale de France (BnF), 'avec l'aimable autorisation des ayants droits'

DEPARTMENT OF SCIENTIFIC RESEARCH  
GOVERNMENT OF INDIA  
ATOMIC ENERGY COMMISSION

[By Airmail]  
[Secret]

21<sup>st</sup> June, 1949

My dear Professor Joliot Curie,

As you are aware the Government of India have entered into an agreement with the two French firms, "The Banque Marocaine de Credit and Societe de Produits Chimiques des Terres Rares" to set up a plant in India for the processing of monazite sands. Under the terms of the agreement the two French firms have to train our Chemists in factories in France and we are therefore arranging to send them 100 tons of monazite in two lots to be used by our Chemists while they are under training in the laboratories and factories of the two French firms in France.

Under the agreement with the firms the thorium and uranium extracted from the monazite sands will remain the property of the Government of India and will have to be returned to the Government of India by the French firms. I am writing this to you so that your Atomic Energy Commission may have full information regarding the purpose for which the monazite sand is being sent to the two French firms in France and that they are allowed to send thorium and uranium recovered from our sands to India. As a friendly gesture, as you have been extraordinarily kind to the Indian Atomic Energy Commission, the Commission may recommend to the Government of India that a certain percentage of this material may be retained by you for experimental purposes with a view to developing further co-operative scientific work in the field of atomic energy. Dr. H.J. Bhabha, who is the Chairman of the Indian Atomic Energy Commission will write to you on the subject. I had a telephonic talk with him last night.

I am expecting to be in France from the 2<sup>nd</sup> to 12<sup>th</sup> August 1949. I enclose a copy of my tour programme. I look forward with eagerness to the pleasure of meeting you both.

With best regards to both of you,

I am,

Yours sincerely,

S.S. Bhatnagar

**Document 3**

**Vincent Bugeja, “Joliot-Curie Rips America for Atomic Energy Report” *New York Herald Tribune*, European edition, 15 June 1947**

*Source: Institut Curie Archives, Paris, Carton F-87, CEA: Relations avec l’Inde (1948-50), Papers of Frédéric Joliot-Curie*

*Bibliothèque Nationale de France (BnF), ‘avec l’aimable autorisation des ayants droits’*

New York Herald Tribune – European Edition 15 June 1947

Joliot-Curie Rips America  
For Atomic Energy Report

By Vincent Bugeja

Professor Frederic Joliot-Curie, High Commissioner for Atomic Energy, charged in Paris yesterday that Professor Henry D. Smyth of Princeton University has made regrettable omissions in his “Report on atomic Energy for Military Purposes”, which have kept scientific and public opinion in the United States in ignorance of the vital contributions of French science to the discoveries leading to the making of atomic bombs.

The young French scientist who was known to feel very keenly about Professor Smyth’s oversight, since the “Report” was published nearly two years ago, made his charge in public for the first time at a press conference following the filming of historic scenes in Paris late in 1939 and early 1940, opening the “Battle for Heavy Water”, as reconstructed in a Franco-Norwegian film now under production.

Raoul Dautry, Minister of Armament in the early months of the war, who also spoke at the conference, confirmed that as early as November, 1939 before President Roosevelt appointed the Advisory committee on Uranium, he was in touch with Joliot-Curie on the possibilities of making atomic bombs.

After further intensive research on nuclear fission begun by the professor’s brilliant team in January, 1939, Joliot-Curie told Dautry in March, 1940, that he was ready for the crucial experiment of a self-sustaining chain reaction pile if he could obtain the world’s unique stock of heavy water distilled at the colossal hydro-electric plant of Rjukan, in Norway.

Joliot-Curie had calculated that this amount of heavy water, about 185 liters, was just sufficient to show whether a self-sustaining pile was possible. He knew also that if it fell into

the hands of the Germans, German science would probably run ahead of the Allied science in the race for the atomic bomb.

Dautry immediately took all measures to obtain the water for France. The precious liquid was snatched just in time before the Germans overran Norway and arrived safely in Paris in April. Before he could get his crucial experiment going, Joliot-Curie had to think of saving the water from the invading Germans. First it was hidden in the vaults of the Bank of France, therein the vaults of Riom prison, in central France, and finally it was shipped at Bordeaux to England with members of Joliot-Curie's team to carry on their research there or possibly in Canada.

All these historical facts are pictured in the "Battle for Heavy Water" Jean Marin, scenario writer and French promoter of the film, said with all the actual actors in the 1940 drama playing the roles. The rest of the film will picture the heroic battle waged by the Norwegian resistance which was finally won not only by the destruction of all heavy water produced by the Germans, but by the dynamiting of the Rjukan plant itself and the pulverization of all, the apparatus for the fractional distillation of heavy water which is present, in ordinary water, in the proportion of one part in 1500.

Professor Joliot-Curie said he hoped the film will correct the false impression produced by the Professor Smyth in the historic section of his "Report" which merely notes in the introduction that "F. Joliot-Curie in Paris had also published his first results (on uranium fission) on the "Comptes Rendus" of January 30, 1939".

Against this summary reference, the French scientist indicated:

That it was French nuclear physicists working under him who first demonstrated experimentally the fission of the lighter [*sic*] uranium isotope and thorium by flying neutrons, a few days after O.R. Frisch and Lise Meitner had made this suggestion.

That it was this same team in March 1939, who discovered that after fission there was an excess of neutrons which could produce other fissions, thus making a chain reaction possible and yielding exothermic energy.

That it was this team who discovered in April 1939, that neutrons absorbed by the heavier uranium isotope give rise to a new element neptunium, from which plutonium is obtained;

That it was his team that first applied the discovery of J. Zeldovich and Lewisa Kharlton, the [*sic*] Russian physicists, that a chain reaction could be promoted by the use of heavy water as a moderator to slow down neutrons to the thermal velocities requisite for fission; and finally,

That it was the French team who discovered how to control the chain reaction once started by neutron-absorbing elements like cadmium, boron and lithium.

In a conversation after the conference, Professor Joliot-Curie smiled when it was suggested that France might have produced atomic bombs before everybody if she had continued to enjoy relative peace after June 1940. "We had all the elements for making a self-sustaining



chain reaction pile in May 1940; he said, but that is as far as I would go". The first pile was erected and got going by Enrico Fernu, [sic] in Chicago, two and a half years later, using graphite as a moderator instead of the more effective heavy water.

Professor Joliot-Curie, who dislikes publicity, said he consented to pose for the "Battle for Heavy Water" for two reasons: first to vindicate French science against the impression left in Professor Smyth's report, secondly, because as a Resistance man he fully approved of the thesis illustrated in the film that partisans, adequately provided with arms and explosives, could do far more effective work in destroying strategical points of value to the enemy than the air bombardment and its accompanying unnecessary destruction.

#### **Document 4**

##### **Text of letter from Sir Roger Makins to Lewis L. Strauss, 21 April 1954**

*Source: National Archives, Kew, AB16/565, Technical cooperation with India, 1947-54.*

##### Extract from A.E. (O) (54) 48

Text of letter from Sir R. Makins to Mr. Lewis L. Strauss, dated April 21, 1954.

You asked me at the meeting with you on April 12, at which the Canadian Ambassador was also present, to confirm in writing the gist of my remarks on the subject of Article 7 of the modus vivendi of January 7, 1948. This article is as follows:-

"In the interest of mutual security, classified information in the field of atomic energy will not be disclosed to other governments or authorities or persons in other countries without due prior consultation."

2. Her Majesty's Government in the United Kingdom have scrupulously observed this condition. They consider, however, that circumstances have changed since this provision was drawn up. In January 1948 there was virtually no information which was not of joint Anglo/American/Canadian origin. In the intervening years the United Kingdom has, as a result of its own research and development, obtained a large amount of information in areas which have not been the subject of any exchanges of information with the United States.

3. Accordingly, Her Majesty's Government in the United Kingdom, who have been approached in this matter by certain members of the British Commonwealth, regard it as reasonable that they should under proper security safeguards, be free to pass on to such members information developed exclusively in the United Kingdom. It is indeed doubtful whether such information should be regarded as falling within the scope of Article 7 of the modus vivendi. Information identified as being of Anglo/American origin would, of course, continue to be covered by the Article.

4. You will observe that Her Majesty's Government are not proposing the amendment of the modus vivendi nor any extension of the areas within which, under its provisions, information can already be passed to members of the British Commonwealth. This letter deals only with information of British origin in areas which have not been the subject of exchange and technical co-operation between the United Kingdom, Canada and the United States.

5. I should be grateful if you on your side could confirm your agreement that the attitude adopted by the United Kingdom in this matter is reasonable.

6. I am sending a copy of this letter to Mr. Arnold Heeney.

Foreign Office  
April 26, 1954

#### **Document 5**

#### **Minutes of a Secret Special Meeting of the Atomic Energy Commission, held on 16 January 1950, New Delhi**

*Source: Institut Curie Archives, Paris, Carton F-86, CEA: Relations avec l'Inde (1948-50), Papers of Frédéric Joliot-Curie*

*Bibliothèque Nationale de France (BnF), 'avec l'aimable autorisation des ayants droits'*

### ATOMIC ENERGY COMMISSION

### GOVERNMENT OF INDIA

### MINUTES

of a Special Meeting of the Atomic Energy Commission held at 3 p.m. on Monday the 16th January, 1950, in the room of the Prime Minister, Jawaharlal Nehru, Ministry of External Affairs, Central Secretariat, South Block, New Delhi.

PRESENT: Jawaharlal Nehru, Prime Minister

Dr. H.J. Bhabha, D.Sc., F.R.S

Dr. K.S. Krishnan, D.Sc., F.R.S.

Dr. S.S. Bhanagar, O.B.E., D.Sc., F.R.S.

Prof. F. Joliot—Curie, High Commissioner for Atomic Energy in France was present by invitation.

1. The Prime Minister opened the Proceedings by saying that India's interest in atomic energy is solely for its peaceful uses. Quite apart from the fact that she had not the resources to make atomic bombs and use atomic energy for military purposes, she was not interested in its military use on principle. When he was in America, he had met a number of atomic scientists and he had told them that he was in not interested in atomic bombs, but solely in the peaceful uses of atomic energy. To his question as to whether it could be used for power generation they had given various replies. Generally these opinions were that it would take some time before atomic energy could be used for power generation. He wished to ask Prof. Joliot-Curie his opinion of the prospects of harnessing atomic energy for power generation in the near future. The question resolved itself in three parts:
  - (a) The general scientific possibilities,
  - (b) The time within which the harnessing of atomic power could be achieved, and
  - (c) The price at which atomic power could be promoted in the future.

Prof. Joliot-Curie said that in France they had constructed a reactor of low power which had given them some experience of the problems involved in reactor construction, and that they were in charge of building a second reactor a capacity of between one and two thousand kilowatts which would give them still more information towards the end of 1950. Although there were still several technical problems to be solved, he could say from their present experience that the subject was full of promise. They already had numerical results which allowed one to foresee with considerable certainty that it might be possible to generate atomic energy at a price not perhaps as cheap as that of the cheapest hydro-electric power, but certainly at a price comparable with that of electricity generated from coal.

Dr. Bhabha enquired whether this referred only to natural hydro-electric power achieved without the construction of enormous dams. He wished to know how the price would compare with hydro-electric power generated from water storage achieved by the construction of large dams such as existed in certain places in India and are contemplated in the future. Prof. Joliot-Curie thought that it was a little early to be able to make such definite estimates of cost but considered that the price of atomic energy would in any case be comparable.

Prof. Joliot-Curie pointed out that atomic energy like energy from coal would be obtained from the using up of energy sources contained in the ground as for example uranium or coal, and were therefore capable of exhaustion in the long run. On the other hand hydro-electric power which essentially depended on the use of solar energy was inexhaustible as far as the human time scale was concerned. He thought the rapid extraction of fissile material from Uranium for the production of atomic weapons a wrong policy as it endangered the future of atomic power of atomic of the world. Prof. Joliot-Curie estimated that within five to ten years a central production plant for atomic energy with a uranium reactor would be possible. In France, about

twenty such centres would be necessary to double the present power production of France, each reactor generating about 200,000 kilowatts. The quantity of uranium required for all these centres would be about 4,000 tons but once this amount of uranium had been collected the annual replacement for the power production mentioned above would be extremely small, namely of the order of 30 tons of uranium per year (one kilogram of uranium liberates the same energy as roughly 3,000 tons of coal.) This would have important effects on the total amount of uranium required for a year's production whereas the amount of coal required for the same amount of energy would be enormously greater and imply a noticeable burden on the transport system.

The French Atomic Energy Commissariat expects to construct the first centre for generating 200,000 kilowatts in France within about seven years time. This would be an experimental centre and they would then be in a position to know whether the construction of further centres would be justified economically or not. Even if such centres were not justified economically in France they may well be justified in other countries, as for example India, where there are regions with no ready supplies of coal or hydro-electric power.

The other uses of such central reactors would be for producing artificial radio-active elements like plutonium from natural uranium or uranium 233 from thorium which could be in their turn be used for building reactors of smaller size. Such reactors could be built, for example, into ships and would completely alter the economics of shipping. The fuel which a ship would have to carry would be of an entirely negligible tonnage thus increasing the useful carrying capacity of a ship. Secondly, a ship would have to refuel but seldom.

Other uses of atomic energy would be for making radio-active tracer elements. These had a great role to play in research in chemistry, bio-chemistry, metallurgy and even in industry. As a rather romantic speculation for the future he mentioned that the high density of ionization produced by the absorption of the radiation emitted by a large quantity of radio-active substance could correspond to a temperature of some several tens of thousands of degrees and might enable unusual and new chemical compounds to be produced in chemistry.

Coming next to the question of atomic bombs he pointed out that their uses were not purely destructive but that they could be used for constructive purposes as for example in changing the geography of land in order to enable peaceful and beneficial projects to be realized. He gave the example of the possibility of removing small mountains and diverting the courses of rivers. To a question from Dr. Bhabha as to whether the atomic bomb had in fact been so used in Russia as reported in the papers, Prof. Joliot-Curie replied in the affirmative.

In conclusion, Prof. Joliot-Curie said that it was important that every great nation should take its place in developing and using atomic energy and not leave it to a few

highly industrialized nations to do it. In this way every country would be able to participate in developing new techniques and taking out patents which could then be exchanged against the patents of other countries. It seemed to him necessary that a country like India should make an important effort, despite its many other important occupations, to develop atomic energy in the country.

2. The policy of the Indian Atomic Energy Commission as contained in Appendix 'A' was then placed before Prof. Joliot-Curie and the Prime Minister enquired whether he had any observations to make about this general policy or about the scientific work in this connection which he had seen going on in various laboratories in India. Prof. Joliot-Curie said that he had visited the nuclear physics laboratories at Bombay and at Calcutta. His impression was that the laboratories at Bombay were organized on the right lines and had the necessary qualities required for successful work in atomic energy. This was not so at Calcutta. In particular, cleanliness and thoroughness was absolutely essential for research in nuclear physics and even more so in atomic energy and this he found lacking at Calcutta. Nevertheless, he had found young workers of good potential quality at Calcutta who might have done good research in another environment. They lacked good and proper direction by an expert on the subject. He had found that the method and spirit of work were on the proper lines at Bombay, in particular at the Tata Institute of Fundamental Research, and the people concerned were competent.

In his opinion the scale of operations in India is not yet large enough at present to develop atomic energy in a reasonably short time. Larger sums of money will be required to bring the effort up to the appropriate level.

Prof. Joliot-Curie said that he was strongly of the view that in countries like India or France where there was a great limitation of specialists, both scientists and technicians, it was necessary to establish only one centre for atomic energy and concentrate in it not only the most qualified scientists, but engineers with the requisite knowledge of chemical, mechanical and electrical techniques. This centre should have a character both scientific and industrial. After a time, when the requisite personnel had been developed in sufficient numbers and more scientific means were available, another centre could be established, and then several. But concentration at the beginning was absolutely essential if the effort was not to be frittered away and dissipated. In a rich country like the United States the problem is entirely different, An establishment for atomic energy should be independent of university laboratories since its character and purposes were different but there should be a close liaison between them. In particular one should continue to support fundamental research in the universities in the lines which were of interest to them.

3. Next Prof. Joliot-Curie proceeded to explain the organization of atomic energy development in France. The organization of atomic energy is determined by a special law which was passed for the purpose. In France the Atomic Energy Commissariat

works directly under the responsibility of the Prime Minister. The Commissariat has a High Commissioner who solely is responsible for the scientific, technical and industrial policy and work of the Commission while an Administrator General is responsible for the administration and the finances. The High Commissioner and the Administrator General work in close collaboration industrial and financial matters. As regards international questions concerning atomic energy and the law requires that the High Commissioner should be consulted for advice to Government and as regards financial matters the Administrator General also.

The purpose of having the Commissariat organized directly under the responsibility of the Prime Minister is that in this way the proper priorities can be given for its operations by the different ministries for obtaining materials, foreign exchange, etc., as also facilitates and even priorities for operations connected with industry both private and State owned. Its organization under the presidentship of the Prime Minister gives the Commissariat the prestige and importance necessary in order for it to accomplish its new and difficult task with rapidity. At this point the Prime Minister observed that the Prime Minister of a country may change from time to time and this may therefore produce a lack of continuity in the policy of the Commissariat. Prof. Joliot-Curie replied that since the Commissariat's inception he had worked under no less than seven Prime Ministers but that nevertheless the policy of the Commissariat had continued without change. This was because the objectives of the Commissariat were well defined and considered to be of great importance and utility for the country.

The French Atomic Energy Law itself makes explicit and special provision for a special financial procedure different from that obtaining in the other departments of Government. In the usual procedure the budget of each department is voted at the beginning of the year under each head separately and reallocation of monies from one head to another is not possible without very great difficulty. On the contrary, every year the Prime Minister, namely the President of the Commissariat of Atomic Energy, presents to the Assembly a total budget to be devoted for the development of atomic energy in the ensuing year. This sum is fixed on the basis of a report by the High Commissioner and the Administrator General after the Prime Minister has had discussions with them and with anyone else he chooses. Once this sum has been voted the Commission can spend it without further financial sanction and has the power of re-allocating sums from one head to another as the occasion may demand. The Committee of Financial Control, consisting of such personnel as may be decided upon by the Prime Minister and the Minister of Finance, then audits the expenditure of the Commission after it has taken place but not before, and submits each year a report on the finances of the Commission. Experience in France shows that this procedure in the case of atomic energy has resulted in the greatest possible speed of action and in the maximum economy, since delays of operation inevitably give rise to inefficiency and unnecessary expenditure.

4. The Prime Minister then asked Prof. Joliot-Curie in what form he thought cooperation between France and India was possible. Prof. Joliot-Curie said that in certain raw

materials, India had much greater means than the French Union and that we also had the scientists and the means for constructing atomic reactors.

He was strongly of the opinion that the thorium should be kept by India for her own use and not sold abroad on a commercial basis except in limited quantities in return for special concessions in the field of atomic energy. This applied equally to all materials of importance in atomic energy, such as uranium, beryllium, etc.

Prof. Joliot-Curie felt that France would be in a position to make available to India information on the purification of uranium in the form of oxide or metal for use in a reactor together with the details of plant design, operation, etc. If closer cooperation could be established then she could also make available the design details of a low power reactor or even a reactor of about a thousand kilowatts. This would effect an enormous saving in effort and time for India. In return, India might be able to give in exchange such materials as thorium and beryllium or even other materials unconnected with atomic energy which she might be in a position to export and which France required.

They could also establish close collaboration between the scientists of the two countries in the domain of atomic energy.

Any arrangements which might be formulated would have to be considered by the Atomic Energy Committee consisting of the Prime Minister of France, the High Commissioner for Atomic Energy and the Administrator General and the three other Commissioners before final ratification of the proposal. The agreement would have to be signed between the two Governments in the usual manner.

The Prime Minister asked the Indian Atomic Energy Commission to have a further meeting with Prof. Joliot-Curie to investigate the general lines along which cooperation could be established between India and France and to set up proposals again for his consideration.

This was all the business.

Jawaharlal Nehru

H.J. Bhabha

K.S. Krishnan

S.S. Bhatnagar

The above is a correct record of the views I expressed.

[signed by Joliot-Curie]

## APPENDIX 'A'

It was resolved at the first meeting of the Atomic Energy Commission held on the 20<sup>th</sup> August 1948 over which the Hon'ble Prime Minister, Jawaharlal Nehru, presided that the general policy of the Indian Atomic Energy Commission should be on the following lines:

- (1) With a view to its future industrial and economic importance for India steps should be taken to set up a small pile as soon as possible. This pile would be used for making radio-active tracer elements for biological, chemical and metallurgical research, for testing materials like graphite and beryllium which might be used in a larger pile, and for training scientific personnel.
- (2) The cyclotron in Calcutta should be made to work and be used for training people. Another small machine might possibly be bought later. Attempts to construct large machines should be postponed for the time being.
- (3) As regards fundamental work in physics the main support should be given to cosmic rays where energies are available for nuclear research beyond the capacity of any machine. On the biological and chemical side research should be fostered using tracer elements which would ultimately be made in the Indian pile.
- (4) Steps should be taken for processing monazite to thorium nitrate and ultimately to thorium metal, and also for extracting the uranium from the monazite. The possibilities of making heavy water, beryllium metal and pure graphite should be investigated.

### **Document 6**

#### **Minutes of a Secret Special Meeting of the Atomic Energy Commission, held on 17 January 1950 3pm, in the House of SS Bhatnagar, 4 York Place, New Delhi**

*Source: Institut Curie Archives, Paris, Carton F-86, CEA: Relations avec l'Inde (1948-50), Papers of Frédéric Joliot-Curie*

*Bibliothèque Nationale de France (BnF), 'avec l'aimable autorisation des ayants droits'*

## ATOMIC ENERGY COMMISSION

### GOVERNMENT OF INDIA

#### MINUTES

of a Special Meeting of the Atomic Energy Commission held at 3 p.m. on the 17<sup>th</sup> January, 1950, in the house of Dr. S.S. Bhatnagar, 4 York Place, New Delhi.



PRESENT: Dr. H.J. Bhabha, D.Sc., F.R.S (in the Chair)  
Dr. K.S. Krishnan, D.Sc., F.R.S.  
Dr. S.S. Bhanagar, O.B.E., D.Sc., F.R.S  
Prof. Joliot-Curie, High Commissioner for Atomic Energy in France

The purpose of the meeting was to explore the possibility of cooperation between India and France in the sphere of atomic energy. Opening the meeting, Dr. Bhabha said that the Indian Atomic Energy would be glad to hear the views of Prof. Joliot-Curie on the possibilities of collaboration in atomic energy between India and France.

Prof. Joliot-Curie said that collaboration could be of different of closeness and could be discussed in stages. The following were the general lines along which he could recommend collaboration between the two countries to his Committee.

On her side France could:

1.(a) Give all information about the process for the purification of uranium to the degree necessary for use in an a reactor, with complete designs and blueprints of the plant, and all technical information about its operation.

(b) Give all information concerning the method of making pastilles (billets) of uranium oxide  $UO_2$  suitable for use in an atomic reactor together with complete designs and blueprints of the plant including the ovens and all technical information about its operation. If desired, France could sell the ovens and other equipment necessary for this plant.

2.(a) Give all information about the process for the purification of uranium and the manufacture of pure uranium metal therefrom suitable for use in an atomic reactor with complete with complete designs and blueprints of the plant and all technical information about its operation.

(b) Give all information about the process for the production of the pure calcium required for the final stage of the process mentioned in (a) above, or supply the pure calcium necessary for the final stage of the process. Calcium of the required purity could be manufactured in India but it would involve a delay of between one and two years and it might be cheaper to buy the limited quantity of calcium required from France, at least at the beginning.

3. Undertake to purify in her own plants uranium compounds supplied by India and manufacture uranium into the form of pastilles or metal for use in an atomic reactor, as India might desire.

4.(a) Supply graphite of sufficient purity for use as a reflector on the outside of a reactor but not of sufficient purity for use as a moderator throughout the entire body of a reactor. The

graphite mentioned above is of sufficient purity for use as a moderator in the external part of a reactor but not in the central core.

(b) Give all information about the process for making graphite of the desired purity from oil or coke of suitable purity, together with complete designs and blueprints of the plant and all technical information about its operation.

The difference between (a) and (b) above is a little more important than in the case of calcium because the pure graphite is made in an industrial plant which already treats large quantities of graphite for industry and the Commissariat has erected its own plant therein at considerable expense. It would therefore be cheaper for India to buy the graphite at least at the beginning.

5. Test the purity of materials made in India for use in reactors such as uranium, graphite, heavy water, beryllium, aluminium, etc. In the absence of an atomic reactor such materials can only be tested by an elaborate diffusion experiment involving not less than several tons of the material. If the material is then found not to be sufficiently pure the entire quantity has to be rejected. With an atomic reactor the purity of a few pounds of the substance can be tested thus enabling a check on the purity of the material from the very beginning and avoiding large scale waste and unnecessary expenditure.

6. Provide aluminium for the structural parts of a reactor.

7. Give all design details, blueprints and specifications of reactors working on metal or oxide together with all the necessary physical and chemical information regarding the properties of the materials employed in the construction of a reactor. The information mentioned above would include physical information such as the capture cross-sections for neutrons of different energies, the number of neutrons emitted per fission, etc. and such chemical information as the limits of contamination allowed vis-à-vis different elements present as impurities.

8. Collaborate in geological prospecting and mining operations. Prof. Joliot-Curie's remarks on the French method of prospecting are contained in Appendix 'A'.

Prof. Joliot-Curie added that they could collaborate in training Indian workers in the prospecting of radio-active minerals in France or Africa. They could also give all the apparatus required for the prospecting, for nuclear measurements, etc., if India desired not to lose time in constructing such apparatus herself.

Prof. Joliot-Curie then added a few general remarks. He said that they could supply the Indian Atomic Energy Commission forthwith with one copy of the special publications of the Commissariat on problems connected with atomic energy. Unfortunately, not more than one copy could be supplied as the stock was very limited.

Prof. Joliot-Curie said that the Commissariat preferred to carry out its industrial operations with the help of and in the midst of existing industry as far as possible in order to avoid the

needless expense of duplicating plants. Special contracts were entered into with industry for the purpose. Such cooperation was in the interest of industry as well as of the Commissariat.

In return for some or all of the above assistance and cooperation, France would be interested to have from India in return:

1. Thorium either in the form salt or metal.  
The interest of the Commissariat in thorium is not an immediate one and it could be utilised in France only in about three years' time.
2. Beryllium
3. Uranium  
On the basis of present knowledge India will not be able to spare uranium for export but should intensive survey disclose large new sources of uranium then India might consider giving a small proportion to France on a quid pro quo basis. In this connection he mentioned that they had developed in France a process which allowed uranium to be extracted economically from an ore containing only 5 parts of uranium in 10,000
4. Mineral oil of animal origin sufficiently free from boron to make it suitable for the manufacture of graphite for a reactor.

Prof. Joliot-Curie felt that the amounts of any or all of the materials mentioned above could only be determined at a later stage after a more detailed discussion. He felt that the first step was for both France and India to agree to the principle of collaboration along the general lines mentioned above. If this principle is accepted by both countries then the Commissariat would send someone to discuss with the Indian Atomic Energy Commission the relative value of the exchange. Dr. Bhabha said that the Indian Atomic Energy Commission would recommend to the Prime Minister that the principle of such cooperation should be accepted.

This was all the business.

H.J. Bhabha (CHAIRMAN)

K.S. Krishnan

S.S. Bhatnagar

The above is a correct record of the statements I made at the meeting.

[signed by Joliot-Curie]

## APPENDIX 'A'

Prof. Joliot-Curie said that during three years they had made a great effort in France to develop specialists for geological prospecting. They had a special course where 20 to 40 young men were trained every year. They had come to the conclusion that the best method of prospecting was to form small self-contained teams each consisting of one geologist, three prospecting mineralogists, one scientist trained in simple physical and chemical measurements which could be made on the spot with portable equipment, and one topographer. Such teams could be sent to different parts of the world, as for example Africa, and could work in isolation for several months. The information supplied by all the teams is received at headquarters, which then chooses the most likely place for further drilling operations. The normal method is to make several deep holes about 1-2" in diameter and about 100-200 meters in depth and keep the slugs taken out in a box in rows for further examination. Besides this a Geiger-Muller counter could be let down into the hole so that the radio-activity at each depth could be recorded immediately on a graph.

### **Document 7**

#### **Secret envelope from Jules Guéron to Raoul Dautry containing résumé of discussions with Homi J. Bhabha in London, 2 July 1950**

*Source: Archives Nationales, Paris, 307 AP 225, 1950-1, Papers of Raoul Dautry*

#### ENTREVUE AVEC MONSIEUR BHABHA A LONDRES

2 Juillet 1950

#### A) Contrat

- 1) M. Bhabha accepte le contrat tel que je le lui ai présenté sous réserve des modifications suivantes:

Dédoublément de l'art. 9 et addition d'une phrase à l'usage des contrôleurs financiers de l'Inde. Ces modifications me paraissent raisonnables, et le texte deviendrait:

Art. 9. Le réacteur étant destiné à devenir la propriété de la Commission les dépenses engagées pour sa construction, sa mise en marche, et de façon générale pour la bonne fin du projet, seront soit supportée directement par la Commission, soit remboursées par elle selon les modalités prévues aux articles suivants.

Les méthodes d'évaluation, de comptabilité et de commande seront étudiées et établies par la Commission et le Commissariat avant le début d'exécution de l'étape B.

Art. 10. Chacune des parties supportera sans remboursement :

- les traitements et accessoires de son personnel supérieur ;
- les traitements et accessoires de son personnel affecté aux études
- les dépenses de matériel afférentes aux études poursuivies dans ses locaux

Toutes les numérotations doivent être modifiées en conséquence.

Art. 15. Au lieu de 'comité paritaire de gestion' lire 'comité paritaire'. En effet, la même phrase précise que la gestion appartient à la Commission, le comité étant consultatif.

- 2) Le texte anglais a été remanié de façon à améliorer la correspondance avec le texte français. Il est entendu que ce dernier fait foi pour l'instant.
- 3) Préambule. – Il n'est pas modifié, à l'exception de la dernière ligne du paragraphe ii qui, du superlatif, passe au comparatif.

## B) Commentaires

### 1) Article 7b

M. Bhabha craint des difficultés à ce sujet avec les services de son gouvernement, pour les deux raisons suivantes:

D'une part le projet ne prévoit pas le cas de résiliation par consentement mutuel.

D'autre part l'Inde a conclu avec les U.S. un contrat de fourniture de béryl qui comporte et le paiement du minerai et l'aide technique pour l'établissement du traitement chimique aux Indes.

### 2) Traitement de l'uranium pendant l'étape A

M. Bhabha est toujours tourmenté par le fait que l'uranium est exclu de l'étape A. Il désire que la collaboration technique s'étende à ce sujet le plus tôt possible. Il propose qu'elle s'instaure dès que la Commission enverra au Commissariat du minerai à

traiter. Devant son insistance, j'ai suggéré que cette solution, si elle est adoptée par M. Bhabha tient fort à cette partie de la collaboration.

### 3) Article 12.

M. Bhabha pose la question du sort de l'uranium équivalent au minerai fourni par la Commission avant l'expédition aux Indes du métal destiné au réacteur, et en particulier dans l'étape A (cf.ci-dessus).

Je lui fais remarquer qu'on ne saurait le travailler au-delà du lingot brut, tant que les plans définitifs ne sont pas fixes, et que les contrats de métallurgie ne sont pas passés.

Il suggère que les lingots bruts puissent être renvoyés aux Indes.

### C) Généralités

M. Bhabha a vu Sir John Cockcroft, et ne lui a pas parlé avec précision de nos projets.

1) Sir John lui a confirmé que les U.S. sont d'accord pour la declassification des petites piles, et que les Anglais espèrent, d'ici 8 à 10 mois, obtenir la declassification de tout ce qui concerne les réacteurs.

2) Sir John s'intéresserait aux réacteurs à béryllium, mais surtout pour la multiplication du combustible nucléaire à l'aide de neutrons de moyenne énergie.

3) Le prix de traitement de l'uranium en Angleterre, du produit courant au métal en forme, est de 5 à 10 le kg. M. Bhabha ne sait pas si ce prix est compte avant ou après la récente baisse annoncée par les Anglais dans le prix de revient de l'uranium.

### D) Liaison

Par lettre sous double enveloppe, adressée à la Commission de l'Energie Atomique, clairement marquée 'To be opened personally by Prof. Bhabha'. Nous pouvons acheminer ces lettres par valise française ou par celle des Indes. Celle-ci part 2 ou 3 fois par semaine.

M. Bhabha correspondra avec le C.E.A. par lettre acheminée (sans y être ouverte) par les soins de l'Ambassade de l'Inde à Paris.

J.G.

Art. 1 - La Commission et le Commissariat réaliseront en commun en deux étapes distinctes :

- A) Les études préliminaires à la construction d'un réacteur nucléaire de moyenne puissance (de 1.000 à 10.000 kW environ) utilisent le béryllium comme modérateur et l'uranium ordinaire comme matière fissile ; -
- B) La construction aux Indes d'un tel réacteur et son exploitation pendant une durée de cinq ans à dater de la date de sa mise en route telle qu'elle est définie à l'article 14 ci—dessous.

A cet effet, le Commissariat et la Commission collaboreront dans toutes recharges et opérations scientifiques ou techniques appropriées.

Art. 2 – Le présent accord pourra être résilié par l'une ou l'autre des parties à l'achèvement de l'étape A, telle qu'elle est définie à l'article 3 ci-dessous.

I – Etape A

Art. 3 – La première étape de l'accord sera réalisée en France. Elle comprendra :

- a) Les études et recherches nucléaires, expérimentales et théoriques, nécessaires pour choisir entre divers types possibles de réacteurs et pour en établir l'avant-projet, mis à l'exclusion des dessins d'exécution.
- b) Les recherches sur la préparation du béryllium métallique dans l'état physique et chimique convenable, ainsi que la fabrication de 10 tonnes de ce métal destinées aux expériences mentionnées au paragraphe précédent.

Art. 4 – Ces études seront dirigées par un Comité formé de représentants du Commissariat et de la Commission. Elles seront exécutées par des équipes comprenant du personnel des deux organismes.

Art. 5 – Toutes les données à la connaissance du Commissariat et nécessaires au projet seront apportées par lui au Comité à mesure que s'en fera sentir le besoin.

Art. 6 – Au cours de étape A :

- a) Chacune des parties supportera sans remboursement :
  - les traitements et accessoires de son personnel supérieure ;

- les traitements et accessoires de son personnel affecté aux études ;
  - les dépenses de matériel afférentes aux études poursuivies dans ses locaux
- b) le béryl nécessaire à la préparation de dix tonnes de béryllium métallique dans l'état physique et chimique convenable sera fourni par la Commission.
- c) les frais de traitement de ce béryl seront supportés par perte égale par la Commission et le Commissariat.
- d) l'uranium nécessaire aux expériences sera fourni par le Commissariat dans l'état physique et chimique convenable.

Art. 7 – Avant l'achèvement de l'étape A, le Commissariat et la Commission délibéreront et décideront si, oui ou non, ils passeront à l'étape B.

- a) s'il est décidé de passer à l'exécution de cette seconde étape, la Commission remboursera au Commissariat sa participation aux frais de préparation du béryllium métallique, celui-ci devant être expédié aux Indes afin d'être utilisé dans la construction du réacteur.
- b) si l'accord est résilié, les dix tonnes de béryllium métallique resteront en tout cas en la possession du Commissariat aux conditions suivantes :
- i. si l'accord est résilié à la demande de la Commission, le Commissariat deviendra seul propriétaire du béryllium métallique sans autre paiement à la Commission.
  - ii. Si l'accord est résilié à la demande du Commissariat, la Commission recevra, au cours mondial en vigueur, le prix du béryl fourni par elle et le Commissariat remboursera à la Commission sa participation aux frais de préparation du béryllium métallique.

## II – Etape B

Art. 8 – L'étape B comprend la préparation des plans d'exécution du réacteur et sa construction ainsi que son exploitation conformément aux stipulations des articles 14 et 15 ci-dessous.

Art. 9 – Au cours de l'étape B :



Le réacteur étant destiné à devenir la propriété de la Commission les dépenses engagées pour sa construction, sa mise en marche et, de façon générale, pour la bonne fin du projet, seront soit supportées directement par la Commission, soit remboursées par elle selon les modalités prévues aux articles suivants.

Toutefois, chacune des parties supportera sans remboursement :

- les traitements et accessoires de son personnel supérieur,
- les traitements et accessoires de son personnel affecté aux études,
- les dépenses de matériel afférentes aux études poursuivies dans ses locaux.

Art. 10 – Le béryl nécessaire au réacteur sera fourni par la Commission. Sa transformation en béryllium métallique, sous la forme physique et chimique convenable, sera réalisée en France sous la responsabilité du Commissariat agissant au nom de la Commission, et aux frais de celle-ci, jusqu'à ce que les établissements nécessaires soient en état de fonctionner aux Indes de façon satisfaisante. Le Commissariat s'emploiera à faciliter l'établissement aux Indes, par l'industrie française, de l'usine nécessaire, aussi rapidement que possible après que la Commission aura signifié sa décision de construire une telle usine.

Art. 11 – L'uranium nécessaire au réacteur, dans l'état chimique et physique convenable, sera à titre d'avance prélevé par le Commissariat sur ses stocks propres.

La Commission rendra au Commissariat une quantité d'uranium égale à celle qu'il lui aura avancée et utilisera à cette fin toutes ses ressources. Cet uranium sera fourni sous forme de minerais, de concentrés ou de composés de pureté courante. Un tiers au moins de la quantité en question sera livré au Commissariat avant l'expédition aux Indes de l'uranium destiné au réacteur.

Les frais afférents au traitement de l'uranium nécessaire incomberont à la Commission sans les conditions prévues à l'article 9 ci-dessus.

Toutefois, le Commissariat fera l'avance des frais occasionnés pour la purification et la mise en forme de l'uranium lorsque ces opérations seront poursuivies dans ses établissements propres.

La Commission recevra d'autre part toutes les informations nécessaires au traitement de l'uranium.

Art. 12 – Le graphite nécessaire au réflecteur sera fabriqué en France sous la responsabilité au Commissariat agissant au nom de la Commission et aux frais de celle-ci.

Art. 13 – A la date la mise en marche du réacteur, il sera procédé à l'apurement définitif des frais de l'entreprise commune. Les remboursements dus au Commissariat seront effectués dans les conditions qui seront fixées avant l'exécution de l'étape B.

Art. 14 – Le réacteur sera considéré comme étant en marche lorsqu'il aura fonctionné de façon continue à une puissance fixée d'avance en commun par le Commissariat et la Commission.

Pendant cinq ans après la date de la mise en marche, le réacteur sera géré par la Commission sur avis d'un comité paritaire de gestion composé de membres de la Commission et du Commissariat.

Pendant cette période, la Commissariat aura accès à toutes les données expérimentales et théoriques obtenues à l'aide de ce réacteur. Il pourra recevoir, s'il le désire et moyennant un juste prix, la moitié de tous les produits, sans exception, obtenus dans la marche du réacteur au cours de ces cinq années.

Art. 15 – Pendant cette même période, la Commission, sous réserve des obligations qu'elle assume déjà, donnera au Commissariat une option prioritaire pour que celui-ci puisse acheter aux Indes, en vue de son usage propre, le béryl nécessaire à la construction en France d'un réacteur sensible à celui qui fait l'objet du présent accord, ainsi que de toutes autres matières premières, nécessaires à l'obtention d'énergie atomique, déterminées d'un commun accord.

Art. 16 – Le présent accord pourra être révisé, par consentement mutuel, pour associer d'autres Etats à cette entreprise commune.

1 – 7 – 50.

**Document 8**

**Letter from UK Embassy in Paris to London on Franco-Indian agreement, 1951**

*Source: National Archives, Kew, AB16/565, Technical cooperation with India, 1947-54*

BRITISH EMBASSY,  
PARIS

SECRET

30<sup>TH</sup> October, 1951.

No. 492

Sir,

With reference to my dispatch No. 394 of the 24<sup>th</sup> August on the subject of Franco-Indian co-operation in atomic energy matters, I have the honour to report that a member of my staff had a recent conversation on this subject with M.J. Guéron, the Director of the French Atomic Energy Commission, who has been actively concerned in the preparation of the Agreement in question.

2. According to M. Guéron the Agreement covers two separate stages. The first is that of research, as indicated in the Note enclosed with my dispatch referred to. This will include nuclear physical studies and theoretical work on beryllium or its oxide as a moderator (calculations so far made suggest the use of Oxide) and treatment of beryl shipped from India. The second stage, which may never be reached, is the construction of a moderate-sized pile and its operation for five years under a joint committee formed of representatives of the French and Indian Atomic Energy Commissions.

3. During the first stage, the cost of research would be shared on an equal basis and cost each country about £250,000; the Indians will provide the beryl (equivalent of sixty tons of beryllium oxide) for treatment in France and return to India and the French will provide the necessary uranium.

4. During the second stage, if it should ever be reached, the Indians would bear the cost of planning and erecting the reactor and of the beryllium used. The French will contribute knowledge and experience of building a pile and will loan the uranium during the five year period, with the right during this period to half the products of all kinds of the reactor.

5. It would seem that the French have obtained an Agreement very favourable to themselves as they have found a way of sharing the cost of doing research on a subject of considerable interest to them. They also have entrée into India for the French firm of

Pechiney who will be treating the beryl for the French Atomic Energy Commission and they will for little cost get the full results of the first five years' operation of the pile if it is ever built. Finally, they will also have a supply of isotopes and other products from the pile (there will be very little plutonium as the pile is to be a small one).

6. For their part, the Indians will have the benefit of French experience and will have another country interested in their beryl which may help them in bargaining with the Americans, who already have some claim to their ore.

7. The Agreement specifically allows other countries to participate and British participation may therefore be possible to a limited extent, particularly in view of the discussions which have been held on the subject of beryllium between representatives of Pechiney and of Harwell. Nothing has been done yet to invite other countries to participate despite newspaper accounts to the contrary.

8. Discussions between India and France had lasted for about fifteen months but since the signing of the Agreement there have been no further meetings and no correspondence and the French are wondering when the Indians will send some beryl for treatment. No doubt this matter will advance soon as one of the chief Indians concerned is coming to Paris at the end of the month.

9. I am sending a copy of this dispatch (together with a copy of my dispatch No. 394) to the High Commissioner at Delhi.

I have the honour to be, with the highest respect,

Sir,

Your obedient Servant,  
(s) OLIVER HARVEY

## Document 9

### Letter from John D. Cockcroft to Homi J. Bhabha, 25 January 1952

Source: National Archives, Kew, File AB 16/565, *Technical co-operation with India, 1947-54*

25<sup>TH</sup> January, 1952.

My dear Bhabha,

I am afraid that owing to an unusual combination of circumstances I have delayed for a very long time in writing to you about co-operation in your reactor programme.

We feel here that since you have made satisfactory arrangements with the French Atomic Energy Project for carrying out exponential experiments with a beryllia moderated reactor, there would be no sense in duplicating these arrangements with ourselves, particularly since we are so heavily engaged at the present time. We would, however, be very much interested to be kept informed about the progress of these experiments and we would be very glad to assist by any advice or assistance you care to ask from time to time.

We are making arrangements to have a post graduate course on reactor technology in Britain probably at Imperial College. We should therefore be very glad to have any members of your staff who would like to attend such a course.

In the long term you are probably interested in the use of your thorium supplies in the power programme. This however cannot develop until such time as breeding reactors have come into operation.

We are at the present time beginning experimental work on such breeding reactors but we think that it will be three to four years before we have adequate experience to advise you on this question. We will however keep you informed about our programme.

Yours Sincerely,

Sgd. J.D. Cockcroft.

**Document 10**

**Secret letter from Roger Makins to Michael W. Perrin, 5 June 1951**

*Source: National Archives, Kew, AB16/565, Technical co-operation with India, 1947-54*

Foreign Office,  
S.W.1.

SECRET

5<sup>th</sup> June, 1951.

Dear Michael,

With reference to your letter to Harpham of the 17<sup>th</sup> May about Indian monazite, I enclose a copy of a further letter from Marten on the subject.

You will see that Pawley (who, according to the "Times", arrived in London yesterday) is on his way to New Delhi with Hamilton for the purpose of negotiating a deal whereby, in return for putting up a processing plant, the United States would get thorium and crude monazite.

The Americans (or at any rate Pawley) evidently think they can achieve results in spite of the linkup between the Indians and the French.

As regards Marten's paragraph 7, it is my understanding from our talk at the beginning of May that they Indians have already made an agreement with the French for the construction in India of a beryllium-moderated reactor. Cockcroft did mention, however, that Professor Bhabha had said the Indians were still prepared to make some similar arrangement with us and that Bhabha had been asked to indicate in writing what he had in mind. I wonder whether Cockcroft has heard any more from Bhabha and whether you or he think we should or could take any action at this stage to get in on atomic energy activities in India. At present, we seem to be running a bad third to the French and the Americans.

I am sending copies of this letter and of its enclosure to Cockcroft, Pritchard and Cliffe. Pritchard will no doubt wish to inform confidentially the United Kingdom High Commissioner in India of the background of Pawley's impending visit.

(signed) Roger Makins

Division of 9052  
Atomic Energy  
6 Jun 1951  
General Office

M.W. Perrin, Esq.,  
Ministry of Supply.

## Document 11

### **Information from the French Foreign Ministry to the UK Embassy in Paris on the Franco-Indian agreement**

*Source: Archives des Ministère des Affaires Etrangères, La Courneuve, AB16/565, Technical cooperation with India, 1947-54.*

MINISTRY OF FOREIGN AFFAIRS,

FRENCH REPUBLIC

Paris, 24<sup>th</sup> August, 1951

The Ministry of Foreign Affairs has the honour to inform the Embassy of the United Kingdom that the Atomic Energy Commissariat and the Indian Atomic Energy Commission have, since the publication of scientific information concerning the construction of nuclear reactors, examined and appreciated the advantages which would accrue from a common study of the problems presented by the use of beryllium as moderator in such a reactor.

The two organisations have reached an agreement to undertake jointly a programme which will cover the following points:-

Necessary experimental and technical nuclear studies and research into the possible types of reactor of moderate power using beryllium or its components as a delaying agent.

Research into the preparation of metallic beryllium and its components as a delaying agent.

Without excluding the possibility of a second programme, in the course of which the joint construction of a reactor will be undertaken, the contracting parties have recognised that such an undertaking constituted a problem, study of which could only be initiated at the end of the work envisaged in the agreement.

Embassy of the United Kingdom,

Paris.

## **Document 12**

**Letter from F.C. How to Roger Makins, 18 August 1951 expressing colonialist aspersion against Homi J. Bhabha**

*Source: National Archives, Kew, File AB16/565, Technical co-operation with India, 1947-54*

SECRET

18<sup>th</sup> August, 1951

Dear Makins,

Thank you for your letter of 3<sup>rd</sup> August about collaboration with India.

This situation seems to me to have got rather tangled and I should not like to take any overt action with the Indians until it has been thrashed out in the Official Committee, or at least at a meeting between the Foreign Office, C.R.O. and the Ministry of Supply at which Cockcroft could be present.

The proposals set out in Bhabha's letter seem to me to be extremely one-sided and to involve our giving far more than we are likely to receive. I put this point to Cockcroft, who seemed inclined to agree, but who said that we need not worry about the point, because the arrangements with the French and our participation in them would by-pass the proposals in Bhabha's letter so far as the period up to about 1954 was concerned.

Then at the Official Committee, as you will remember, Perrin said that it had been a guiding principle in the negotiations with Bhabha that we would not become entangled with the French. In these circumstances, I do not think it would be safe to make any move until we have got round a table.

/It should

Sir Roger Makins, K.C.M.G.,

Foreign Office,

LONDON, S.W.1.

[end of Page 1]

It should be possible to do this about the end of the month, and an Oriental should not regard a delay of less than three months in answering a letter as being abnormal! I do not think it was our delay in answering his earlier approaches which caused him to turn to the French, because it appears from Cockcroft's paper that Bhabha had made his arrangements with the French at a time when he was still amicably discussing possible similar arrangements with us.

I am sending a copy of this letter to Sykes of the Commonwealth Relations Office.

Yours Sincerely,

(Sgd.) F.C. HOW

### Document 13

***Le Monde* article "Nos voisins et les autres pays n'ont rien à craindre de l'Inde déclare Mme Gandhi," 28 May 1974**

*Source: Archives des Ministère des Affaires Etrangères, La Courneuve, Carton 2252, Questions atomiques : explosion indienne, 1973 – June 1980.*

### APRES L'ESSAI NUCLEAIRE INDIEN

Nos voisins et les autres pays n'ont rien à craindre de l'Inde

déclare Mme Gandhi

New-Delhi (A.P., U.P.I., A.F.P., Reuter) - Mme Indira Gandhi, premier ministre indien, a répondu samedi 25 mai aux accusations dont son pays fait l'objet depuis qu'il a procédé à sa première expérience nucléaire.

S'adressant à New-Delhi à une réunion destinée à célébrer « le jour de l'Afrique » Mme Gandhi a dit : « *Je voudrais assurer tous nos voisins et tous les autres pays qu'il n'y a rien à craindre de l'Inde.* »



Le premier ministre a encore déclaré: « *Faut-il admettre qu'il est très bien pour les riches d'utiliser l'énergie nucléaire en vue de la destruction, mais qu'il n'est pas bien qu'un pays pauvre cherche si cette énergie ne peut pas être utilisée pour la construction ?* »

« *Les connaissances de l'Inde dans le domaine nucléaire, a dit encore Mme Gandhi, ne se sont pas développées de façon soudaine ou en secret. Notre département de l'énergie atomique fonctionne depuis vingt-cinq ans. Il est difficile, en conséquence, pour nous de comprendre le toile qui s'est élevé contre quelque chose qui se développe depuis vingt-cinq ans.* »

Les félicitations du C.E.A.

Dans un éditorial intitulé « Une France arie » – un journal nationaliste de New-Delhi, *Motherland*, commente avec chaleur le télégramme envoyé par l'administrateur général du commissariat de l'énergie atomique française, M. André Giraud, à son homologue indien, M. H.N. Sethna, félicitant les hommes de science indiens d'avoir franchi un pas difficile vers la maîtrise des techniques nucléaires. Il conclut : « *Jusqu'à présent, nous avons eu peu de rapports avec la France. Avec la fin de l'ambiguïté du statut de l'Inde, tout cela pourrait changer.* »

A Tokyo, la Chambre haute du Parlement, suivant l'exemple de la Chambre basse, a adopté une résolution protestant contre la récente expérience nucléaire effectuée par l'Inde.

[Interrogé ce lundi 27 mai, l'administrateur général, du Commissariat à l'énergie atomique (C.E.A.) a confirmé l'envoi du télégramme de félicitations aux spécialistes indiens et nous a fait parvenir le commentaire suivant :

« On peut s'interroger sur la suite que connaîtra le programme atomique indien. Pour nous, la question n'était pas là. L'amitié entre la commission atomique indienne de l'énergie nucléaire et le C.E.A. remonte à la fin des années 40, époque où aucun organisme étranger à part elle n'acceptait de coopérer avec le C.E.A. Nous savons l'intérêt et la difficulté d'un essai souterrain comme celui que viennent d'effectuer les Indiens, car il s'agit d'une technologie délicate, que toutes les grandes puissances considèrent effectivement comme porteuse d'avenir dans le domaine civil. Le C.E.A. a donc félicité M. Sethna et ses collaborateurs pour leur maîtrise technique, comme il est fréquent de le faire entre organismes nucléaires amis en pareille circonstance, et avec d'autant plus de liberté que nous n'avons pas apporté la moindre contribution à l'obtention de ce résultat. Ne pas les faciliter serait revenu à mettre en doute l'objectif pacifique annoncé par le gouvernement indien, ce qui ne nous a pas paru souhaitable. » ]

**Document 14**

**Telegram from French Ambassador Jean-Daniel Jurgensen in New Delhi to the French Foreign Ministry in Paris dated 23 May 1974**

*Source: Archives des Ministère des Affaires Etrangères, La Courneuve, Carton 2252, Questions atomiques: explosion indienne, 1973- June 1980.*

NEW DELHI LE 23 MAI 1974.

COMMUNIQUE VIA LE DEPARTMENT

LONDRES 125/26, MOSCOU 127/28, N. YORK 161/62, PEKIN 112/13, WASHINGTON 154/55.

DIRECTEURS

A/S EXPLOSION NUCLEAIRE INDIENNE.

ON SE FELICITE A DELHI DE CONSTATER QUE LES REACTIONS MONDIALES EN PRESENCE DE L'EXPLOSION NUCLEAIRE DU 18 MAI SONT SOMME TOUTE MONDEREES, SAUF DANS CERTAINS CAS, TELS QUE LE CANADA ET L'AUSTRALIE.

ON SE REJOUIT PARTICULIEREMENT QUE LA FRANCE SE SOIT ABSTENUE DE TOUT JUGEMENT INAMICAL ET L'ON SE SOUVIENT QU'ELLE EST ELLE-MEME BIEN PLACEE POUR COMPRENDRE LA POSITION DE L'INDE DANS CE DOMAINE. SANS DOUTE LA PRESENTATION QUE FAIT LE GOUVERNEMENT INDIEN DE SON EXPERIENCE COMME ETANT DE NATURE 'EXCLUSIVEMENT PACIFIQUE' N'EST ELLE GUERE PRISE AU SERIEUX, MEME DANS CE PAYS. EN REVANCHE, IL EST EVIDENT QUE L'INDE A MONTRE A LA FOIS D'INTERESSANTES CAPACITES TECHNIQUES ET UNE GRANDE HABILETE POLITIQUE EN FAISANT SOUS TERRE SA PREMIERE EXPLOSION, CE QUI LAISSE PREVOIR QU'ELLE SERA SANS DOUTE LA SEULE PUISSANCE ATOMIQUE A N'AVOIR JAMAIS FAIT D'EXPERIENCE DANS L'ATMOSPHERE. LES FORCES PUISSANTES QUI DANS LE MONDE CRITIQUENT TOUT ACCROISSEMENT DE 'POLLUTION' NE SE SONT DONC PAS MOBILISEES CONTRE DELHI. IL Y A LA POUR CHACUN MATIERE A REFLEXION./.

JURGENSEN

**Document 15**

**Confidential note prepared for the Minister by Pierre Laurent, 27 May 1974**

Source: Archives des Ministère des Affaires Etrangères, La Courneuve, Carton 2253,  
Questions atomiques : explosion indienne, 1973 – June 1980

27 mai 1974

CONFIDENTIEL

Service des Affaires Scientifiques

NOTE POUR LE MINISTRE

A/s. Explosion nucléaire indienne.

L'Inde a procédé le 16 mai à une explosion nucléaire souterraine d'une puissance d'une dizaine de kilotonnes, soit la moitié environ de celle de la bombe d'Hiroshima.

1°) Il convient de faire au sujet des motifs et des moyens de cette explosion trois observations :

- la détermination du gouvernement indien de 'maintenir ouvertes toutes les options pour l'avenir' était de notoriété publique, comme les difficultés financières peuvent s'opposer à la réalisation d'un explosif nucléaire,
- la capacité de ses ingénieurs de maîtriser les techniques de l'explosif, de l'explosion et de leurs risques radioactifs pouvait difficilement être mise en doute.
- enfin il y a tout lieu de penser que le plutonium utilisé dans cette première explosion provient du retraitement chimique, dans une installation construite par les Indiens seuls, d'uranium libre d'emploi ayant été utilisé dans un réacteur expérimental d'une puissance de 50 mégawatts environ fourni par les Canadiens et en fonctionnement depuis 1961. Ce réacteur a été construit en vertu d'un accord de coopération datant de 1956 qui ne prévoyait pas de clause d'utilisation pacifique. Des dispositions bilatérales complémentaires, non publiées, conclues en 1960 ne limitaient vraisemblablement pas l'utilisation par ce réacteur des matières libres d'emploi, d'origine indienne selon toute probabilité.

La vigueur des réactions canadiennes à l'égard de l'Inde confirme, s'il en était besoin, que le plutonium utilisé provient d'uranium irradié dans le CIA (Canada India Reactor) puis retraité dans une installation purement indienne.

2°) Bien que nous n'ayons pas été mis en cause à l'occasion de l'explosion en question, il convient de s'interroger sur les conditions dans lesquelles pourra se poursuivre notre coopération nucléaire avec l'Inde et avec d'autres pays.

La coopération franco-indienne dans le domaine atomique est étroite et cordiale, ce depuis 1951, mais il ne semble pas que l'assistance que nous avons apportée à l'Inde depuis cette époque puisse être tenue comme ayant directement contribué à la mise en œuvre par les Indiens d'un programme d'explosions.

Sur le plan industriel, cette coopération pour significative qu'elle soit au point de vue technique, est très inférieure en volume à l'aide apportée par les États-Unis et le Canada qui ont construit ou construisent, suivant des formules variables de coopération, plusieurs centrales nucléaires en Inde, alors que nous n'en avons construit aucune. Comme ces deux pays, nous avons toutefois aidé l'Inde par des transferts de connaissance dans les multiples domaines ce qui lui a permis d'affecter à des opérations purement nationales des ressources qu'en l'absence de concours étrangers, elle aurait dû consacrer à des recherches et des applications industrielles purement civiles.

3°) À l'heure actuelle, notre principal projet de coopération avec l'Inde, en dehors de la fourniture déjà ancienne d'une usine d'eau lourde, sans lien direct avec la fabrication d'un explosif mais nécessaire pour faire fonctionner les réacteurs de la filière canadienne, consiste en la réalisation à Kalpakkam près de Madras, d'un réacteur expérimental à neutrons rapides basé sur les travaux français (Rhapsodie et Phenix) auxquels les Indiens ont pu accéder en vertu d'un accord entre le CEA et la Commission indienne conclu en 1969.

L'uranium enrichi destiné à ce réacteur sera fourni par la France suivant un contrat de vente déjà signé par les deux parties et actuellement soumis à l'Agence d'approvisionnement d'Euratom. D'autre part un accord gouvernemental a été récemment conclu par lequel l'Inde s'engage à utiliser exclusivement à des fins pacifiques l'uranium fourni (ainsi que ses sous-produits) et à permettre au gouvernement français de vérifier par un contrôle sur place que cet engagement est respecté.

En ce qui concerne ce projet sur lequel il ne paraît pas possible de revenir, il conviendrait de l'avis de la Direction générale des relations culturelles, scientifiques et techniques :

- de prescrire au CEA une application stricte des contrôles prévus par l'accord afin d'éviter tout détournement de matières et de signaler au Département toute infraction éventuelle.

- D'envisager, compte tenu de l'explosion nucléaire indienne, une démarche auprès du gouvernement de Delhi, tendant à obtenir des garanties supplémentaires en ce qui concerne l'utilisation dans le réacteur de Kalpakkam de matières autres que celles que nous fournissons. Faute d'obtenir de telles assurances nous ne pourrions écarter l'hypothèse de nous trouver dans quelques années dans la situation dans laquelle se trouvent les Canadiens aujourd'hui.

4°) En ce qui concerne la poursuite sur un plan plus général et à plus long terme de notre coopération avec l'Inde, la Direction générale des relations culturelles, scientifiques et techniques estime qu'il conviendrait :

- de prescrire au CEA d'exercer un contrôle strict sur l'accès des stagiaires indiennes a des stades sensibles d'acquisition des connaissances et bien entendu de n'effectuer aucun transfert de matières sans l'accord du Département qui devrait être informé également de tout projet de transfert d'équipements.
- d'examiner la possibilité de faire aavoir aux Indiens que nous souhaitons que toutes nos livraisons de matières et d'équipements soient soumises à l'avenir au contrôle de l'Agence Internationale de l'Energie Atomique. Il s'agirait de leur représenter que les conditions de contrôle que nous leur avons faites pour l'uranium enrichi de Kalpakkam doivent garder un caractère exceptionnel et que nous ne pourrions renouveler une telle opération en raison de notre politique a l'égard l'autres Etats que nous ne voulons pas voir invoquer le cas indien à titre de précédent.

5°) En effet, compte tenu des conséquences que ne peut manquer d'avoir l'explosion indienne sur les ambitions d'autres pays, la Direction générale des relations culurelles, scientifiques et techniques se demande si, pour ce qui est de certains pays sensibles, par exemple l'Egypte, la Libye, l'Arabie Saoudite, le Brésil, Israël, le Pakistan, qui n'est pas accede au TNP, il n'y a pas lien désormais de recourir de façon systématique aux contrôles de l'AIEA, tels qu'ils sont prouvés aàson statut et comme nous l'avons fait avec le Japon.

Les conditions nouvelles de nos relations avec les pays arabes en raison de la crise de l'énergie font en effet ressortir la nécessité d'un réexamen de notre politique dans ce domaine.

Le recours à l'Agence de Vienne aurait pour avantages :

- de nous donner une règle uniforme opposable à tous alors que le précédent indien s'il ne reste pas unique peut être invoqué par d'autres pays avec lesquels nous n'avons pas les mêmes relations qu'avec l'Inde.
- de nous décharger des aspects techniques et financiers des contrôles qui sont peu aisés à exercer de manière convaincante vis-à-vis de l'opinion internationale,

- de dégager notre responsabilité politique, sans pour autant modifier notre attitude de principe à l'égard du traité de non-prolifération, en nous permettant de nous comporter « exactement comme si nous l'avions signé », c'est-à-dire en conformité avec la déclaration du gouvernement français aux Nations Unies en 1968.

Telles sont les premières réflexions sur lesquelles la Direction générale des relations culturelles, scientifiques et techniques ne demande pas que le Ministre se prononce à ce stade, mais qu'elle souhaite voir examiner au cours d'une réunion qui pourrait avoir lieu très prochainement chez le Secrétaire Général avec les dirigeants du CEA./.

PIERRE LAURENT

#### **Document 16**

#### **Note on Indian foreign policy and Franco-Indian relations, 1 February 1955, Direction Asie Océanie, French Foreign Ministry**

*Source: Archives des Ministère des Affaires Etrangères, La Courneuve, Carton 65, Inde : Relations avec la France, 1944-72*

DIRECTION GENERALE DES  
AFFAIRES POLITIQUES  
ASIE OCEANIE

1 FEV. 1955

NOTE

a/s : Politique étrangère  
de l'Inde et relations  
franco-indiennes.

La conclusion de l'armistice en Indochine, le règlement de la question des Etablissements ouvrent des perspectives nouvelles aux relations franco-indiennes. La satisfaction avec laquelle le Premier Ministre indien a accepté l'invitation du Gouvernement français à s'arrêter à Paris au retour de la conférence du Commonwealth en témoigne. Les échanges de vues qui auront lieu à cette occasion présentent d'autant plus d'intérêt que différents indices permettent de penser qu'à l'heure actuelle la politique étrangère de l'Union Indienne est peut-être moins exactement définie qu'elle ne paraissait l'être il y a quelques mois.

En dépit de ses faiblesses flagrantes dans le domaine militaire comme sur le plan économique et financier, de l'absence de traditions politiques, difficultés entraînées par le partage de 1947 et qui ne sont pas encore résolues, l'Inde doit à son étendue, à l'énormité de sa population et au prestige de ses dirigeants de jouer un rôle important dans le monde et essentiel en Asie. Sa politique étrangère, inspirée et dirigée personnellement par le Premier Ministre, repose sur des données que celui-ci considère comme fondamentales. Dans ces limites elle peut toutefois subir des orientations différentes. L'attitude adoptée à l'égard des problèmes asiatiques par les puissances occidentales revêt, de ce point de vue, une importance non négligeable.

De son éducation anglaise, le Pandit NEHRU a certainement conservé une secrète préférence pour les conceptions occidentales ; la lutte qu'il a menée pour la libération de son pays, sa volonté de maintenir une indépendance qu'il sait vulnérable sont d'autre part à l'origine de deux principes qui sont pour lui des dogmes : le nationalisme et le neutralisme.

Nationaliste, le Premier Ministre se refuse à admettre la domination d'une race sur une autre. Tout ce qui porte la marque du 'colonialisme' lui est odieux. De sa volonté de libérer l'Inde de toute présence étrangère, si peu importante qu'elle soit en pratique, sa réticence à l'égard de la France aussi longtemps que n'a pas été réglée la question des Etablissements, son irritation contre le Portugal qui se refuse à céder ses territoires indiens ; de là aussi son hostilité à la présence française en Indochine, sa sympathie pour HO CHI MINH, pour les hommes d'Etat et pour les peuples asiatiques décidé à se libérer de toute influence occidentale son mépris pour ceux qu'il estime inféodés à des puissances étrangères. Son anticolonialisme ne se limite du reste pas à l'Asie ; il s'étend aux autres continents et surtout à l'Afrique, que ce soit l'Afrique du Nord ou l'Afrique Noire.

S'il a pour origine la fidélité aux thèses de Gandhi sur la non-violence et une horreur sincère de la guerre et de ses misères, le neutralisme de M. NEHRU est en fait inspiré surtout par des considérations d'ordre pratique : persuadé que toute participation à une guerre serait fatale à son pays, le Premier Ministre considère qu'une attitude de neutralité absolue est la seule qui réponde aux possibilités et aux intérêts de l'Inde comme à celui des autres pays asiatiques qui ne peuvent, sans péril pour leur indépendance, prendre parti entre le monde occidental et l'association de la Chine Populaire et de l'U.R.S.S.

Des préoccupations plus immédiates s'ajoutent aux considérations précédentes : le partage de 1947 est loin d'avoir réglé de façon définitive le problème indo-pakistanaï ; la

question du Cachemire en particulier reste toujours posée. Originaire de ce pays, M. NEHRU est décidé à le maintenir dans l'Union Indienne. L'incertitude ou il est des résultats du plébiscite demande par Karachi lui fait envisager avec répugnance une telle consultation ; il redoute par ailleurs un renforcement du Pakistan, que celui-ci soit aidé par les puissances occidentales ou qu'il réussisse dans son dessein de grouper autour de lui les nations musulmanes et plus particulièrement les nations musulmanes asiatiques ; il sait au surplus qu'un règlement de la question du Cachemire, défavorable à l'Inde, nuirait de façon irrémédiable au parti du Congrès dont il reste l'animateur sinon le chef et compromettrait ses chances de succès aux prochaines élections de 1956.

L'existence entre l'Inde et la Chine d'une frontière mal déterminée, l'activité du Gouvernement de Pékin retiennent aussi son attention ; il tient à préserver son pays du communisme qu'il juge incompatible avec les traditions indiennes et son propre idéal ; entre les deux pays se pose un problème analogue à celui qui existe entre l'U.R.S.S. et les puissances occidentales, le problème de coexistence entre des régimes politiques contraires ; cette coexistence, il l'envisage du reste comme devant conduire à une coopération dans certains domaines strictement limités, plutôt que comme l'établissement d'un *modus vivendi* entre deux isolements ; à son avis la Chine Populaire doit avoir sa place dans le concert des nations : son régime doit être reconnu par toutes les puissances, son entrée à l'O.N.U. est indispensable.

C'est en tenant compte de ces différentes données qu'il convient de voir – sous les angles qui nous intéressent plus particulièrement et en laissant de côté le rôle que M. NEHRU peut jouer dans le problème des relations générales entre l'Est et l'Ouest – l'évolution récente de la politique étrangère de l'Inde et d'examiner les perspectives qui s'ouvrent d'un développement des relations franco-indiennes.

M. NEHRU souhaite on l'a vu un aménagement des relations entre les puissances occidentales et la Chine populaire. Il est vraisemblable que la question sera examinée à Londres lors de la réunion des Premiers Ministres du Commonwealth.

Dans le courant de l'année 1954, l'Inde s'est attachée à clarifier ses rapports avec Pékin : par un traité signé au mois d'avril, elle a abandonné les privilèges hérités des Britanniques au Tibet, en échange de concessions minimales Britanniques au Tibet, en échange de concessions minimales pour ses commerçants et ses pèlerins ; mais en revanche, l'accord a défini les cinq principes destinés à servir de base aux relations sino-indiennes. Après que CHOU EN LAI se fait arrêté à Delhi, au mois de juillet, à son retour de la conférence de Genève, M. NEHRU s'est rendu à Pékin au mois d'octobre.

Il semble, d'après les indications fragmentaires que l'on possède, qu'il en soit revenu persuadé de la solidité du gouvernement actuel, impressionné par ses réalisations, mais incertain en ce qui concerne l'état d'esprit des dirigeants chinois, leurs buts finaux, et la possibilité pour l'Inde de fixer, en accord avec la Chine, une politique de consolidation de la paix en Asie sans appui, garantie ni chances d'ingérence de la part des puissances occidentales.



Interrogé au mois de septembre par M. SASTROAMIDJOJO, inquiet d'un partage d'influence qui laisserait l'Indonésie à la merci des entreprises chinoises, il s'est défendu d'envisager une telle éventualité. Il est certain malgré tout, que les manifestations du dynamisme chinois retiennent d'autant plus son attention qu'elles sont plus proches du territoire indien ; sa réaction lors de la publication récente de cartes de la Grande Chine englobant des portions de la Birmanie, des Etats situés au Nord de l'Inde et même du Cachemire, est de ce point de vue, caractéristique.

En ce qui concerne Formose par contre, il n'est pas douteux que les revendications chinoises ne lui apparaissent comme légitimes. Si, au cours de son voyage à Pékin, il a conseillé la modération et la patience à ses interlocuteurs, s'il s'est montré partisan de la formule du 'trusteeship', c'est qu'il craint qu'une attaque armée contre l'île ne dégénère en conflit international. Dans la crise actuelle il s'emploiera certainement à favoriser toute solution de compromis.

Il est probable qu'il abordera, au cours de son séjour à Paris le problème des rapports franco-chinois. Compte tenu des possibilités qu'il a de se faire entendre à Pékin, il sera utile de lui exposer notre politique chinoise <sup>(1)</sup>, de lui souligner qu'un développement des relations culturelles et économiques peut être envisagé, alors que la modification des relations politiques apparaît encore comme prématurée, et de lui indiquer que la France est disposée pour sa part à envisager un aménagement progressif des rapports de fait avec Pékin.

Le rôle joué par l'Inde à la tête des Commissions Internationales de Contrôle rend souhaitable une meilleure compréhension par le Gouvernement de Delhi de notre position en Indochine.

M. NEHRU a cru longtemps que l'indépendance accordée aux Etats Associés n'était destinée qu'à tromper les puissances sur les visées réelles de l'impérialisme français. De là son refus de reconnaître les Etats. La Conférence de Genève et les décisions qu'elle a prises l'ont maintenant convaincu de la signification réelle de notre politique. Au mois de novembre dernier, l'Inde a reconnu le Laos et la Cambodge. Elle s'est, jusqu'à présent, abstenue de reconnaître le Viêt Nam. En ce qui concerne ce dernier pays, il n'est pas douteux que les préférences de M. NEHRU vont à HO CHI MINH avec qui il a eu des entretiens à Hanoi au mois d'octobre, et qui l'a impressionné par son désintéressement et son patriotisme ; par contre, il dissimule à peine son mépris pour les dirigeants du Sud Vietnam.

Très réservé sinon hostile au maintien de la présence française en Indochine, il la juge toutefois moins dangereuse que la présence américaine qu'il craint de voir se développer et qui lui paraît redoutable.

Les initiatives prises par les Etats-Unis en Asie depuis un an ont, à n'en pas douter, renforcé ses appréhensions. Il suffit de rappeler la véhémence de sa réaction lorsque le

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(1) Voir note de la Direction d'Asie en date du 15 octobre

Gouvernement de Washington a décidé d'apporter son aide au Pakistan et lorsqu'il a encouragé la conclusion du traité turco-pakistanaï.

Cela explique son attitude à l'égard du Pacte de Manille. Partisan de la formule d'un Locarne asiatique mise en avant par M. EDEN, il a considéré l'accord comme une entreprise belliciste et colonialiste et sa rancœur a été encore avivée par la participation du Pakistan. A cet égard, il apparaît indispensable de lui rappeler les préoccupations qui ont présidé à l'élaboration du S.E.A.T.O. et de lui préciser que le but était, avant tout, d'assurer sur trois Etats d'Indochine une garantie que les accords de Genève ne comportaient qu'insuffisamment.

Le protocole annexe au Traite de Manille ne contient rien qui puisse être présenté ou même interprété comme une violation de la lettre ou de l'esprit des accords du 21 juillet. Il respecte, sans la moindre équivoque, les clauses de ces accords qui, a des degrés divers, interdisent au Vietnam, au Laos et au Cambodge, de participer à une alliance militaire. Ces états, en effet, ne sont pas parties au Traité. La protection qui leur est assurée est conférée de l'extérieur et, pour ainsi dire, passivement.

Il sera utile de souligner à M. NEHRU que la France ne voit dans le Traité de Manille qu'une entreprise strictement pacifique. L'accord ne menace personne, ne jette aucune exclusive : ses principes sont entièrement conformes aux buts visés par la Charte des Nations Unies.

La prochaine réunion de la conférence afro-asiatique a donné à M. NEHRU l'occasion de réaffirmer son attachement au maintien des liens avec le Commonwealth, partent, avec les puissances occidentales. Apres avoir souligné, au cours de l'interview qu'il a accordée au correspondant du TIMES a Delhi, le 11 janvier, qu'une invitation à l'Australie et à la Nouvelle-Zélande n'était pas définitivement exclue, il a reproché à l'O.N.U. une prédominance occidentale qui l'amène à traiter les problèmes asiatiques sous un angle européen et américain. Peu favorable à cette conférence, dont l'initiative revient au Premier Ministre d'Indonésie et dont le principe a été adopté au mois d'avril à Colombo, il craint visiblement un isolement indien devant les puissances musulmanes groupées autour du Pakistan.

Des réserves peuvent et doivent certes être faites sur l'attitude du Pandit NEHRU a l'égard de problèmes auxquels la France est intéressée au premier chef. En Afrique du Nord ses sympathies vont à nos adversaires, dont il facilite la propagande en Asie et dont il se fait l'avocat en toutes circonstances. Son anticolonialisme est à l'origine de cette attitude ; la crainte d'un groupement des puissances musulmanes sous l'égide du Pakistan l'y confirme.

Laposition indienne serait sans doute la même si M. NEHRU abandonnait le pouvoir. Or s'il n'était pas là pour diriger la politique indienne, on discerne malaisément ce que serait l'évolution d'un pays ou tant de problèmes restent à resoudre et ou aucune personnalité ne jouit d'assez de prestige pour lui succéder. L'Inde pourrait connaître une confusion qui faciliterait l'arrivée au pouvoir des communistes avec toutes ses conséquences sur les états voisins et sur l'Asie en général. L'intérêt des puissances occidentales est donc que NEHRU

este a la tête du Gouvernement indien et qu'il entretienne avec elles des rapports plus confiants et plus amicaux qu'auparavant ; son désir de ne pas rester seul en Asie en face du communisme facilite une telle évolution.

C'est ce qu'a compris la Grande-Bretagne depuis longtemps déjà et ce que les Etats-Unis sont actuellement, de leur côté, enclins, semble-t-il, à admettre.

Le litige relatif aux Etablissements français de l'Inde de du Sud était l'obstacle majeur à l'établissement de relations fructueuses entre la France et l'Inde. Cet obstacle a été levé et la voie est désormais ouverte. La détente apportée par le transfert 'de facto' de ces établissements, le 1er novembre dernier, permet en premier lieu aux deux pays d'examiner ensemble de grands problèmes internationaux.

Intéressée comme toutes les autres puissances au maintien de la paix en Asie, la France peut en particulier – si paradoxal que cela puisse paraître – trouver dans une coopération avec l'Inde un moyen d'assurer la défense de ses positions en Indochine : défense contre l'action du Vietminh, les entreprises chinoises indirectes ou non au Laos, parade à une emprise trop appuyée des Etats-Unis au Cambodge.

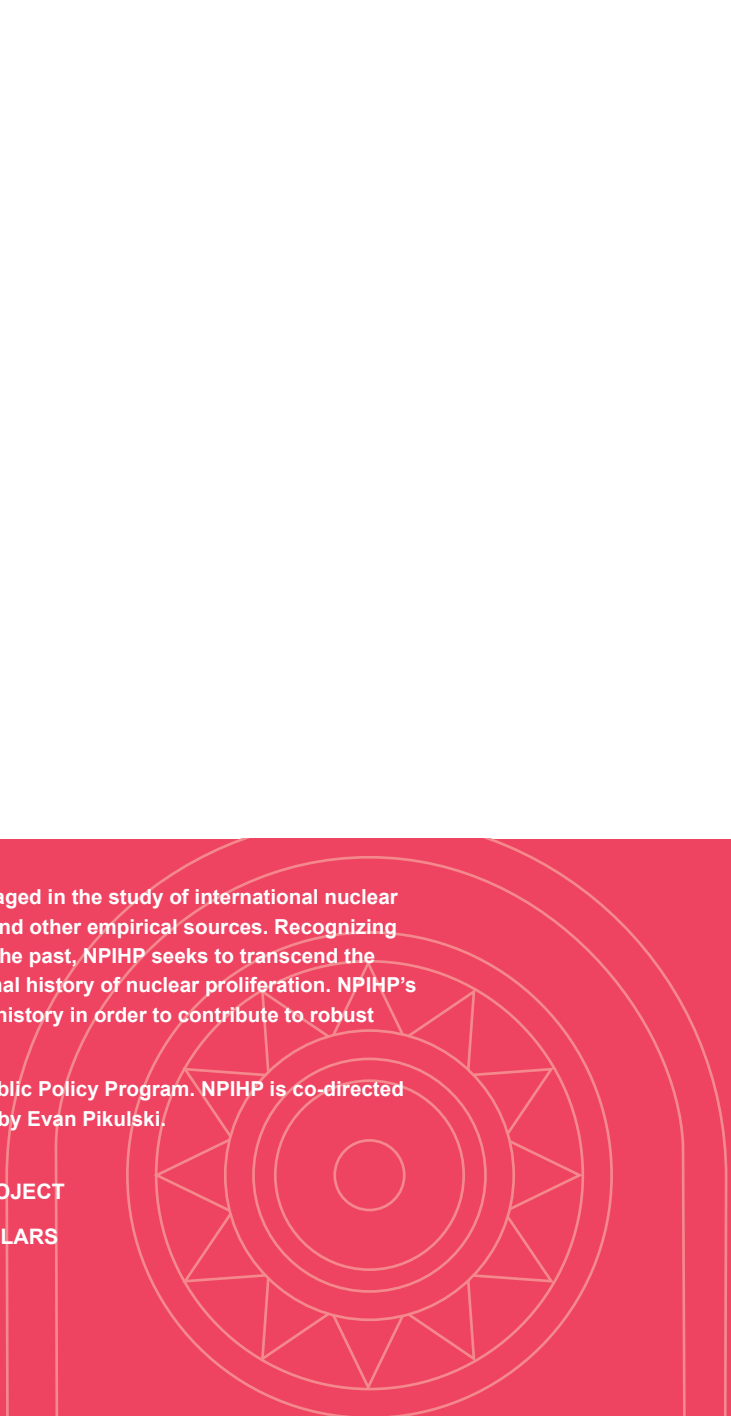

Le meilleur moyen d'y parvenir est de convaincre M. NEHRU de notre volonté d'appliquer strictement les Accords de Genève et surtout les clauses politiques de la déclaration finale. Au cours d'un entretien récent, M. DESAI, Président est ouvert au General ELY, en exprimant le désir que des apaisements soient donnés, sur ce point, par une très haute personnalité politique française.

Il importe évidemment que M. NEHRU accepte de s'employer, de son côté, à faire respecter ces accords et comprennent que l'aide ouvertement donnée par le Vietminh au Pathet-Lao constitue une violation flagrante de l'armistice, susceptible des plus redoutables conséquences. Son séjour à Paris, où il vient pour la première fois à titre officiel, pourra être mis à profit à cet égard, le 15 février prochain.

L'occasion sera en même temps donnée de discuter des problèmes particuliers intéressant les deux pays : le plus important est la négociation du traité de cession 'de jure' des Etablissements ; ce traité, dont la conclusion a été formellement prévue et qui sera soumis à la ratification des deux parlements, mettra fin à une situation provisoire que nous n'avons d'ailleurs pas intérêt à voir durer trop longtemps ; les autres questions susceptibles d'être examinées sont l'extension des relations économiques franco-indiennes, la fixation sur de nouvelles bases des conditions d'établissement de ressortissants français dans l'Union Indienne, enfin le développement de notre action culturelle dans ce pays.

De ce dernier point de vue, des perspectives sont ouvertes par l'intention du Gouvernement français de demander son admission au Plan de Colombo. Nous pouvons compter, en franco-indien du 21 octobre 1954 nous permettra d'ailleurs d'apporter une contribution effective à ce plan, par l'installation à Pondichéry d'un établissement technique, dont les élèves, formés à nos disciplines, seraient mis à la disposition des pays membres.

On peut dire que le caractère nouveau ainsi donné aux relations franco-indiennes, trop longtemps assombries, contribué au maintien du rôle joué par la France en Asie et au renforcement utile des liens entre ce continent et le monde occidental.



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