

TARAPUR

A BRIEF FOR THE UNITED STATES

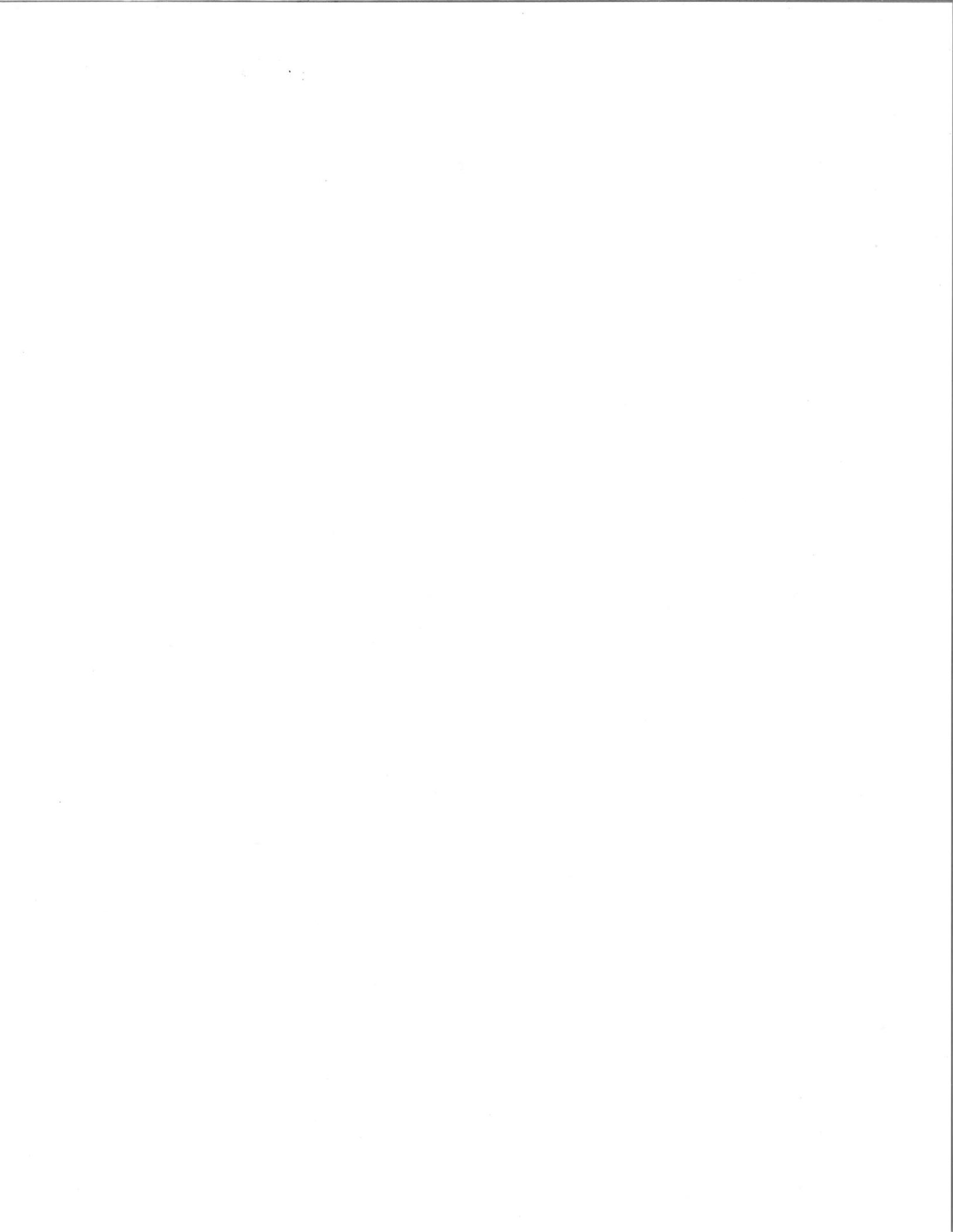
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Note: The information contained in this report and the conclusions of the author do not necessarily reflect the views of the United States Government.



SUMMARY

India has received reactors and reactor fuel from the United States through an Agreement for Cooperation. Those reactors (at Tarapur, near Bombay) have produced spent fuel from which India wishes to extract plutonium, a nuclear explosive. India contends that it has the right to do so, and that nine years from now (in 1993), when the fuel supply under the Agreement ends, it will have the right to use that plutonium for any purpose it wishes, including weapons. Despite India's contention, the United States has the right to prevent the plutonium from being extracted. Also, despite India's contention, India will have no such right in 1993 as it asserts, and India's repudiation of its obligation in 1993 is a present breach of the Agreement for Cooperation. Because of this breach, the United States can suspend, through France, its delegee, fuel deliveries under the Agreement until India assures the United States that India will perform its obligations. If India does not provide these assurances, the United States can terminate the Agreement, accelerate the AID loan on Tarapur, and if India does not pay the balance due, accelerate the principal of all past AID loans to India and suspend disbursements on all current AID loans to India. Because the United States will lose, by 1993, the remedy of suspending fuel deliveries, the United States should act now. If the United States does not act, plutonium made from fuel shipped to Tarapur in the late 1980's will, under India's view, be free of all restrictions as soon as it leaves the Tarapur reactors.

This is a study of the nuclear trade relations between the United States and India. Those relations were changed drastically on May 18, 1974 when India became the first country in the world to explode an atomic bomb made from a civilian nuclear energy program. India made the bomb with plutonium formed in a Canadian reactor¹ moderated in part by heavy water from the United States.² India had promised to use the reactor and its heavy water for only "peaceful purposes,"³ but India contended that its bomb was a "peaceful nuclear device." When India clung to that view Canada severed nuclear trade relations. The United States, however, continued to supply enriched uranium to fuel two reactors at Tarapur, near Bombay, which the United States had furnished to India in the 1960's. The Indian blast, and the mild reaction of the United States, provoked indignation in Congress, and by 1980 Congress had made it illegal⁴ for the United States to continue to supply fuel to Tarapur unless India would open all of its nuclear program to international inspection.⁵ When India refused, the United States asked France to take over the fuel supply to Tarapur, which France agreed to do. The French are now scheduled to supply Tarapur until 1993, when the United States supply contract ends.⁶

The United States no longer exports fuel or reactors to India. But the effects of the previous exports still remain. The Tarapur reactors have discharged enough spent fuel to produce about 1000 kilograms of plutonium,⁷ which is a nuclear explosive. By 1993, they will have discharged about 2000 kilograms.⁸ Only about 10 kilograms of plutonium are needed to make a

nuclear weapon with a yield equal to the one dropped on Nagasaki, Japan.⁹ So far, the plutonium from Tarapur is not in a form which can be used for weapons; it is still embedded in Tarapur's spent reactor fuel. In order for plutonium to be useful -- either for weapons or as fuel to drive additional reactors -- it must be separated from spent fuel by what is known as "reprocessing." This consists of dissolving the spent fuel in a chemical solution and then extracting the plutonium, which emerges from the solution in essentially pure form. The plutonium can be used to make a bomb, or additional reactor fuel. Under the Agreement for Cooperation between the United States and India, Tarapur fuel cannot be reprocessed without United States consent. The question now is whether the United States should give that consent.

The question of reprocessing is only one of the questions posed by the Tarapur reactors. Another is whether the United States will have any further rights after the fuel supply ends in 1993. India says that all rights end when the fuel supply ends. The United States, however, contends that India's pledge of peaceful use for U.S.-supplied materials, and India's agreement to international inspection of U.S.-supplied materials and equipment, are independent of the fuel supply, and extend beyond 1993. A further question is what the United States should or could do if India were to reprocess the Tarapur fuel without United States consent, or were to detonate another "peaceful nuclear device," or deploy a nuclear weapon. The fact that the French have taken over the fuel supply complicates these questions.

This study will discuss each of these questions fully. It will also set forth the strongest position which the United States could realistically take on each of them.

I. REPROCESSING: SHOULD THE UNITED STATES CONSENT?

Reprocessing is probably the most pressing of the questions listed. India wants to reprocess now, but the United States withholds consent. Reprocessing poses a number of issues, but the main one is whether separated Tarapur plutonium carries a real proliferation risk; that is, whether it is realistic to think that India might use that plutonium in a weapons program. Does India -- or will India ever -- need to make weapons from Tarapur plutonium? Does India have -- or will it soon have -- other plutonium which is better suited to bombs, and free of legal restraints?

a. Tarapur fuel: The proliferation risk

India has commissioned five power reactors. They are Tarapur 1 and 2, Rajasthan Atomic Power Plant (RAPP) 1 and 2, and Madras Atomic Power Plant (MAPP) 1.⁹ The RAPP and MAPP reactors are heavy water reactors of Canadian design (called CANDU). The Tarapur reactors, which are of United States design, went critical in 1969, and, as stated above, have produced about 1000 kilograms of plutonium, which is still contained in their spent fuel. By 1993, they will have produced about 2000 kilograms. The RAPP reactors have produced about 840 kilograms of plutonium in spent fuel so far, and will produce about 2,000 kilograms by 1993.¹⁰ The figures for 1993 assume normal operation.¹¹ The MAPP reactor went into commercial operation in January of 1984,¹² and produces about 70 kilograms of plutonium per year.¹³ All the power reactors except MAPP are legally restricted to peaceful use and covered by the system of international inspection administered by the International Atomic Energy Agency.¹⁴

The RAPP and MAPP reactors use a design which makes it possible to replace the fuel assemblies one at a time (known as continuous refueling). This allows the reactor operator to vary the amount of irradiation each assembly receives by leaving it in the reactor for a longer or shorter period. If an assembly is taken out after a short period it receives only a small amount of irradiation (called "burnup"). The amount of burnup determines the isotopes of plutonium which are formed in the spent fuel. The isotopes of plutonium, in turn, affect the suitability of the plutonium for weapons. Plutonium 239 and 241 are desirable for simple weapons; plutonium 240 is not. "Weapons grade" plutonium is generally defined as plutonium containing less than 7% Pu 240 and about 93% Pu 239. At low burnup, "weapons grade" plutonium is produced in light water reactor fuel.¹⁵ As the burnup increases, so does the concentration of Pu 240. This isotope lowers the explosive yield of a weapon because it "pre-initiates" the nuclear fission chain reaction; that is, it spontaneously emits neutrons that cause the reaction to begin before the optimum moment. If the RAPP and MAPP reactors are operated so as to get the maximum amount of electricity out of each fuel assembly, the burnup will be fairly high and so will the concentration of Pu 240 (over 20%).¹⁶ But because individual assemblies can be removed with low burnup, and because the reactors can be operated at low efficiency, one can achieve "weapons grade" isotopes. The Tarapur reactors are boiling water reactors which cannot be refueled continuously. They are refueled by removing about 1/3 of the core at once, and they produce, in normal operation, plutonium which contains over 20% Pu 240.¹⁷ However, Tarapur has been operated at less than normal capacity, and hence lower burnup, for several years.¹⁸ So has RAPP-1.¹⁹ The result is that low burnup spent fuel has been discharged from both Tarapur and RAPP-1. Moreover, simple weapons can be

produced even from "reactor grade" plutonium; that is, plutonium with more than 19% Pu 240. The United States has tested a weapon made with such plutonium. Reactor grade plutonium has a fast critical mass of about 20 kilograms.²⁰ From this discussion, one can see that weapons could be made from the spent fuel discharged from any of the Indian power reactors.

India also has five research reactors,²¹ of which three are important. The 40 megawatt (thermal) CIRUS reactor went critical in July of 1960, and began routine operation in 1964.²² It produces about 9 kilograms of plutonium per year, and by 1984 will have produced about 180 kilograms.²³ It is not covered by IAEA safeguards, but is restricted to peaceful use.²⁴ CIRUS made the plutonium for India's explosion in May of 1974. The second important research reactor is the R-5, rated at 100 megawatts (thermal). It will produce about 23 kg. of plutonium per year²⁵ beginning in 1985, if it comes on line. Finally, there is the Fast Breeder Test Reactor (FBTR) at Kalpakkam, which is not yet operating. Neither the R-5 nor the FBTR is subject to IAEA safeguards, or restricted to peaceful use. These eight reactors are India's only sources of plutonium.

From the above, it appears that India does not now have any separated plutonium from which it would be legal to make a weapon. CIRUS plutonium is restricted to peaceful use; the plutonium from Tarapur and RAPP is similarly restricted and is safeguarded as well. By "safeguarded," one means that the reactor and/or its fuel is subject to the system of inspection and accounting conducted by the International Atomic Energy Agency. This system is discussed further below. Only the MAPP plutonium is unrestricted (that is, free of safeguards and a pledge of peaceful use), but that plutonium will not be available in separated form until spent fuel from MAPP is discharged and reprocessed. This situation is quite different from the one the State

Department predicted in 1976.²⁶

The peaceful use restriction on CIRUS requires a few additional words. At the time of the explosion in 1974, the State Department cited an estimate by the Energy Research and Development Administration that heavy water in CIRUS is lost at a rate of 10% per year. This, according to State, meant that the 20 tons heavy water supplied by the United States to start the reactor's operation in 1960 would have been totally replaced by 1970 -- four years before the explosion.²⁷ State's position was apparently based upon a misunderstanding of reactor operation. A certain percentage of a reactor's heavy water degrades each year, and that figure could reach 10% for power reactors, but for research reactors such as CIRUS, where the heavy water is used only as a moderator and not a coolant, no more than about .3% would theoretically be lost.²⁸ State also said that U.S.-supplied heavy water was commingled in India with domestic Indian heavy water, and was commingled in CIRUS. However, State admitted that U.S. heavy water was part of the CIRUS inventory before the 1974 explosion, and was about 30 percent of India's total heavy water inventory by the end of 1970.²⁹ Based on all this, State concluded that there was no way to establish conclusively the origin of the heavy water present in CIRUS when CIRUS made the plutonium used in India's explosion.³⁰ At the time, the State Department even suggested³¹ that India had the right to "substitute" indigenously-produced heavy water for U.S.-supplied heavy water under the substitution clause (Art. VI C.) of the Agreement for Cooperation. This would have allowed India, through a bookkeeping transaction, to treat the heavy water in CIRUS as all Indian, and to consider the U.S. supplied heavy water as being elsewhere. This latter suggestion is clearly wrong. The 1963 Agreement for Cooperation is expressly limited to the Tarapur reactors; the substitution clause in that Agreement

does not apply to any other material or facility. It does not extend to the heavy water for CIRUS. Also, the 1956 Agreement on heavy water for CIRUS did not contain a substitution clause. Substitution is a very particular right; it must be granted by express language and cannot be implied. From these facts, it follows that there is no right to use the U.S.-supplied heavy water for other than peaceful purposes.

There remains the definition of "peaceful use." India says its explosion in 1974 was "peaceful." Under that view, India could continue to use CIRUS plutonium for explosive tests. It could also refine the plutonium into metal, place it in an explosive device, store the device, and not break its word until the device killed someone in battle. The Canadians have never accepted this interpretation, and neither has the United States.³² Unfortunately, the Indian interpretation has some historical support. At the time when the Agreement for Cooperation was signed in 1963, the United States was conducting peaceful nuclear explosions in its "Plowshare" program. That program did not exist in 1956, when the heavy water contract was signed, but by the 1960's Plowshare was well underway. For example, on October 11, 1963, two weeks before the Agreement was signed, the United States detonated an explosion in Nevada to test the use of "clean" nuclear explosives for excavation.³³ In 1964, Plowshare set off ten peaceful explosions.³⁴ The United States continued to set off peaceful nuclear explosions in Plowshare until 1973.³⁵ In 1968, when the Treaty on the Non-Proliferation of Nuclear Weapons³⁶ was promulgated, Article V provided that nuclear weapons states would share with non-nuclear weapons states the "potential benefits from any peaceful application of nuclear explosions. . . ." Thus, it is difficult to contend that India is without support in defining a nuclear explosion as peaceful. The best that can be said is that the United States told India, before India

set off its bomb, that the United States would not consider an explosion by India to be peaceful.³⁷ Of course, India did not agree.³⁸

In addition to its guarantee of peaceful use to the United States for the heavy water, India also gave Canada a guarantee of peaceful use for the CIRUS reactor.³⁹ Canada ended nuclear cooperation with India because of the explosion in 1974. But that did not put Canada in breach of its CIRUS agreement, or excuse India from performing that agreement. In view of India's action, Canada was entitled to suspend its performance until India gave assurances that India would not engage in a weapons program. This point is developed further below. The result is that some of the plutonium produced by CIRUS is covered by a peaceful use pledge to the United States (if, for example, 2/3 of the heavy water in CIRUS were U.S.-supplied, 2/3 of the plutonium would be covered by peaceful use) and all of the plutonium is covered by a similar pledge to Canada. However, there are no safeguards on CIRUS. So there is no official way to know what CIRUS plutonium is being used for. When, for example, India begins to reprocess spent fuel from MAPP-1, the United States will have only India's word that plutonium said to be from MAPP-1 (and therefore unrestricted) is not really plutonium from CIRUS.

So the result is that India has no unrestricted plutonium now. Until MAPP plutonium is separated, it will be awkward, as well as illegal, for India to deploy a nuclear weapon.⁴⁰ But how much unrestricted plutonium will India have in the future? The answer depends upon India's heavy water production. India has not yet been able to produce enough heavy water to meet its needs. Each of the RAPP reactors requires 250 tons of heavy water to begin operation; MAPP-1 requires the same.⁴¹ In addition, each of these reactors can require up to 25 tons of heavy water per year to replenish operating losses.⁴² Despite an installed capacity of over 300 tons, India

produced only 39 tons of heavy water in fiscal year 1982.⁴³ In order to start MAPP-1 without imported heavy water, India was forced to wait until late 1983, when it finally accumulated enough domestic heavy water.⁴⁴ Having scraped the bottom of the heavy water barrel to start MAPP-1, India begins 1984 with essentially no reserve of domestic heavy water, and an annual requirement which could reach 75 tons to keep its three CANDU reactors running. With a domestic annual production in the range of only 40 tons, how will India do it? The shutdown of RAPP-1, which is suffering from serious heavy water leaks,⁴⁵ relieves some of the pressure. As long as RAPP-1 remains shut down, only the 50 tons for RAPP-2 and MAPP-1 will be required annually. But that is still more than the 40 tons of domestic production, so India will need imports. India has been importing heavy water from the Soviets, and probably will continue to do so. It has imported about 550 metric tons so far.⁴⁶ Soviet heavy water carries strict safeguards, however, and plutonium made with Soviet heavy water carries pursuit and perpetuity restrictions. To keep plutonium from MAPP-1 free of safeguards, India will be forced to meet MAPP-1's annual requirements with domestic heavy water, and meet RAPP-2's annual requirements with Soviet heavy water (RAPP-2 is already safeguarded). If India can produce 25 tons of heavy water per year, MAPP-1 can be kept running free of safeguards. But, how can India start up the R-5 in 1985? The R-5 is rated at 100 megawatts (thermal). The CIRUS reactor, which is similar to the R-5, is rated at 40 megawatts (thermal). If R-5's heavy water requirement is proportional to its rating, it will require an initial charge of about 50 tons. India will not be able to accumulate anything near that amount by 1985 at the current production rate. It may never be able to accumulate that amount. If India wants to operate R-5 fairly soon (say, before 1993) it will have to be with imported heavy water.

Thus, India must make choices: Either it can import more heavy water, make more electricity, and accept more safeguards, or import less heavy water, make less electricity, and accept fewer safeguards. For example, India could use imported water to replace the heavy water in MAPP-1. This would put MAPP-1 under safeguards, but free the heavy water from MAPP-1 for transfer to R5, keeping R-5 free of safeguards. If MAPP-1 heavy water were shifted to R-5 in 1985, R-5 would produce about 180 kilograms of unrestricted plutonium by 1993.⁴⁷ If R-5 is not started, and domestic heavy water production can keep MAPP-1 running, and a portion (say 30%) of the MAPP-1 schedule is dedicated to "weapons grade" plutonium, MAPP-1 could produce about 180 kilograms of such plutonium for unrestricted use by 1993.⁴⁸ If a greater percentage of the MAPP schedule were devoted to weapons, the amount of weapons grade plutonium would be greater. Finally, India could shut down CIRUS and shift its heavy water to R-5. This would mean 23 kilograms of plutonium per year from R-5 instead of 9 kilograms from CIRUS, but would raise the question of a peaceful use restriction on R-5 because U.S.-supplied heavy water may still remain in CIRUS.

From the above, one concludes that India could produce about 180 kilograms of unrestricted "weapons grade" plutonium by 1993, either from R-5 or MAPP-1. This would be true unless India's imports of heavy water increase greatly, either to bring more plants on line, or to compensate for losses in domestic heavy water production. If there were such an increase, MAPP-1 or R-5 or both could come under safeguards, and the amount of unrestricted plutonium could be much smaller than 180 kilograms.

How does this affect Tarapur? Does it mean that plutonium from Tarapur is irrelevant? Do Tarapur's unfavorable isotopes disqualify it from serious consideration? The answer is "no."

As stated above, Tarapur has been operated at less than normal capacity for several years. This lower capacity could produce a lower "burnup" of the fuel and a lower percentage of undesirable isotopes. Also, many of Tarapur's fuel bundles have ruptured (97% as of 1977),⁴⁹ which can require their removal after little irradiation. Further, there is variation in burnup within the core due to design factors.⁵⁰ The result is that the Tarapur spent fuel inventory probably contains fuel bundles and individual rods with "weapons grade" plutonium. At a burnup of 8,000-10,000 MWD/MT, which was average up to 1977, the plutonium would be 85-90% free of undesirable isotopes.⁵¹ If the Indians grouped the lightly irradiated bundles or rods for separate reprocessing, they could achieve a degree of purity of at least 90%. Thus, one must add some additional number of weapons grade kilograms to those mentioned above. If only 10% of the 2,000 kilograms of plutonium produced by 1993 were lightly irradiated, that would make 200 more kilograms of weapons grade plutonium available in 1993, a significant number indeed. Since India contends that all controls over Tarapur end in 1993, this plutonium would be available for weapons.

India is also interested in breeders. It would like to bring the FBTR on line soon. The FBTR might use CIRUS or RAPP plutonium for the first core.⁵² It might use CIRUS, RAPP, or MAPP-1 plutonium for succeeding cores. If MAPP plutonium is used for weapons, RAPP plutonium may have to be used for the FBTR, which will mean that the "supergrade" plutonium made in the breeder's blanket (97% free of undesirable isotopes)⁵³ will be safeguarded because of pursuit. India may prefer to avoid such a result. Will India therefore wish to use Tarapur plutonium to fuel the FBTR? Could it do so legally? First, there is India's promise (made in 1974, after the explosion) to devote Tarapur fuel "exclusively to the needs of . . . [the Tarapur]

Station."⁵⁴ The FBTR does not fit this formula. Second, Tarapur fuel is subject to a peaceful use restriction,⁵⁵ which means that plutonium made by a Tarapur-fueled FBTR would also carry a peaceful use restriction. This point is developed in the next paragraph in connection with the CIRUS reactor. Given this, the only advantage from Tarapur plutonium would be the possible absence of a perpetuity restraint. This restraint means that equipment and materials carry safeguards indefinitely (in perpetuity). India contends that Tarapur plutonium is free of perpetuity, a matter which is discussed below. If India prevails on this point, plutonium made by a Tarapur-fueled FBTR becomes unrestricted in 1993, despite India's promise of peaceful use, and its promise to restrict Tarapur fuel exclusively to the needs of the Tarapur Station.

The FBTR also raises other questions. It could begin operating on cores from CIRUS plutonium. Does the peaceful use restriction on the CIRUS reactor and its heavy water extend to other plutonium bred from CIRUS plutonium? The 1956 Agreement on heavy water is silent on pursuit. Is pursuit absent because not expressly mentioned? Or is it already contained in the Agreement's literal terms or implied from the Agreement's circumstances? The Agreement says that the heavy water "shall be for use only . . . in connection with research into . . . atomic energy for peaceful purposes."⁵⁶ This excludes "use" for any military purpose. If CIRUS is used to make plutonium cores for the FBTR, and those cores are used to make plutonium for a weapon, then CIRUS will have in fact been "used" to make a weapon. There is a direct causal chain. If "peaceful use" means that one cannot use a reactor to make material for a weapon, it must also mean that one cannot use a reactor to make material which is used to make material for a weapon. Without CIRUS, there would be no weapon, regardless of whether one makes the weapon from CIRUS's product

directly or one makes it by using CIRUS's product in additional manufacturing. It is not a peaceful use of a factory to make molds for cannons, although molds are not weapons. The molds will be used to make weapons, and are not "peaceful" for that reason. CIRUS plutonium used to make weapons would not be peaceful either, and neither would CIRUS. At the time of the heavy water agreement it was perfectly reasonable to regard the peaceful use guarantee as having such a meaning. Later, when other countries argued that the meaning was not clear, the United States responded by mentioning pursuit specifically. This later effort by the United States, which was also reasonable, is no evidence that the meaning was not contained in the original language. Moreover, even if the original language were ambiguous, it could only be so in the sense that the literal terms might not express the parties true intent. But the parties' true intent was to guarantee the peaceful use of CIRUS. In ordinary understanding, peaceful use means that CIRUS would not be used in a weapons manufacturing process, regardless of whether CIRUS were one step or two steps away from the final product. Only by disregarding the literal meaning of peaceful use, and ignoring the parties' intent, can one say that CIRUS can be part of a weapons manufacturing process. This same reasoning also applies to Tarapur, and means that its fuel carries pursuit regardless of whether the Agreement for Cooperation mentions pursuit or not.

Where does the above discussion leave us? How significant is Tarapur fuel now, and how significant will it be in 1993? First, India will have some plutonium from CIRUS, the amount being uncertain. CIRUS will have produced about 260 kilograms of plutonium by 1993⁵⁷ but India has used some for the explosion in 1974,⁵⁸ may have used some for the FBTR cores, and may use a considerable amount for these cores.⁵⁹ CIRUS plutonium carries a peaceful use restriction, so it will not be legally available for weapons. The lack of

safeguards makes it difficult to keep track of, however. Second, India will have plutonium from MAPP-1. The production could total about 650 kilograms by 1993, the amount of weapons grade plutonium depending upon how the reactor is operated. Dedicating 30% of MAPP production to weapons grade plutonium would produce about 180 kilograms by 1993. There would be no restriction on its use. If the heavy water from MAPP-1 were shifted to the R-5 in 1985, the R-5 would make about 180 kilograms of weapons grade plutonium by 1993. There would be no restriction on the use of R-5's plutonium either, but MAPP-1 would probably come under safeguards because it would be operated on imported heavy water. If India steps up imports of heavy water to bring more plants on line, or to make up for lost domestic production, the amount of unrestricted plutonium could be smaller. Third, India may have some plutonium from the FBTR. If this reactor is operated on cores made from MAPP plutonium (which requires waiting for that plutonium to become available) some additional number of kilograms of high-quality, unrestricted plutonium will be produced by 1993. If the FBTR is operated with Tarapur plutonium, these additional kilograms could be produced without tying up the MAPP-1 plutonium in reactor cores. That would leave the MAPP plutonium free for weapons between now and 1993.

Thus, Tarapur fuel is still important. Its content of weapons grade plutonium is quite significant. If 10% of Tarapur's spent fuel were lightly irradiated, and reprocessed separately, it would now produce about 100 kilograms of weapons-grade plutonium. By 1993, Tarapur could produce an additional 100 kilograms of weapons grade plutonium from lightly-irradiated rods. According to India, the entire 200 kilograms will then become unrestricted. That is probably enough for 50 bombs.⁶⁰ The 200 kilograms is obviously significant when compared to the 180 kilograms available from

dedicating 30% of MAPP-1 production to weapons grade plutonium, and is similarly significant when compared to the 180 kilograms available from the R-5 through switching heavy water. If Tarapur plutonium were used to fuel the FBTR, India could proceed with its breeder program while using the MAPS plutonium wherever it wished.

The result is that reprocessing Tarapur fuel now might free MAPP plutonium for weapons if that plutonium were otherwise destined for the FBTR, and reprocessing Tarapur fuel later could add, by 1993, up to 200 kilograms of unrestricted weapons grade plutonium to the amounts otherwise available. If India decided to make weapons from "reactor grade" plutonium, the entire 2000 kilograms from Tarapur would be available for weapons in 1993 under India's view of perpetuity. Also, the 2000 kilograms would be available for unrestricted transfer to third countries or subnational groups.

b) The Right of the United States to Consent to Reprocessing

India wants to reprocess Tarapur fuel. Under Article II C. of the Agreement for Cooperation, "such reprocessing may be performed in Indian facilities upon a joint determination of the Parties that the provisions of Article VI . . . [safeguards] may be effectively applied. . . ." So far, the United States has not been willing to make this determination. Should it do so? Must it do so? India contends that the United States has no choice, that there is no longer any legal basis upon which the United States can refuse. India's position rests upon the history of the Tarapur relationship, and upon a recent decision by the International Atomic Energy Agency to apply safeguards to PREFRE, the facility at which India will do the reprocessing.

It was obvious from the beginning that India planned to reprocess

Tarapur's fuel. In 1960, when a team of United States experts visited India, they concluded that India could build a reprocessing plant,⁶¹ could reduce the need for foreign exchange by doing so,⁶² and was considering constructing a pilot facility.⁶³ In 1962, the State Department, the Agency for International Development (AID), the Atomic Energy Commission (AEC), and the Indian officials in charge of Tarapur discussed the possibility that the United States would buy back Indian-reprocessed plutonium.⁶⁴ In May of 1963, three months before the Agreement for Cooperation was signed, India informed the United States that India planned to reprocess Tarapur fuel as soon as possible.⁶⁵ In the Agreement for Cooperation itself, Article II A. allows India to operate Tarapur with "material produced" from Tarapur fuel. Article VI B. states that the parties agree to "review the design of facilities which will . . . process any special nuclear material . . . produced in the Tarapur Atomic Power Station," and also agree that United States personnel will have full access to "chemical processing facilities in India at such time as special nuclear material . . . received from the Tarapur Atomic Power Station is located at such facilities" In 1965, in the contract for the supply of enriched uranium to Tarapur, the United States agreed to accept U-235 recovered by India as a result of reprocessing Tarapur fuel.⁶⁶ In 1966, in preparation for a visit to the United States by a team of Indian experts, the leading AEC official recommended that the AEC give "encouragement and assistance toward the recycle of plutonium produced in India's nuclear power plants," and noted that the United States had agreed "to train four Indians associated with the Tarapur project in plutonium recycle."⁶⁷ In 1968, the AEC reviewed the design of PREFRE, the reprocessing plant constructed at the Tarapur site to handle Tarapur fuel, and concluded that it "permits effective application of the safeguards

arrangements provided for in Article VI of the U.S.-India agreement for cooperation. . . ." However, the AEC added:

Before the joint determination contemplated in Article II E. of the agreement is made, we would expect to be able to confirm during visits to the plant that the measuring and control procedures to be used are such that the provisions of Article VI may be effectively applied.⁶⁸

In 1980, the International Atomic Energy Agency decided that safeguards could be applied to PREFRE, and signed an agreement with India to that effect.⁶⁹ Since then, India has contended that the United States has no remaining basis for opposing reprocessing. This argument is encouraged by the fact that, in 1971, India and the United States signed a trilateral safeguards agreement with the IAEA under which the United States agreed that the IAEA would take over United States safeguard responsibilities under the Agreement for Cooperation.⁷⁰

In light of this history, has the United States still any right to refuse reprocessing at Tarapur? If so, on what grounds? The grounds upon which it cannot rely are obvious. First, the United States cannot consider reprocessing to be a new issue. India's intention has been clear from the beginning, and the United States has never objected to it. India's design for PREFRE was approved in 1968, and PREFRE has been built. Second, the United States cannot simply refuse reprocessing as a matter of discretion. The Agreement for Cooperation says that reprocessing may occur "upon a joint determination" that safeguards can be "effectively applied."⁷¹ Such language always poses a question: Does it mean that the United States may refuse even to go through the steps of making a determination, or does it mean that the United States must go through the steps of making a determination and decide in good faith whether safeguards can be effectively applied? The effect of the language is to impose a condition. That is, reprocessing may

occur on condition that there is a joint determination. The language does not require that there be a joint determination. Looking at the language literally, one can say that if there is no joint determination, the condition fails and there can be no reprocessing. The language does not require that the determination happen, or that the United States make it happen. However, where the cooperation of one party is necessary to allow a condition to happen, that party usually has an implied duty to provide the cooperation.⁷² The familiar example is the one in which a buyer's duty to purchase a residence depends upon obtaining suitable financing. The buyer does not promise that the financing will occur, but the intention of the parties is that the buyer take reasonable steps to cause it to occur (apply for a loan to banks) and if he does not the condition is excused and the buyer is bound without it.⁷³ A second relevant principle is the one which requires that determinations of satisfaction be made in good faith. The example is the construction contract requiring a certificate of satisfaction by the owner's architect as a condition of the owner's duty to pay. The language of such conditions is usually absolute -- no certificate, no pay -- but the courts have held that the condition is excused (and the owner made liable) if the architect does not make an inspection in good faith and state his reasons for not being satisfied.⁷⁴ The same is true of satisfaction by the owner himself.⁷⁵ These two principles -- that there is an implied duty to cooperate in allowing a condition to happen, and that there is an implied duty to determine satisfaction in good faith -- mean, in the context of Tarapur, that the United States cannot reject reprocessing as a matter of discretion. The knowledge of India's plans, the approval of PREFRE's design, and the fact of PREFRE's construction, are inconsistent with such discretion. India could not have been expected to get a design approval, and build PREFRE,

with the knowledge that the United States could block reprocessing at its whim, without giving any reason. The only way to view the Agreement's language, and Tarapur's history, is to find that the United States has a duty to determine in good faith whether safeguards at PREFRE can be "effectively applied."

This duty poses a problem. The problem is that in making a determination on safeguards at PREFRE, the United States must confront the fact that the IAEA has already decided that safeguards can be applied. PREFRE is now reprocessing spent fuel from RAPP, and the IAEA is safeguarding that fuel. If RAPP fuel at PREFRE can be safeguarded by the IAEA, why can't Tarapur fuel at PREFRE be safeguarded by the IAEA?

There are several reasons why the United States need not reach the same decision on safeguards as the IAEA. The first is purely legal. It is simply that the IAEA's decision on safeguards is not legally the same as the United States' decision on safeguards. The IAEA is an independent international organization. The United States is but one member of that organization. The IAEA can make decisions which the United States opposes, or supports, but those decisions are not United States decisions any more than decisions of the United Nations are United States decisions. The trilateral agreement did not change this fact. Section 4 of the trilateral, which provides for the suspension of United States rights to implement safeguards, in favor of implementation by the IAEA, affects only those United States rights contained in Article VI of the Agreement for Cooperation. The right of the United States to approve reprocessing, which is found in Article II, is expressly left alone. To make this clear Section 4 provides that "no other rights and obligations of the Government of India and the Government of the United States . . . under . . . other provisions of the Agreement for Cooperation . . . will

be affected. . . ." Section 12 of the trilateral, which provides that "the Agency shall have the rights and obligations of the United States . . .," is similarly restricted. The only United States rights given to the Agency by Section 12 are those in Article VI of the Agreement, not those in Article II. The history of the IAEA makes this even clearer. The IAEA was created to implement safeguards arrangements negotiated between sovereign states; not to make such arrangements on behalf of sovereign states. The Statute⁷⁶ of the Agency says so specifically. Article III A.5 of the Statute provides that the Agency is authorized "to apply safeguards, at the request of the parties, to any bilateral or multilateral arrangement. . . ." In the preamble to the trilateral, this language is cited as the basis for the Agency's participation in the trilateral. Thus, there is no support for the notion that the IAEA has the power to bind the United States on the question of reprocessing. The trilateral specifically excludes such a power in Sections 4 and 12, and both the history and the Statute of the Agency are squarely against it.

So one concludes that the United States must determine in good faith whether safeguards can be "effectively applied" to Tarapur, and that the IAEA has not, and cannot make that determination for the United States. This poses the next question, which is whether, in making its determination, the United States can in good faith disagree with the IAEA. The answer depends upon the criteria which govern the IAEA's decision, and the criteria which govern the United States' decision.

How does the IAEA decide whether a given facility can be safeguarded? What criteria does the IAEA apply? The answer is not easily given. For facilities in countries such as India, which are not parties to the NPT, the IAEA applies the safeguards system outlined in INFCIRC/66/Rev. 2.⁷⁷ That system does not define the Agency's technical objectives (safeguards

criteria). Those criteria were not defined until the appearance of INFCIRC/153 (Corrected)⁷⁸ in 1972, which the Agency drafted after the NPT was signed, and which applies to facilities in countries which are parties to the NPT. The Agency takes the position, however, that its current practice is to apply INFCIRC/153 even to facilities in non-NPT countries.⁷⁹ Under this view, PREFRE would have been subject to the facility-specific requirements of INFCIRC/153. But safeguards arrangements are individually negotiated for facilities such as PREFRE, so the extent to which PREFRE satisfies INFCIRC/153 depends upon what the IAEA was able to negotiate with India. Once negotiations are concluded, the parties adopt a "subsidiary arrangement" (also called a "facility attachment") which contains the details of the inspection program for that facility. Unfortunately the IAEA keeps facility attachments secret,⁸⁰ so there is no way to know exactly what the IAEA is inspecting at PREFRE. All one can say is that India may have been made to satisfy the facility-specific provisions of INFCIRC/153. What does that mean?

INFCIRC/153 makes a series of general statements. They are, first, that the objective of safeguards is the "timely detection of diversion of significant quantities of nuclear material . . ."; second, that "material accountancy" is a "safeguards measure of fundamental importance, with containment and surveillance as important complementary measures"; and third, that "the technical conclusion of the Agency's verification activities shall be a statement, in respect of each material balance area, of the amount of material unaccounted for over a specific period. . . ."⁸¹ The IAEA has narrowed these general statements in subsequent pronouncements. A "significant quantity" of plutonium has been defined as 8 kilograms, and of highly enriched uranium as 25 kilograms.⁸² "Timely detection" has been defined according to the amount of time it would take a potential diverter to

convert a given form of nuclear material into a weapon ("conversion time"). Detection is "timely" for a given material if inspections would detect a diversion of it within its conversion time. The conversion time for plutonium oxide, the material coming out of PREFRE, is stated to be one to three weeks.⁸³ If the plutonium were refined to finished metal, the time is 7-10 days.⁸⁴ With respect to "material accountancy," INFCIRC/153 requires that the country in which the facility is located have its own national system of accounting for nuclear material, states that the Agency shall verify the findings of that system, and that the Agency shall require only "the minimum amount of information" necessary to that end.⁸⁵ The national system of accounting must be based upon "material balance areas" (measuring points) and procedures for establishing periodic book inventories, physical inventories, and the amount of material unaccounted for in each area.⁸⁶ This system permits the IAEA to make its "technical conclusion" about the amount of material at each area. It is unlikely that the Indians accepted such a national system of accounting. In 1966, the IAEA published Annex I to INFCIRC/66, which stated the general provisions for applying safeguards to reprocessing plants; it applies to PREFRE. It provides that facilities such as PREFRE may be inspected at all time, that notice of inspection shall be negotiated between the parties, that safeguards shall not apply to areas where no safeguarded material is present, and that for plants such as PREFRE inspection would normally be continuous.⁸⁷

The above provisions describe safeguards at PREFRE. It is important to see what they do not accomplish. First, the IAEA defines a "significant quantity" of plutonium as 8 kilograms. But by using a reflector in the bomb design, the fast critical mass of Pu-239 can be reduced to 4 kilograms.⁸⁸ With respect to "timely detection," it is important to realize that it is not

the same as "timely warning." The IAEA's goal is not to notify anyone of a diversion within the conversion time, but only to detect a diversion within that time. What this means, in effect, is that inspections will be scheduled frequently enough so that one will occur within the conversion time of the material being inspected. As L.W. Herron, Director of the Agency's Legal Division put it, "it is a misconception . . . that it is a prescribed task of the Agency to deliver timely warning. This is not the task under NPT safeguards. . . ." ⁸⁹ The IAEA would not notify the United States, or anyone else, of a diversion within the conversion time. Notice would come only after a report of material unaccounted for had made its way up through IAEA channels. At the IAEA, a report of material unaccounted for requires a period of time for evaluation, a period to report the diversion to the Director General, and a period for him to report it to the Board of Governors, who would then meet and decide: a) whether to ask the country concerned to remedy the discrepancy, b) whether to report the discrepancy to all members of the Agency, or c) whether to report it to the United Nations. ⁹⁰ It is obvious that this will take longer than one to three weeks. The concept of timely warning is quite different. Under the Nuclear Non-Proliferation Act of 1978, the United States may allow foreign reprocessing of U.S.-origin reactor fuel only after considering whether the United States will receive "timely warning . . . of any diversion well in advance of the time at which the non-nuclear-weapons state could transform the diverted material into a nuclear explosive device." ⁹¹ The function of timely warning, as this language implies, is to create the opportunity to intervene, either diplomatically or with force, between the moment of diversion and the moment of weapons manufacture. This is why the warning, to be timely, must be "well in advance" of manufacture. In the case of PREFRE, it is obvious that the IAEA cannot

warn the United States of a diversion "well in advance" of the one to three weeks needed to convert the plutonium into a weapon. The IAEA could barely detect a diversion within that period. Also, there is another point to make about reprocessing. The limit of accuracy in measuring the throughput of a reprocessing plant is $\pm 1\%$.⁹² This means that 20 of Tarapur's 2,000 kilograms of plutonium could be diverted without detection. Twenty kilograms could make up to 5 fission bombs with reflectors, assuming the 4 kilogram per bomb figure already cited.⁹³

From what has been said above, it is clear that the United States can decide in good faith that safeguards cannot be "effectively applied" to PREFRE. The IAEA's decision has little to do with the United States decision. All the IAEA can decide is whether, within a $\pm 1\%$ limit of accuracy on the throughput of a reprocessing plant, it can detect a diversion of more than 8 kilograms of plutonium from a material balance area within 1 to 3 weeks. It makes this decision as a compromise, reconciling its conflicting responsibilities as a promoter of nuclear power and as an inspector of it. The United States has no similar conflict to resolve; the United States is not obliged to facilitate national spent fuel reprocessing. In order to find that safeguards at PREFRE would be "effectively applied," the United States is entitled to consider whether a diversion is likely to occur in a given country, whether it is likely to be detected there, whether notice of a diversion would provide timely warning, whether safeguards, if applied, would last long enough, and whether credible remedies would be available if a diversion occurred. That is, the United States could look to its own interest in defining "effectively applied," just as the IAEA looks to its own interest in making its definition. With respect to India, the United States could reasonably find the risk of a diversion to be higher than elsewhere. India

has rejected the NPT, has fought safeguards to the limit of its strength, and has exploded a nuclear device from its civilian program. India cannot be expected to make life easy for IAEA inspectors, who cannot measure the plutonium in a reprocessor very accurately and who can only deem "significant" a quantity of plutonium which is unrealistically high. Also, India has not shown any legitimate need for Tarapur plutonium in its energy program. RAPP-1 and 2, CIRUS, and MAPP-1 will supply enough plutonium for the FBTR. If Tarapur plutonium were used in the FBTR, it would only be to avoid perpetuity as discussed above, and to free MAPP or CIRUS plutonium for improper uses. The FBTR and Tarapur are the only reactors in India (either in use or planned) which could use plutonium as fuel; all the others use natural uranium. Thus, the only legitimate need for Tarapur plutonium is to make mixed oxide fuel for Tarapur itself. But India has no facility for making such fuel, and even if it did, the fuel would be far more costly than the enriched uranium fuel which Tarapur uses now. With respect to timely warning, it is obvious that the United States won't have it. The IAEA will do well to achieve timely detection. Moreover, under India's view of perpetuity, safeguards would only apply until 1993, when the fuel supply commitment ends. The United States is clearly entitled to find that safeguards are not "effectively applied" if they last no longer than that. Indeed, this factor alone -- the absence of perpetuity on safeguards -- means that safeguards cannot be effectively applied. Finally, the United States could reasonably find that safeguards are not effective without at least some hope of responding to a diversion if it occurs. A response requires negotiations, and negotiations must begin somewhere. The United States and India already disagree on perpetuity, the definition of peaceful use, and whether the India can reprocess without United States consent. By starting this far apart, it is unlikely that the United

States and India could resolve an alleged diversion within a short period of time.

For the above reasons, the United States can find in good faith that safeguards cannot be effectively applied at Tarapur. For these same reasons, the United States should find that they cannot be effectively applied, and should refuse reprocessing. Under the Indian view of perpetuity, reprocessing gives India hundreds of kilograms of plutonium for legal use in weapons only nine years from now. India could make weapons herself, or legally sell the plutonium (or weapons made from it) to enemies of the United States or subnational groups.⁹⁴ To give India this power is unacceptable, both in itself and as a precedent.⁹⁵ The United States would have abandoned the concept of timely warning,⁹⁶ would have abandoned the reprocessing barrier, which is the last time barrier between reactor fuel and weapons, would have abandoned the policy against national stockpiling of separated plutonium (in a case where no legitimate peaceful need for the plutonium appears) and would simply be left with India's word.⁹⁷ That word was spectacularly inadequate in 1974, and is no more adequate now. Reprocessing of Tarapur fuel need not and should not occur under present conditions.

II. PERPETUITY: ARE THERE RIGHTS AFTER 1993?

India contends that all rights end when the Agreement for Cooperation expires in 1993. The United States contends that perpetuity is inherent in peaceful nuclear cooperation, and that the Agreement for Cooperation legally imposes it. The Agreement is silent. Who is right?

In Article X, the Agreement provides that it "shall remain in force for a period of thirty (30) years." It is possible to read this to mean that not a

single one of the Agreement's provisions remains in force a day longer. Hence, the safeguards under Article VI, the pledge of peaceful use under Article VII, and the right of the United States to approve reprocessing under Article II would all end in thirty years; that is, in 1993. But it is also possible to read Article X as simply limiting the obligation to purchase and supply reactor fuel contained in Article II. Since the Agreement is silent, the matter becomes one of interpretation. It is universally agreed that, in interpreting contracts, "the primary search is for the common meaning of the parties. . . ."98

Does India's interpretation reflect the common meaning of the parties? The best way to test the validity of an interpretation is to place it on the agreement, see what effect the agreement would have with the interpretation on it, and then ask whether the parties are likely to have intended such an effect. If India's interpretation were placed upon the Agreement for Cooperation, the effect would be as follows:

- (1) The Tarapur reactors could be converted legally to military production in 1993.
- (2) India could legally use all the U.S.-origin spent fuel generated by Tarapur as source material for weapons, simply by holding the fuel in storage until 1993. If this were done, the Tarapur reactors would have functioned as military production reactors during the entire period of the Agreement.
- (3) Plutonium extracted from U.S.-origin spent fuel, or weapons made from such plutonium, could be transferred after 1993 to any country or subnational group of India's choosing.
- (4) Enriched uranium supplied during the early years of the Agreement would carry safeguards for almost 30 years, but enriched uranium

shipped during the later years of the Agreement would carry safeguards for almost no time at all. Enriched uranium shipped, for example, in 1988, loaded into the reactor in 1990, and discharged in 1993 would have been used to form plutonium to which no safeguards could ever apply.

- (5) If India chose to store all the U.S.-origin fuel discharged from Tarapur until 1993, the right of the United States under Article II to approve reprocessing of that spent fuel could never be exercised.

The above results could not have been intended. The United States would never have agreed to supply fuel or reactors for military production. India could not have believed that the United States was doing so. Nor would the United States have agreed to allow plutonium produced from Tarapur to be transferred to other countries, or subnational groups, simply because the period of fuel supply to Tarapur had ended. India could not have believed that the United States was doing that either. Under India's present interpretation of the Agreement, the United States would be in the position of insisting on pledges of peaceful use, systems of keeping records, and international inspections only for the fuel shipped during the first part of the supply period. Toward the end of the supply period, the United States would progressively lose interest in the fate of its fuel. From 1985 onward, the United States would ship uranium with the knowledge that plutonium made from it would become unrestricted as soon as it left the reactor. This means that from 1963 to about 1985, the United States would be greatly concerned about threats to its own or international security from its nuclear exports, but after 1985 its concern would evaporate. It would no longer care whether its exports endangered security. Does any nation believe that nuclear threats to its national security, or to international security, expire after a fixed

period? Neither the United States nor India believes this, or could have believed it in 1963. Finally, India's interpretation allows India to negate unilaterally the right to approve reprocessing. Neither the United States nor India could have intended for the United States to forfeit this right simply because reprocessing did not happen before 1993. The right of the United States to approve reprocessing would be illusory if the Indians could reprocess anyway simply by waiting. With respect to uranium shipped in 1988, loaded into the reactor in 1990, and discharged in 1993, the United States would never have a right to approve reprocessing. The right would end as the fuel left the reactor. Interpreting the Agreement in this way destroys rights which the agreement obviously intended to confer.

The result of the above discussion is to show that India's view of the Agreement is untenable. The Agreement cannot function intelligibly with India's view placed upon it. For the Agreement to make sense, one must reconcile the 30-year termination clause with other clauses in the Agreement. There should not be a war between termination after 30 years and the intention to restrict Tarapur and its fuel to peaceful use or the intention to require safeguards for all fuel shipments including the later ones, or the intention to allow the United States to approve reprocessing of all fuel shipments, including the later ones. The obvious way to avoid conflict among these provisions is to interpret the 30-year period as simply a limit on the fuel supply commitment. The 30-year term approximately equals the expected life of the Tarapur reactors. The fact that the reactors can be operated only upon U.S.-origin fuel makes it logical to have a fuel supply commitment equal to the reactors' expected life. It is a usual practice to make agreements for cooperation run for a period equal to a reactor's lifetime. By interpreting the 30-year period in this way, one makes it intelligible in the context of

the rest of the Agreement, and avoids having it defeat other rights which must survive it in order to have meaning. If the 30-year provision ends all rights, the Agreement, which is for the peaceful use of nuclear energy, becomes an option contract for weapons. The recipient country earns the weapons option simply by performing the Agreement to its end. The parties cannot have intended that result, and since they did not, the Agreement cannot be so interpreted. The United States is clearly right: perpetuity is inherent⁹⁹ in the very concept of peaceful nuclear cooperation, and the Agreement cannot fairly be read to exclude it.

III. THE FRENCH TAKEOVER

France took over the fuel supply to Tarapur in 1982. The NNPA, which had taken effect in 1980, prohibited the further export of enriched uranium to non-nuclear weapons states which had not placed all of their nuclear facilities under international inspection.¹⁰⁰ The President could waive the prohibition,¹⁰¹ and had done so for India, but after 1980 it was clear that exports to India could not continue. India warned the United States that a halt in supply would breach the Agreement for Cooperation, and that a breach would excuse India from all further duties, including safeguards and peaceful use. India was probably bluffing;¹⁰² its legal position was doubtful and it would have faced even stricter controls from other suppliers. But the showdown was avoided because the United States got France to take over the fuel supply.

To accomplish this, France and India signed a short agreement, and the United States and India exchanged diplomatic notes. France agreed to supply enriched uranium "within the framework of the 1963 Agreement for Cooperation,"

and India agreed to use the uranium "or its by-products" for "peaceful purposes."¹⁰³ India also agreed to continue the safeguards required by the 1963 Agreement and the trilateral.¹⁰⁴ India's note to the United States provided that India would "waive its right to have the Government of the United States . . . sell to . . . India . . . all requirements . . . for enriched uranium for the . . . Tarapur Atomic Power Station."¹⁰⁵ It also provided that India would "obtain all its requirements for enriched uranium . . . for Tarapur . . . from the Government of France . . .," and that the Agreement for Cooperation and the trilateral "shall remain in effect in all other respects."¹⁰⁶ In the United States note to India, the United States agreed to "waive its right to have the Government of India purchase from the Government of the United States . . . all requirements . . . for enriched uranium for . . . the Tarapur Power Station," and to have "Tarapur . . . operated on no other special nuclear material than that made available by the United States."¹⁰⁷ The note also provided that the Agreement for Cooperation, the letters of September 16 and 17, 1974, and the trilateral "shall remain in effect in all other respects."¹⁰⁸ The first shipment of enriched uranium from France arrived in India on May 7, 1983.¹⁰⁹

This is the new arrangement among the United States, India, and France. What does it accomplish? India "waives" its right to have the United States supply Tarapur's fuel; the United States "waives" its right to have India receive it only from the United States; France agrees to complete the supply schedule. These are the only changes in the Agreement or the trilateral; everything else remains the same. France's supply is "within the framework of the 1963 Agreement," and peaceful use, safeguards, and reprocessing controls remain, as well as India's promise to restrict Tarapur fuel "exclusively to the needs" of the Tarapur Station.

In law, there are two possible ways to view this situation. Either the parties have made a "novation", in which the United States drops out of the picture and France, under a new contract between itself and India, assumes all rights and duties formerly held by the United States, or the parties have not made a novation, and the United States remains in the contract and has merely delegated to France the United States' duty to supply fuel. A novation means that the parties have agreed that one of the two original parties will be replaced by a third party, the original contract will end, and the party which is replaced will have no further right or duty under it.¹¹⁰ A delegation means that the two original parties remain bound, and the party which delegates its duty (the delegor) is still liable if the delegee does not perform.¹¹¹ In this case the United States still controls everything under the Agreement except the fuel supply. It controls the right to approve reprocessing, to maintain safeguards (through the IAEA), and to insist upon peaceful use. Moreover, if France should for some reason halt deliveries, it is clear that India would look to the United States for performance -- India has not released the United States from its duties under the Agreement. Thus, there is not a novation. There is only a delegation of duty. India has agreed that the United States may delegate its fuel-supply duty to France, and France has agreed to assume that duty, and that is all. France has not received the United States' rights, has not promised India anything more than the United States promised, and India has not promised France anything more than India promised the United States.¹¹² If this were not true the United States' right to enforce the Agreement would be greatly diluted. The United States would have given up one of its best remedies for an Indian breach. That remedy, as stated in the following paragraph, is to cut off supply through the delegee.

This point has certain implications. In a delegation, each of the original parties is still responsible for his own performance. The delegor is performing through the person to whom he delegated (the delegee) and as long as that performance continues the delegor is entitled to the return performance of the other original party.¹¹³ This means that if India breaches the Agreement for Cooperation, the United States has the right, through its delegee, to suspend or terminate the delegee's performance. Reprocessing Tarapur fuel without permission would be such a breach, and so would a failure to maintain safeguards, or to keep the pledge of peaceful use. If any of this occurs, the United States would have the right to halt the fuel supply or pursue other remedies. A present declaration by India that safeguards will not continue beyond 1993 could also be such a breach; this will be discussed below in the section on remedies.

So the French takeover has changed very little. The legal relations between the United States and India remain the same. In a sense, this was required by the position of France. The Nuclear Suppliers' Guidelines, to which France adheres, forbids the export of enriched uranium to a non-nuclear weapons state unless that state accepts pursuit and perpetuity.¹¹⁴ If France's supply to India had been a new commitment, it would have violated France's pledge to abide by the Suppliers' Guidelines. That is, it would have violated them unless India had backed away from its position on perpetuity, or France could have convinced other nuclear suppliers that perpetuity was inherent in the Agreement for Cooperation. France avoided this difficulty by agreeing to serve only as delegee. But if France did not make a new commitment, and France's performance is still the performance of the United States, the United States may be violating the NNPA.

If the United States insists that it still has all rights under the

Agreement, and the United States does so insist, can it at the same time insist that it is not performing the Agreement through its French delegee? Either there is a novation, and the United States is complying with the NNPA because the French have taken over the contract, or there is not a novation and the United States is circumventing the NNPA through supply by its delegee. The present United States position is that it retains all rights under the Agreement (the French and Indians agree with this position) but it is not really "exporting" the fuel. Section 306 of the NNPA requires full-scope safeguards "as a condition of continued United States export of . . . special nuclear material. . . ." ¹¹⁵ Is a shipment by a foreign delegee of the United States from a point outside the United States an "export" if done to perform an Agreement for Cooperation? Is it "cooperation"? Does Section 306 intend to end "cooperation" as well as "exports"? Since exports cannot be made except through cooperation, ¹¹⁶ it is possible so to read § 306.

"Exports" are not defined by the NNPA or the Atomic Energy Act. However, under Section 53 of the Act, the Nuclear Regulatory Commission may issue export licenses for special nuclear material ("SNM"; e.g., the low enriched uranium supplied to India) only "under terms of an agreement for cooperation." ¹¹⁷ Under § 123 of the Act, an agreement for cooperation is required for there to be "cooperation with any nation or group of nations." ¹¹⁸ Thus, exports can only be done through cooperation, and cooperation can only be done through an agreement for cooperation. Section 128 of the Act ¹¹⁹ (§ 306 of the NNPA) forbids exports of SNM to non-nuclear weapons states which have not placed all their peaceful nuclear facilities under international inspection (implemented full scope safeguards). It also provides that this requirement will become an "export criterion with respect

to any application for the export of materials . . . which is filed after eighteen months from the date of enactment of this section. . . ." ¹²⁰ Thus, exports of SNM will be terminated to any non-nuclear weapons state which does not accept full scope safeguards within eighteen months after the NNPA takes effect. During the eighteen month "grace period," Section 404 of the NNPA requires the President to "initiate a program immediately to renegotiate agreements for cooperation in effect. . . ." ¹²¹ The President's purpose is to convince other nations which are parties to current agreements with the United States to accept the new export criteria imposed by the NNPA before exports to these nations are cut off by Section 128. ¹²² In addition, the President is required, under Section 403 ¹²³ of the NNPA, to

"take immediate and vigorous steps to seek agreement from all nations . . . to commit themselves to adhere to the following export policies . . .

- (a) No nuclear materials . . . within the territory of any nation . . . or under its control anywhere will be transferred to . . . any other nation . . . unless the nation . . . receiving such transfer commits itself to . . . provisions sufficient to insure that . . . IAEA safeguards will be applied to all peaceful nuclear activities in . . . any non-nuclear weapon state."

So the President was required, during the 18-month grace period, to renegotiate existing agreements for cooperation. His goal was to get all recipients of United States exports to implement full scope safeguards. Also, he was to convince other nuclear suppliers to halt exports to countries which did not accept full scope safeguards. If a non-nuclear weapon state did not accept full scope safeguards by the end of this period, United States exports of SNM would be terminated.

Section 128 has ended export licenses of SNM to India. India did not meet the full scope safeguards requirement at the end of the grace period, so,

without presidential waivers, no further licenses could be issued. Does Section 128 forbid cooperation, as well as licenses? As stated above, Section 53 forbids "exports" of SNM except through cooperation. Did the framers of Section 128 intend for its prohibition on exports also to prohibit "cooperation"? It appears that they did. The statutory scheme into which the NNPA was fit already required cooperation for exports. It would have been natural for the Congress to have equated exports of SNM with cooperation, and to have assumed that they were ending cooperation when they were ending exports. The House Report, when discussing the new requirement of full-scope safeguards in agreements for cooperation, said:

"Under the terms of this provision, however, a non-nuclear weapons State recipient would have to agree to place all its existing unsafeguarded nuclear facilities under IAEA safeguards. . . . U.S. exports would be terminated in the event the recipient chose to build a facility or produce materials not under safeguards. Thus this requirement would provide a strong disincentive -- termination of cooperation with the United States -- to undertaking unsafeguarded activities . . . (emphasis added).¹²⁴

Also, the House Report discussed the effect of the 18 month grace period on India and South Africa. It said:

India and South Africa would be most significantly affected by this requirement. The Committee feels strongly that the currently unsafeguarded facilities in those countries must be brought within the framework of the IAEA safeguards system if American nuclear cooperation is to continue . . . (emphasis added).¹²⁵

Finally, the Committee pointed out that § 128

"may become effective prior to the time that the President . . . is able to renegotiate existing agreements . . . to bring them into conformity with the requirement of amended section 123, and the committee intends this result."¹²⁶

A well-placed commentator on the NNPA, writing about it soon after its passage, equated exports and cooperation,¹²⁷ and the NNPA itself provides in Section 405¹²⁸ that "[during the grace period] the amendments to section 123

of the 1954 Act . . . shall not affect the authority to continue cooperation pursuant to agreements for cooperation entered into prior to the date of enactment of this Act . . ." (emphasis added). So the drafters of the NNPA saw cooperation continuing during the grace period, and they obviously equated exports and cooperation. They did not provide that cooperation would continue after the grace period. They knew that exports of SNM would be stopped by Section 128, and they assumed that cooperation would be stopped too. The main purpose of Section 128 is to end United States nuclear trade in SNM with countries which reject full-scope safeguards. That purpose requires an end to cooperation as well as exports.

Is the United States still "cooperating" with India? The United States stands as guarantor of France's fuel deliveries; the United States insists that all United States rights under the Agreement for Cooperation remain in effect; the continuation of United States rights is premised upon France's performance as the United States' delegee. France will follow United States instructions on reprocessing, and follows other United States interpretations of the 1963 Agreement. India's duties under the Agreement still run to the United States, not to France. The deliveries by France did not and could not take place without the United States' consent. Is this "cooperation"?

The fact that the Agreement for Cooperation has not been suspended, breached, or terminated by either party shows that the Agreement is still in effect. The United States still has rights under it and is insisting that they be observed. The duties of the United States under the Agreement, which must be fulfilled in order to enforce those rights, have not caused the agreement to break down because the United States has arranged for France to fulfill them. In effect, the United States has arranged for the 1963 Agreement to continue, and for one of the United States' duties under it to be

performed by France. The State Department has said that it does "not view the U.S.-India exchange as amending the U.S.-India Agreement for Cooperation or creating a 'new' agreement. . . ."129 If cooperation cannot occur without an agreement, as Section 123 provides, then how can an agreement be performed without that performance being cooperation? Because the United States is still performing the Agreement through its delegee, it is still cooperating.

This indicates that the United States is probably violating the letter, as well as the spirit, of the NNPA. The letter of the NNPA forbids "exports" of SNM after the grace period. The intention seems to have been to include "cooperation" in the term "export"; the terms were used interchangeably. The Atomic Energy Act confines exports to those countries with which there is cooperation; it is natural to assume that cooperation would be confined to those countries to which the United States could send exports. By continuing to supply uranium through its delegee, the United States is still cooperating, and thus appears to be committing a violation of Section 128 of the Atomic Energy Act. With respect to the spirit of the NNPA, the violation is unmistakable. Section 403 of the NNPA, quoted above, directs the President to "take immediate and vigorous steps" to get other nuclear suppliers to require full scope safeguards for their own exports. Did the President take "vigorous steps" to get France to do so with respect to India? If France had been making a new supply commitment to India, the President would have been bound under Section 403 to discourage it unless India accepted full scope safeguards. Is it proper for the President to encourage France not to require full scope safeguards in order to fulfill one of the United States' own contracts? How can the President encourage other suppliers to require full scope safeguards, and at the same time arrange for France to supply India without such safeguards? The portion of Section 403 quoted above would have

other nuclear suppliers require full scope safeguards on "nuclear materials . . . within the territory of any [supplier] nation . . . or under its control anywhere. . . ." Since the United States arranged for the French uranium supply, and is in a position to end it if India breaches, the French fuel is to that extent "within the control" of the United States. Because the United States does "control" this fuel under the Agreement for Cooperation, the United States seems itself to be violating the policy declared in Section 403.

IV. REMEDIES

Thus far, the discussion has been of United States rights. What remedies can the United States use to enforce these rights? To a certain extent, the remedies must depend upon which events occur. For example, India could begin to reprocess Tarapur fuel without United States permission. Or, India could detonate another "peaceful nuclear device" or deploy a nuclear weapon. India could also refuse to agree that safeguards and the pledge of peaceful use extend beyond 1993. Each of these events requires a response by the United States. One should ask what this response might be.

a. Judicial action

Could the United States bring India before the International Court of Justice? Should it do so? The International Court has jurisdiction in contentious matters only by the parties' consent. Parties may consent in three ways: (1) by a special agreement in which they refer a particular dispute to the Court for adjudication; (2) by a prior treaty or convention containing a clause which confers jurisdiction upon the Court; or (3) by a

declaration accepting compulsory jurisdiction under the "Optional Clause" of Article 36 of the Court's Statute.¹³⁰ If India agreed to refer its dispute with the United States to the Court, the Court would have jurisdiction under method (1) above. However, if India does not agree, there is no jurisdiction under this method. Method (2) requires a previous treaty between the parties which confers jurisdiction, but no such treaty between the United States and India appears to exist. One is left with method (3). Both India and the United States have accepted compulsory jurisdiction under the Optional Clause, but with reservations in their declarations of acceptance. These reservations -- particularly that of the United States -- are sufficient to defeat jurisdiction. India's declaration excludes jurisdiction of any dispute based on facts existing before the date of the declaration.¹³¹ India's current declaration became effective on September 15, 1974, and excludes jurisdiction over disputes based on facts prior to that date. The United States' declaration excludes jurisdiction of "disputes with regard to matters which are essentially within the domestic jurisdiction of the United States of America as determined by the United States of America."¹³² This is known as the Connally Amendment. The United States has taken the position that if the United States determines that a matter is within its domestic jurisdiction, "[t]his determination by the United States of America is not subject to review by any Tribunal."¹³³ The effect is to give the United States a unilateral veto over jurisdiction; the United States can defeat it simply by characterizing an issue as within its "domestic jurisdiction." Because adherence to the Optional Clause is based upon reciprocity, any nation sued by the United States can assert the Connally Amendment as a defense.¹³⁴ Norway defeated the Court's jurisdiction by asserting a similar reservation made by France,¹³⁵ and Bulgaria used the Connally Amendment itself to defeat a suit

by the United States.¹³⁶ Scholars have debated whether the Connally amendment is "valid",¹³⁷ but regardless of that, India would probably prevail on reciprocity if the United States based a suit on the Optional Clause, and the case would be dismissed for lack of jurisdiction.¹³⁸

There remains one last possibility: the IAEA could ask the Court for an advisory opinion. The Court is empowered to render such opinions to an organization authorized by the United Nations to request them,¹³⁹ and the IAEA is so authorized.¹⁴⁰ The Agency could ask the Court to declare the future rights and duties of the Agency, India, and the United States under the 1971 trilateral. The Court's power to render advisory opinions is, however, discretionary. One of the main principles governing that discretion is that the Court should preserve its fundamental purpose of deciding disputes among states, which means that it will not render an advisory opinion if to do so would amount to deciding a controversy between states without the consent of one of the parties.¹⁴¹ The Court has specifically refused to render an advisory opinion where it would be necessary to investigate and adjudicate facts bearing on a dispute between states which underlay the request.¹⁴² So, if India refused to go before the Court, and the IAEA were asked by the United States to request an advisory opinion, and the IAEA in a departure from its usual caution asked for such an opinion, the Court would probably refuse to render it because to do so would adjudicate the underlying dispute between the United States and India. Thus, the only way to bring India before the Court is with Indian consent.

b. Action on the AID Loan

AID loaned India 80 million dollars in 1963 to build the Tarapur

reactors. The loan was on generous terms: yearly interest of 3/4 of one percent over 40 years with the first payment due ten years after the first disbursement.¹⁴³ As of September 30, 1983, India still owed 50 million dollars on the loan.¹⁴⁴ Under the loan agreement, an "event of default" occurs if "the Agreement for Cooperation . . . is terminated for any reason. . . ."¹⁴⁵ Upon an event of default, AID may accelerate the loan and make the "Principal . . . due and payable immediately."¹⁴⁶ Thus, if India should reprocess Tarapur fuel without United States consent, or otherwise breach the Agreement for Cooperation, the United States could terminate the Agreement and demand immediate repayment of the 50 million dollars still outstanding on the loan. Failure by India to pay the \$50 million would violate the loan's repayment terms,¹⁴⁷ and would therefore be a default under all other AID loans to India. AID loans have a standard clause which makes a failure to make a required payment under any loan a default under all other loans to that country. Such a default allows AID to suspend disbursements under all current loans,¹⁴⁸ and to accelerate the principal still owing on all loans made in the past.¹⁴⁹ The suspension of disbursements would affect about 248 million dollars worth of payments still to be made on current loans.¹⁵⁰ Acceleration would affect about 2.5 billion dollars worth of principal still outstanding on past loans.¹⁵¹ India could, of course, avoid the effects on other loans simply by paying the 50 million dollars due on Tarapur. A breach of the Agreement of Cooperation would not be a default under any loan except that for Tarapur; only a failure to repay the Tarapur loan would be a default under other loans.¹⁵²

So, the United States could accelerate the Tarapur loan if India breached the Agreement for Cooperation. And if India did not pay the accelerated amount, the United States could suspend about 248 million dollars worth of

pending disbursements and accelerate about 2.5 billion dollars worth of outstanding principal. How realistic is this remedy? First, 248 million in disbursements is not large when compared to the foreign assistance available to India. In 1980, for example, India received a total of 1.48 billion from international agencies and almost another billion in bilateral assistance from developed countries.¹⁵³ In 1982, these amounts were .7 billion from international agencies and 1.27 billion from developed countries.¹⁵⁴ This is an annual current level of about 2 billion; 248 million is not a crucial number in comparison. The 2.5 billion of outstanding principal is more significant. However, for the United States to insist that India pay this amount immediately would strain bilateral relations to the limit. India would undoubtedly say that it had not breached the Agreement for Cooperation, that the Tarapur loan was therefore not in default, and that the 2.5 billion was therefore not due either. The United States could protest this view, but the United States probably would be remitted to its unilateral remedy of suspending disbursements under current loans. Even this would carry some risk, because the cash coming into the United States from India's loan repayments now exceeds the cash going out to India in new disbursements. Therefore, one concludes that the immediate price in AID dollars for breaching the Agreement for Cooperation would be either the 50 million due on the Tarapur loan, or, if India balks at that payment, 248 million in suspended disbursements. An additional price would be the loss of new assistance, which would surely be withheld until the Tarapur controversy was resolved.

c. Remedies Contingent Upon Events

1. India deploys a nuclear weapon

If India made such a weapon with CIRUS plutonium, India would have violated the peaceful use guarantee made in the heavy water agreement, which would breach that agreement. Would it also breach the Agreement for Cooperation? The peaceful use pledge in the Agreement's Article VII refers only to materials transferred "pursuant to this Agreement," and the Agreement refers only to Tarapur fuel. So the answer is "no". If India made the weapon with RAPP plutonium, India would have violated its promise of peaceful use to Canada and the USSR, and also have breached IAEA safeguards, which cover RAPP fuel. If India made the weapon from MAPP fuel, no agreement would be breached, but there would be other consequences. The timing of the deployment would be important, because no unrestricted plutonium will be available to India until MAPP-1 fuel is discharged from the reactor and reprocessed.

But how would this question come up? India has never admitted that its "peaceful nuclear device" of 1974 was a weapon. The following discussion assumes that India would fabricate and position a nuclear explosive device in such a way that its military purpose would be clear. If the deployment were clandestine, the United States would discover it through intelligence. Would the United States reveal its discovery to the world, and ask India which plutonium it used? That is not how governments usually respond to discoveries through intelligence. Only if India openly announced a deployment would the United States be likely to respond publicly. Such an announcement would only come in a crisis, and the United States' legal remedy under the heavy water agreement would have to be weighed along with other responses which the crisis

might demand. The heavy water was delivered long ago; performance of that agreement cannot be suspended. The only public remedy would be a request to France to suspend fuel deliveries to Tarapur. But, as stated above, misuse of CIRUS plutonium would not breach the Tarapur Agreement. However, deploying a weapon in breach of the heavy water agreement would be a fundamental change in U.S.-India nuclear relations, and would justify suspension or termination of the Tarapur Agreement under the doctrine of rebus sic stantibus. That doctrine is discussed more fully below. A termination for this reason would be an event of default under the Tarapur loan, and would allow the United States to accelerate payment of the 50 million dollars still outstanding. In the face of a weapon deployment, France would, as delegee, cut off the fuel supply. There would be no question of a United States "waiver" of its right to object to a weapons deployment; the United States reaction to the "peaceful nuclear device" in 1974, however mild, was not a reaction to a clearly military deployment.

If India announced that it had deployed a weapon made with MAPP plutonium, no agreement would be breached. However, there would still be a fundamental change in circumstances, because our partner in cooperation would have changed its character. India would now be committed to building nuclear weapons. This change too would probably justify suspension or termination under rebus sic stantibus. The United States would be bound to so contend, because United States domestic law prohibits "exports" to a non-nuclear weapon state which deploys a nuclear weapon,¹⁵⁵ and, under the analysis presented earlier, prohibits "cooperation" as well.¹⁵⁶ This would require the United States to instruct its delegee to halt deliveries, since deliveries under the Agreement are cooperation.

At this point it is necessary to discuss the doctrine of rebus sic

stantibus. It is the equivalent, in international law, of the common law principle which excuses performance of a contract because of unforeseen circumstances. The doctrine finds its most authoritative expression in the Vienna Convention on the Law of Treaties. Article 62 provides:

1. A fundamental change of circumstances which has occurred with regard to those existing at the time of the conclusion of a treaty, and which was not foreseen by the parties, may not be invoked as a ground for terminating or withdrawing from the treaty unless:

- (a) the existence of those circumstances constituted an essential basis of the consent of the parties to be bound by the treaty; and
- (b) the effect of the change is radically to transform the extent of obligations still to be performed under the treaty.

. . .

3. If, under the foregoing paragraphs, a party may invoke a fundamental change of circumstances as a ground for terminating or withdrawing from a treaty it may also invoke the change as a ground for suspending the operation of the treaty.¹⁵⁷

The United States is not party to the Vienna Convention, but the State Department has said that the Convention "is already recognized as the authoritative guide to current treaty law and practice."¹⁵⁸ The International Court of Justice has held the Convention to be a "codification of existing customary law"¹⁵⁹ on rebus sic stantibus, but the Court has not developed the doctrine beyond the Convention's definition.¹⁶⁰ If India and the United States were to go before the Court, the Court would apply the definition in the Vienna Convention. The United States invoked rebus sic stantibus in 1941 to suspend the International Load Lines Convention. Acting Attorney General Francis Biddle found that "peacetime commerce and voyages were assumed as the basis of the Convention," and since ten of the thirty-six parties were at war and sixteen others were under occupation, "[c]onditions essential to the operations of the convention, and assumed as a basis for it,

are in almost complete abeyance." Biddle concluded that the United States was released from the Convention by the doctrine of rebus sic stantibus.¹⁶¹ Although international applications of the doctrine are skimpy, the common law doctrine of unforeseen circumstances is well developed. The general principle is this: when circumstances change radically from those assumed by the parties as the basis for their agreement, and the change makes one party's performance impossible, or so much more burdensome as to be fundamentally different, then performance is excused unless the parties assumed the risk that the change might occur.¹⁶² How radical does the change have to be? There are several "classic" cases. The owner of an opera house was excused from a contract to let the house for a series of performances when the house was destroyed by fire through no fault of the owner.¹⁶³ The fire made the owner's performance impossible. But a shipping company was not excused from its duty to take cargo from the United States to Iran at the original contract price even though the closing of the Suez Canal (because of its invasion in 1956 by Great Britain and France) required sailing around Africa.¹⁶⁴ The performance was more burdensome, but not fundamentally different. The courts also excuse performance when one party's basic purpose under the contract would be frustrated. Persons who had contracted rooms at inflated prices to view the coronation procession of Edward VII were excused when Edward's illness caused the procession to be cancelled.¹⁶⁵ It was still possible to use the rooms, but the basic purpose of the contract -- known to both parties and reflected in the price -- was frustrated. In all these cases, the problem is to allocate risks. The courts assume that parties inevitably take risks under a contract -- that the price of grain will rise or fall, that goods will be ready by a certain date -- but that they do not risk everything which might occur. It would be possible to make the owner of the opera house pay damages

for not having his house ready when he promised, and possible to tell the disappointed renters of rooms that Pall Mall, though empty, was still there. But such results would change the nature of these undertakings, in the sense that risks would be imposed which were not foreseen, and which, under ordinary expectations, would not be understood as included. In the coronation cases, the court clearly assumed that the parties were not risking that the procession would be cancelled. Both parties understood the essential purpose to be viewing the procession.¹⁶⁶

How does this affect Tarapur? First, under Article 62 of the Vienna Convention, a breach of the peaceful use pledge in the heavy water agreement would be a "fundamental change of circumstances." By deploying a weapon, India would have shown itself unwilling to abide by its commitment -- a commitment the United States assumed India would keep at the time of the 1963 Agreement and throughout the period of nuclear cooperation -- and India would have shown itself committed instead to making weapons from its civilian nuclear program. The United States could not have foreseen such a breach at the time of the 1963 Agreement, and the United States cannot fairly be considered to have taken the risk of such a breach. India's explosion in 1974, though suspicious, was still not overtly military. In the words of Article 62, the pledge of peaceful use "constituted an essential basis of the consent of the parties to be bound. . . ." And failing to keep the pledge "is radically to transform the extent of obligations still to be performed. . . ." The pledge was essential to both the heavy water agreement and the Agreement for Cooperation. Once the pledge is broken, the nature of cooperation changes radically. As Attorney General Biddle pointed out, cooperation in a civilian context is not the same as cooperation in a military one. Without a reliable pledge of peaceful use, the essential purpose of the

United States -- to aid India in the peaceful use of nuclear energy -- can no longer be achieved. The United States' purpose would be frustrated. Under such circumstances, both Article 62 and the common law permit the United States to suspend or terminate the Agreement for Cooperation. The United States could do so through its delegee.

If India's weapon were made with MAPP plutonium, the case under international law would be less clear. No pledge would be broken. The United States could foresee, at the time of the 1963 Agreement, that India would build unrestricted facilities. There was always the risk -- though unappreciated at the time -- that India might use the facilities for weapons. One cannot say the risk was wholly unforeseen. However, actually to deploy a weapon still changes profoundly the conditions of cooperation. The change from electricity to atomic bombs is still "radical." The only thing more radical is to make the change in violation of a pledge. But regardless of any uncertainty under international law, the United States domestic law is still clear. Section 129 of the Atomic Energy Act would require the United States to cease cooperation as well as exports, and so require that France be instructed to suspend performance.

If India deployed a weapon made from RAPP plutonium, India would violate IAEA safeguards and the peaceful use pledge to Canada and the USSR. It would not violate any agreement with the United States. But, the United States could suspend or cancel cooperation under rebus sic stantibus. India's breach of safeguards would be a fundamental change in circumstances, similar to breach of the heavy water agreement discussed above. After such a deployment, the United States could no longer rely upon India to keep its word on either safeguards or peaceful use. Section 129 of the Atomic Energy Act would require the United States to halt cooperation through its delegee.¹⁶⁷

2. India detonates a nuclear explosive device

India would say the device was peaceful. Section 129 of the Atomic Energy Act would require an end to United States exports, and thus to cooperation, regardless of India's characterization. The United States would be required to instruct its delegee to end the fuel supply for Tarapur. Any military aid to India would be cut off by the Symington Amendment.¹⁶⁸ These statutes would apply regardless of the material India used in the device. If India used CIRUS plutonium, the question whether India had breached the heavy water agreement takes us back to the debate, discussed earlier, over what is a peaceful use.¹⁶⁹ If India used Tarapur plutonium, India would violate the promise it made in 1974 to devote Tarapur fuel "exclusively to the needs of . . . [the Tarapur] Station,"¹⁷⁰ and would thus breach India's own view of the Agreement for Cooperation. If India used MAPP plutonium, no agreement would be breached. The United States would have only the argument that a "peaceful nuclear device" is really a weapon, that a weapon fundamentally changes the nature of cooperation, and that the United States should be excused under rebus sic stantibus. The United States would also have this argument if CIRUS plutonium were used. This position, like the one discussed above for a weapon deployment, does not point to a clear result under international law. But United States domestic law would still require the United States to suspend deliveries to Tarapur, and would authorize the United States to terminate the Agreement for Cooperation and accelerate the Tarapur loan.

In summary, the result is this: the United States could, under international law, halt its delegee's fuel supply, and accelerate the Tarapur

loan, if India deployed a weapon made with either CIRUS, RAPP, or Tarapur plutonium. The same would be true if India breached safeguards at either RAPP or Tarapur. The United States might have these remedies for a deployment with MAPP plutonium, but this is less clear. If India exploded a nuclear device, the United States would have these same remedies if RAPP or Tarapur plutonium were used. If CIRUS or MAPP plutonium were used, the result is less clear; the United States has no explicit promise from India not to use CIRUS plutonium for nuclear explosives; it would be necessary to rely upon rebus sic stantibus. However, regardless of uncertainties under international law, United States domestic law would prohibit further deliveries to Tarapur if India deployed a nuclear weapon or exploded a nuclear device regardless of the material used.

3. India reprocesses without consent

This breaches the Agreement for Cooperation. It also gives India a stock of separated plutonium which India says becomes unrestricted nine years from now. The United States has not found (and need not and should not find) that safeguards can be effectively applied to PREFRE. If India reprocesses anyway, in breach of the Agreement, the United States has the same remedies as in "1" above for the deployment of a weapon. The United States could halt deliveries and accelerate the loan.

d. Perpetuity: The Heart of the Matter

India says all rights end in 1993. The effects of this position have already been described. The Tarapur reactors would have spent their lives

making unrestricted plutonium. That plutonium could be extracted without United States consent and transferred to anyone, or made into weapons which could be transferred to anyone. No records would be kept; no one would know when the plutonium was separated, how it was stored, whether it had been stolen, or anything else about it. The United States would have created a terrible precedent.

What can the United States do? First, there are certain legal rights. By rejecting perpetuity, India has repudiated an obligation which India has under a fair reading of the Agreement. In effect, India has declared that it will not perform its obligation when the time comes. Such a repudiation is a present breach under established contract principles.¹⁷¹ Each party to a contract is entitled to reasonable assurance that the other will perform obligations when they come due.¹⁷² When one party has reasonable grounds to believe that the other may not perform, assurances can be demanded, and if they are not forthcoming, performance can be suspended until they are received.¹⁷³ In the words of the Uniform Commercial Code, neither party should have "reasonable grounds for insecurity" about the performance of the other.¹⁷⁴ In this case, India has said repeatedly that it does not and will not recognize perpetuity for Tarapur fuel. This is a clear repudiation. It gives the United States "reasonable grounds for insecurity," and allows the United States to suspend its performance under both the Uniform Commercial Code and the Restatement (Second) of Contracts. The Restatement and the Code are both compilations of ordinary contract principles; these same principles apply to international contracts. Article 60 of Vienna Convention, for example, provides that "A material breach of a bilateral treaty by one of the parties entitles the other to invoke the breach as a ground for terminating the treaty or suspending its operation in whole or in part," and provides

further that "A material breach . . . consists in . . . a repudiation of the treaty not sanctioned by the present Convention. . . ." ¹⁷⁵ Article 2(1) defines a treaty as "an international agreement concluded between States in written form . . . whatever its particular designation." ¹⁷⁶ It follows from these principles that the United States has the right to demand three specific assurances from India. First, that India will never use the Tarapur reactors or their fuel for any military purpose; second, that India will never reprocess Tarapur fuel without United States consent; and third, that India will maintain safeguards on the Tarapur reactors and their fuel as long as either is within India's jurisdiction. ¹⁷⁷ These rights belong to the United States under any plausible reading of the Agreement; the United States is entitled to be assured that they will be observed. If the assurances are not given when demanded, the United States has the right to declare the Agreement breached, and to pursue the remedies described above. That is, to suspend the delegee's performance and accelerate the loan. The United States would also have this remedy under the doctrine of rebus sic stantibus. India's repudiation would be a fundamental change in the circumstances essential to peaceful cooperation, and would radically transform the United States' obligation under the Agreement.

If the United States pursues this remedy, what are the risks? First, India could stick to its denial of perpetuity. That would deny the rights asserted by the United States, deny that the United States was entitled to assurances, deny that the United States was entitled to suspend performance, and cause India to claim that the United States itself had breached. Such a breach, India would say, excuses India from further obligations. India could reprocess, consider the plutonium free of safeguards, and forget about peaceful use. How would the United States respond? It would have the legal

defenses mentioned above. It could offer, at the time of suspending its performance, to go before the International Court. An opinion could probably be had before the suspended deliveries had a critical effect.¹⁷⁸ But jurisdiction would be by consent, so India could refuse to adjudicate. If India did refuse, the parties would be at loggerheads. Each would deny the rights of the other and India must give in or face an end to the fuel supply. Would France end the supply under such conditions? The French have agreed to abide by the United State's interpretation of the Agreement.¹⁷⁹ As delegee they are bound to do so. If the United States suspends its performance, and orders France to stop delivery, and France continues, then France will have abandoned its role as delegee. Further deliveries would not be under the Agreement for Cooperation; they would be under a novation between France and India. This would amount to a new, independent supply commitment by France. However, under its adherence to the Nuclear Suppliers Guidelines, France cannot make such a commitment without requiring pursuit and perpetuity.¹⁸⁰ Neither can any other potential supplier of enriched uranium; all such suppliers adhere to the Guidelines.¹⁸¹ Moreover, the Guidelines require that, in the event of an

"illegal termination or violation of IAEA safeguards by a recipient, suppliers should consult promptly . . . [and] pending the early outcome of such consultations, suppliers will not act in a manner that could prejudice any measure that may be adopted by other suppliers concerning their current contacts with that recipient."¹⁸²

So under the Guidelines, neither France nor any other supplier would be likely to take over the fuel supply without perpetuity. Nor would any supplier "prejudice any measure" adopted by the United States. France would follow its delegor's order, and other suppliers would stay out of the fight. India's choice would be limited: provide assurances or close Tarapur.

Should the United States force such a choice? If the Indians are truthful about what they will do in 1993, what can the United States look forward to? Nine years from now the Indians will do what they wish with U.S.-supplied spent fuel. Why continue to supply until then? So India will have even more spent fuel? No one knows whether India will ever want Tarapur's plutonium for bombs; even India may not know. Regardless of that, however, India will still have the plutonium. If the United States allows its delegee to continue deliveries, there will simply be more plutonium than if deliveries are stopped. Would the Indians close down Tarapur rather than give in? Perhaps. If they did, they would probably reprocess the spent fuel and stockpile the plutonium. But that is what they say they will do with it anyway after 1993. Does it make a difference whether it is then or now? The present United States policy is to allow supply to continue in the hope that India will agree to perpetuity by 1993. Negotiations are now going on. But what strategy does the United States have, if India doesn't agree? The worst possible result would be for India to get deliveries up to 1993 and then repudiate its obligations. India will have got its way cost-free, and shown the world that the United States cannot enforce its agreements. The United States must ask itself what leverage it will have in 1993, when the last shipment has been made. As long as the supply continues, India can simply wait. If the United States allows things to drift along until 1993, the worst possible outcome will be assured. If there are only two choices -- a showdown now or a drift to 1993 -- the showdown seems better.

With the showdown, there is at least a chance that India will give in. India may find electricity from Tarapur, and freedom from repaying 50 million dollars immediately, more valuable than its strained reading of the Agreement. When India could not operate RAPP without imports, India accepted

safeguards in perpetuity to get Russian heavy water. There is no reason to think that, when faced with a similar choice, India would not accept perpetuity in order to run Tarapur. If India prefers to close Tarapur now rather than accept perpetuity, how likely will India be to accept perpetuity in 1993, when the reactors will be closing anyway? As 1993 approaches, the reactors approach the end of their useful lives, the loan balance falls, and the cost of rejecting perpetuity becomes smaller and smaller. Time erodes the United States' position.

e. Buying Back the Fuel: A Compromise

Should the United States repurchase Tarapur's spent fuel, or the plutonium made from it? With no plutonium or spent fuel left in India, the questions of safeguards and perpetuity disappear. This is a way around disagreements. However, there are serious problems.

First, if the United States were to buy unprocessed spent fuel assemblies, there is the question of transportation. Spent fuel assemblies are dangerous and must be shipped in protective casks weighing many tons. A recent study has concluded that, because of a shortage of available ships and shipping casks, and the limitations on the railroad from Tarapur to Bombay, it would take great expense over many years to repatriate Tarapur's spent fuel with existing techniques.¹⁸³ The study recommends a new concept in spent fuel transportation which might overcome these shortages and limitations. But the author's concept has not been tried, would require design and manufacture of new handling equipment, would require Indian approval, and might eventually require licensing review in the United States. It would require a strong commitment on both sides to make it work.

The second possibility is to buy only the plutonium. This avoids the problem of transporting the giant casks needed to ship spent fuel assemblies. But it would mean that India would be reprocessing U.S.-origin fuel under conditions where safeguards could not be effectively applied. It would also establish a precedent for allowing national reprocessing in yet another non-nuclear-weapon state, and one with a clear interest in weapons. Nonetheless, this alternative might still be possible if India agreed to extraordinary precautions at PREFRE. United States inspectors could be on duty throughout the plant continuously while Tarapur fuel was being reprocessed; plutonium could be delivered to United States custody as soon as available in separated form; it could be returned to the United States by air under military protection; etc. One could imagine suitable arrangements.

However, there is a further problem attached to both of the above solutions. That is the question of price. With respect to spent fuel assemblies, how much is India going to pay the United States for taking away India's high level nuclear waste? Or, is the United States going to pay India for the privilege of receiving a potentially valuable source of future energy? Shipment and handling will be expensive, regardless of the method used. Should the United States pay a high price just to get rid of the problem? Unfortunately, the price paid to India will be a precedent for the price demanded by others in similar situations. With respect to separated plutonium, the price will also be a problem. The United States does not use plutonium for commercial reactor fuel, and does not use civilian plutonium for weapons. How much should the United States pay for plutonium it will not use? Some amount, surely, in order to be rid of the problem. But will India accept an amount which the United States will pay?

The final problem with repurchase is Indian consent. The Agreement for

Cooperation permits the United States "first option" to purchase spent fuel or plutonium from Tarapur "which is in excess of the need of the Government of India for such material in its program for the peaceful uses of atomic energy."¹⁸⁴ If India does not want to sell, it can declare that it needs Tarapur plutonium for use in its energy program. Thus, there would be no "excess" for the United States to purchase.

What does one conclude about repurchase? It may or may not be feasible. It depends upon practical and financial factors which are unknown. For this solution to work the parties would have to want it to work, and would have to decide that it is better than any other alternative. They may never reach that point between now and 1993. From what is presently known, there is no reason to assume that repurchase can save the situation.

V. CONCLUSION

The above analysis can be summarized as follows: Tarapur's spent fuel contains enough plutonium to be significant, either in a weapons program, as an export to third countries, or as a target for theft. This is true despite the fact that India will soon have unrestricted plutonium available from MAPP-1. The United States can stop Tarapur's plutonium from being reprocessed because the United States can find in good faith that safeguards cannot be effectively applied to PREFRE. The United States should so find, because reprocessing at PREFRE would abandon the concept of timely warning, abandon the reprocessing time barrier, abandon the policy against allowing plutonium to be stockpiled in a non-nuclear-weapon state, and remit the United States to relying upon India's word, which has not been adequate in the past. India has rejected perpetuity under the Agreement for Cooperation, but a fair reading of

that Agreement makes perpetuity inherent in peaceful cooperation. India has refused to adopt full-scope safeguards, but the United States continues uranium deliveries by a delegee, probably in violation of the NNPA. If India reprocesses without consent, deploys a nuclear weapon, breaches safeguards, or continues to reject perpetuity, the United States can suspend performance by its delegee, and, if assurances are not received, terminate the Agreement and accelerate the Tarapur loan. This will be because India will have breached the Agreement for Cooperation, or because India's conduct will have fundamentally changed the circumstances of cooperation under rebus sic stantibus, or because India has given the United States reasonable grounds for insecurity about India's future performance.

These are the United States' rights and remedies. Which should it pursue? They all have costs. If India reprocesses without consent, deploys a weapon, or breaches safeguards, India will have imposed a cost on the United States unilaterally. That is, there will be the cost to the United States of seeing its Agreement flouted. Any additional cost, which would come from suspending performance, will be small compared to the cost in credibility of not reacting to the breach. If India continues to reject perpetuity, and the United States suspends performance until assurances are received, the cost is the chance that India will declare the United States in breach. India might reprocess the fuel, repudiate safeguards, and repudiate peaceful use. That is, however, what India says will happen anyway in 1993. There is also a possible benefit in suspending performance, which is that India might decide to accept perpetuity rather than close Tarapur. The alternative to suspending performance, which is to continue negotiations, also has a cost. The cost is the risk that India will never agree to perpetuity. If India does not, the Tarapur reactors will have spent their lives making unrestricted plutonium,

and India will have proved that the United States cannot control its exports. For perpetuity, the worst outcome is a drift to 1993. If that happens, India will have flouted the Agreement at no cost to itself. The need to impose a cost seems crucial. If the United States is unwilling to impose a cost on India for Tarapur, how can the United States convince other suppliers to be more strict with their recipients? By drifting to 1993, the United States would lose credibility in all its nuclear trade relations.

Because time is weakening the United States' position, the United States should take steps now to limit the period of drift. The sooner assurances are demanded, the greater is the effect on the Tarapur reactors, and the greater is India's incentive to find an accommodation. Setting a deadline for assurances also sets an outside limit to the drift. With both parties seeking to avoid a breach, the chances of accommodation are high. If there is no accommodation, it appears better for the United States to impose a cost on India, than to let India have its way by default.

Footnotes

¹The CIRUS reactor, rated at 40 megawatts (thermal), fueled by 10 tons of natural uranium, and moderated by heavy water (D₂O). For a history of the Indian nuclear program, see R. Wohlstetter, "The Buddha Smiles": Absent-Minded Peaceful Aid and the Indian Bomb (1977). See also Bhatia, India's Nuclear Bomb (1979).

²For a description of the debate on the source of heavy water for CIRUS, see R. Wohlstetter, id. at 144-156.

³Agreement, March 16, 1956, United States Atomic Energy Commission-India, § 9. The Canadian agreement is described in Hunt, Canadian Policy and the Export of Nuclear Energy, 27 Univ. of Toronto L. J. 69, 77 (1977).

⁴The Nuclear Non-Proliferation Act of 1978, Pub. L. No. 95-242, § 92 Stat. 120 (codified at 22 U.S.C. §§ 3201-3282) [hereinafter cited as NNPA].

⁵Id.; Pub. L. No. 95-242, § 306 (codified at 42 U.S.C. § 2157) (amending § 128 of the Atomic Energy Act of 1954).

⁶Agreement for Cooperation Concerning the Civil Uses of Atomic Energy, Oct. 25, 1963, United States-India, Art. X, 2 U.S.T. 1484, T.I.A.S. No. 5446.

⁷Reprocessing Status Report 19 (Nuclear Assurance Corporation, Norcross, Ga., Oct. 1983).

⁸Id.

⁹Nuclear News, Feb. 1984 at 71 and Mar. 1984 at 94; Hart, Nuclear Power in India, 39-49 (1983).

¹⁰Reprocessing Status Report, supra note 7, at 103.

¹¹Id. RAPP-1 has been shut down since early 1982 by leaks of heavy water. It is uncertain whether it will continue to operate. If it does not, the figure of 2,000 kilograms is much too high. See The Statesman (Calcutta)

Mar. 6, 1984 at 12.

¹²Nuclear News, Mar. 1984 at 94.

¹³Reprocessing Status Report, supra note 7, at 103.

¹⁴International Atomic Energy Agency, Annual Report for 1982, at 77.

¹⁵Benedict, Pigford & Levi, Nuclear Chemical Engineering 142 (2d ed. 1981) [hereinafter cited as Benedict] (the figures are for a pressurized water reactor).

¹⁶See, e.g., LaMarsh, The Production of Plutonium Isotopes and U-233 in American and Canadian Power Reactors, reprinted in Nuclear Proliferation Factbook 516, Environmental and Natural Resources Policy Division, Congressional Research Service (Sept. 23, 1977) [hereinafter cited as Nuclear Proliferation Factbook].

¹⁷Id. at 506.

¹⁸Hart, supra note 9, at 66; A. Wohlstetter, Addendum H to R. Wohlstetter, supra note 1, at 223; Last and Kiefer, Indian Atomic Energy Commission's Enriched Uranium Supply and Inventory Needs for the Tarapur Atomic Power Station, Sept. 16, 1976, reprinted in Export of Nuclear Fuel to India, Hearings and Markup before the House Committee on Foreign Relations, 95th Cong., 2d Sess. 319, 326-327 (May 23, June 8 and 14, 1978).

¹⁹Hart, supra note 9, at 67.

²⁰Hildenbrand, Fast Critical Masses of Fissile Material for Nuclear Explosives, 1977, reprinted in Nuclear Proliferation Factbook, supra note 16, at 382.

²¹These reactors are listed in Hart, supra note 9, at 37.

²²R. Wohlstetter, supra note 1; Letter from Myron Kratzer, United States Department of State, to Benjamin Huberman, United States Nuclear Regulatory Commission (June 29, 1976).

²³Committee on Foreign Relations, United States Senate, Analysis of Six Issues About Nuclear Capabilities of India, Iraq, Libya and Pakistan 2, (Jan. 1982) [hereinafter cited as Analysis of Six Issues].

²⁴Agreement of Mar. 16, 1956, United States Atomic Energy Commission-India, § 9, reprinted in Hearings on S. 1439, infra note 27, at 857.

²⁵Analysis of Six Issues, supra note 23, at 2.

²⁶In 1976, the State Department predicted that unrestricted plutonium would be available from the R-5 in 1978, might be available from RAPP after 1976, and would be available in large quantities from the MAPP and Narora reactors. Department of State, Comments (July 9, 1976) at 36-37, Edlow International Company, Docket No. 70-2131, United States Nuclear Regulatory Commission.

²⁷Letter from Robert J. McClosky, United States Department of State to Senator Abraham Ribicoff (June 2, 1976) reprinted in Hearings on S. 1439, The Export Reorganization Act of 1976, Before the Senate Committee on Government Operations, 94th Congress, 2d Sess. 854 (Jan. 19, 20, 29, 30 and Mar. 9, 1976).

²⁸Nucleonics Week 6-7 (July 1, 1976); R. Wohlstetter, supra note 1, at 153-154.

²⁹Letter from Myron B. Kratzer, United States Department of State, to Benjamin Huberman, United States Nuclear Regulatory Commission (July 20, 1976).

³⁰Id.

³¹Nucleonics Week, 6 (July 1, 1976).

³²In an Aide-Memoire provided to India in November of 1970, the United States said that it "would not consider the use of plutonium produced in CIRUS for peaceful nuclear explosives intended for any purpose to be 'research into and the use of atomic energy for peaceful purposes.'" Letter from Myron Kratzer, United States Department of State, to Benjamin Huberman, United

States Nuclear Regulatory Commission, 4-5 (June 29, 1976). The Aide-Memoire is quoted in Noorani, Indo-U.S. Nuclear Relations, 21 Asian Survey 399, 403 (April, 1981). The Indians rejected this interpretation, and rejected a similar interpretation made by Canada in 1971. Letter from Myron Kratzer, id. at 5.

³³The Nuclear Proliferation Factbook, supra note 16, at 375-376.

³⁴Id.

³⁵Id.

³⁶21 U.S.T. 483, T.I.A.S. No. 6839, 729 U.N.T.S. 161 (entered into force March 5, 1970).

³⁷Letter of June 29, 1976, supra note 32.

³⁸Id.

³⁹Hunt, supra note 3, at 77.

⁴⁰India has no highly enriched uranium, which is the only other material currently used to make nuclear weapons.

⁴¹Nuclear Fuel Cycle Materials, Services and Sources 100 (Nuclear Assurance Corporation, Norcross, Ga., Sept. 1983).

⁴²Id.

⁴³Id.

⁴⁴Cable 02291 from American Embassy New Delhi to U.S. Secretary of State (Feb. 3, 1983).

⁴⁵The Statesman, supra note 11.

⁴⁶Nuclear Fuel Cycle Materials, supra note 41.

⁴⁷Analysis of Six Issues, supra note 23, at 2. Twenty-three kilograms per year times 8 years equals 184 kilograms. The R-5 is moderated by heavy water. Like the CANDU reactors, it is refueled continuously and could be operated so as to produce "weapons grade" plutonium.

⁴⁸Thirty percent of 70 kilograms per year times 9 years = 189 kilograms.

⁴⁹A. Wohlstetter, supra note 18, at 221.

⁵⁰Id. at 223-225; Benedict, supra note 15, at 94, 110, 111 (the figures are for a PWR).

⁵¹A. Wohlstetter, supra note 18, at 223; Last and Kiefer, supra note 18, at 326-327; Benedict, supra note 15, at 142 (the figures are for a PWR).

⁵²CIRUS plutonium has been separated at the Trombay reprocessing plant, which operated from 1964 to 1975, when it was shut down for modification. Nuclear Fuel Reprocessing and Mixed-Oxide Fabrication Services 118 (Nuclear Assurance Corporation, Norcross, Ga., Sept. 1983). RAPP plutonium separation was started at PREFRE (the reprocessing plant built at Tarapur) at the end of 1982. Id. The Indians have stated that the RAPP plutonium will be used for the FBTR. Id. at 120, 128. The same statement appears in Hart, supra note 9, at 88. However, because the RAPP reactors carry safeguards and pursuant, one must assume that RAPP plutonium may not be used in the FBTR in order to keep the FBTR free of safeguards. This leaves only the CIRUS plutonium. Also, it is quite likely that work on the FBTR cores preceded the availability of RAPP plutonium. This would mean that only CIRUS plutonium would have been available for the first core at the time work began.

⁵³LaMarsh, supra note 16, at 516.

⁵⁴Letter from Homi N. Sethna, Chairman, Atomic Energy Commission of India, to Dixy Lee Ray, Chairman, United States Atomic Energy Commission (Sept. 17, 1974).

⁵⁵Agreement for Cooperation Concerning the Civil Uses of Atomic Energy, Oct. 25, 1963, United States-India, Art. VII.

⁵⁶Agreement of Mar. 16, 1956, United States Atomic Energy Commission-India, § 9.

⁵⁷Nine kilograms per year times 29 years = 261 kilograms.

⁵⁸According to Hart, supra note 9 at 57, India used 10 to 15 kilograms and achieved a yield of about 12 kilotons. According to Bhatia, supra note 1, at 147, India also used CIRUS plutonium to fuel the Purnima research reactor.

⁵⁹The FBTR, as described by Hart, supra note 9, at 87-88, is essentially a copy of the French Rapsodie-Fortissimo reactor. It will have a conversion ratio of .5 to .6 and will be cooled by liquid sodium. Its fuel will be 30% PuO₂ and 70% UO₂. The plutonium content will be about 50 kilograms and the UO₂ content about 120 kilograms. See also the Congressional Record, Extension or Remarks by Congressman Marcy Kaptur, E 593, (Feb. 23, 1983), citing an article by Milton R. Benjamin in the Washington Post on Feb. 20, 1983. According to Benjamin, India would require 50 kilograms of plutonium for the core of the FBTR.

⁶⁰The published literature widely assumes that 4 kilograms of weapons-grade plutonium is enough to make a bomb. See, e.g., Hildenbrand, supra note 20.

⁶¹United States Atomic Energy Commission, Report by Team Members on Visit to India 7 (Feb. 29-Mar. 18, 1960).

⁶²Id. at 16.

⁶³Id. at 19.

⁶⁴Summary Memorandum of Record, sent by A.A. Wells, United States Department of State, to M.N. Chakravarti, Government of India 7 (July 31, 1962).

⁶⁵Report to the General Manager by the Director, Division of International Affairs, Atomic Energy Commission, Proposed Safeguard Arrangements with the Government of India, 8 (May 8, 1963).

⁶⁶Contract of Sale of Enriched Uranium, May 17, 1966, United States-India.

⁶⁷Memorandum from Myron B. Kratzer, Division of International Affairs, to the Atomic Energy Commission (Sept. 21, 1966).

⁶⁸Letter from Myron B. Kratzer, United States Atomic Energy Commission, to N. Srinivasan, Bhabha Atomic Research Center, Bombay, India (Oct. 18, 1968).

⁶⁹Cable 22121 from American Embassy New Delhi to U.S. Secretary of State § 3, Oct. 23, 1980, citing Noorani, Indian Express (Oct. 13, 1980). See also, International Atomic Energy Agency, supra note 14, at 85.

⁷⁰Agreement of Jan. 27, 1971, United States-India-International Atomic Energy Agency §§ 4, 12, T.I.A.S. No. 7049.

⁷¹Agreement for Cooperation, supra note 6, Art. II C.

⁷²Where, for example, an assignment of mining leases on Navajo lands required the approval of the Secretary of the Interior, the assignee had an implied duty to request the Secretary's approval, and to furnish information necessary to that end, and failure by the assignee to do so prevents the assignee from relying on failure of the Secretary's approval in order to void the transaction and recover a downpayment. *Vanadium Corporation v. Fidelity & Deposit Co.* 159 F.2d 105 (2d Cir. 1947). See also Restatement (Second) Contracts § 245 (1979).

⁷³See, e.g., *Fry v. George Ekins Co.*, 162 Cal. App. 2d 256, 327 P.2d 905 (1958); Restatement (Second) Contracts § 225, illustration 8 (1979).

⁷⁴Restatement (Second) Contracts § 227, illustration 7 (1979).

⁷⁵See, e.g., *Haymore v. Levinson*, 8 Utah 2d. 66, 328 P.2d 307 (1958); Restatement (Second) of Contracts § 228 (1979).

⁷⁶Statute of the International Atomic Energy Agency, 8 U.S.T. 1093, T.I.A.S. No. 3873, 276 U.N.T.S. 3 (entered into force July 29, 1957).

⁷⁷International Atomic Energy Agency, Information Circular, The Agency's Safeguards System (1965, As Provisionally Extended in 1966 and 1968) (INFCIRC/66/Rev. 2) (Sept. 16, 1968).

⁷⁸The International Atomic Energy Agency, The Structure and Content of Agreements Between the Agency and States Required In Connection With the Treaty on the Non-Proliferation of Nuclear Weapons (INFCIRC/153 (Corrected)) (Vienna, June 1972).

⁷⁹International Atomic Energy Agency, IAEA Safeguards, An Introduction 14 (Vienna, Oct. 1981) [hereinafter cited as IAEA Safeguards]. See also, Herron, A Lawyer's View of Safeguards and Non-Proliferation, 24 IAEA Bulletin No. 3 at 34-35 (1982).

⁸⁰IAEA Safeguards, id. at § 5.

⁸¹Id. at §§ 28-30.

⁸²International Atomic Energy Agency, IAEA Safeguards Technical Manual, 33 (Vienna, 1976).

⁸³International Atomic Energy Agency, IAEA Contribution to INFCE, 7 (Vienna, 1979).

⁸⁴Id.

⁸⁵INFCIRC/153 (Corrected), supra note 78, at ¶¶ 7, 8.

⁸⁶Id. at ¶¶ 31, 51-69.

⁸⁷INFCIRC/66/REV.2, supra note 77, at §§ 3, 6.

⁸⁸Hildenbrand, supra note 20, at 382.

⁸⁹Herron, supra note 79, at 36.

⁹⁰Herron, id., at 37. The time required to process a report of material unaccounted for through channels at the IAEA has been estimated at six months. A. Wohlstetter, supra note 18, at 236.

⁹¹NNPA, supra note 4, at § 303(a).

⁹²IAEA Technical Safeguards Manual, supra note 82, at 36.

⁹³Hildenbrand, supra note 20.

⁹⁴India's export policies are not restrained by adherence to the NPT or the Nuclear Suppliers' Guidelines.

⁹⁵In October of 1981 the United States authorized the Japanese to reprocess, until 1984, up to 210 tons of U.S.-origin spent fuel per year at the Tokai Mura facility. This approval was recently extended. The approval is in line with President Reagan's policy of permitting reprocessing in countries with advanced nuclear power programs where reprocessing is not thought to create a proliferation risk. The decision does create a precedent, but Japan's situation is different from India's. Japan adheres to the NPT, so Japan's entire nuclear industry is open to international inspection. There is no problem, as there is in India, with unsafeguarded facilities. Japan is also a close ally of the United States, so one can expect that questions about material unaccounted for could be quickly resolved. Japan has not detonated a "peaceful nuclear device," and is not likely to do so. Also, Japan accepts safeguards in perpetuity. Only safeguarded, U.S.-origin fuel will be reprocessed at Tokai Mura, so there will not be the problem, as at PREFRE, of keeping safeguarded fuel separate from unsafeguarded fuel. Japan has agreed not to recycle the plutonium separated from U.S.-origin fuel in light water reactors, but to "co-convert" the plutonium at the site to a mixed-oxide product for use in reactor research and development. The Tokai Mura approval is described in Pilat and Donnelly, Nuclear Export Policy of the Reagan Administration: A Summary Analysis and Four Case Studies, Report No. 80-705, II-13 (Congressional Research Service, Apr. 1982).

⁹⁶Timely warning is the "foremost consideration" in deciding whether the United States should permit foreign reprocessing of U.S.-origin fuel.

NNPA, supra note 4, at § 303(a). The NNPA implies that other factors may also be relevant. For a discussion of this point see Bettauer, The Nuclear Non-Proliferation Act of 1978, 10 Law & Policy in Int. Bus. 1105, 1130 (1978).

⁹⁷ For a thorough discussion of the policy implications of reprocessing of Tarapur fuel, see A. Wohlstetter, supra note 18, at 236.

⁹⁸ Restatement (Second) Contracts § 201, comment c (1979).

⁹⁹ This conclusion is reinforced by the use of specific perpetuity provisions in subsequent agreements for cooperation. These subsequent provisions spell out what was previously understood by the nature of the undertaking. The fact that subsequent recipients have accepted these provisions shows a general international understanding that perpetuity is inherent in peaceful nuclear cooperation. See also IAEA Doc. No. GOV/1621, infra note 114, which requires pursuit and perpetuity for safeguards negotiated under the Nuclear Suppliers' Guidelines.

¹⁰⁰ NNPA, supra note 4, at § 306.

¹⁰¹ Id.

¹⁰² See Clausen, Nonproliferation Illusions, Tarapur in Retrospect, Orbis, 741, 752 (Fall 1983).

¹⁰³ Cable 22789 from American Embassy New Delhi to U.S. Secretary of State (Nov. 29, 1982). The agreement was made on Nov. 27, 1982.

¹⁰⁴ Id.

¹⁰⁵ Note to the United States from India (Nov. 30, 1982).

¹⁰⁶ Id.

¹⁰⁷ Note to India from the United States (Nov. 30, 1982).

¹⁰⁸ Id.

¹⁰⁹ The Times of India (Bombay), May 7, 1983 at 1.

¹¹⁰ See, e.g., Restatement (Second) Contracts § 280 (1979).

¹¹¹Id. at § 318.

¹¹²Personal communication with Bertrand Barré, Nuclear Attaché, Embassy of France (Feb. 2, 1984). In the negotiations on the takeover, the French attempted to get India to agree specifically that pursuit and perpetuity would attach to fuel deliveries, but the Indians resisted and the question was left open. Donnelly and Miller, Nuclear Termination of U.S. Nuclear Cooperation with India, Issue Brief No. 81087 (Congressional Research Service, June 23, 1983); Nucleonics Week 1 (Dec. 2, 1982).

¹¹³Restatement (Second) Contracts § 318 (1979).

¹¹⁴International Atomic Energy Agency, INFCIRC/254, Appendix: Guidelines for Nuclear Transfers § 4, 1978, incorporating the durational requirements of safeguards stated in IAEA Doc. No. GOV/1621 (1973).

¹¹⁵NNPA, supra note 4, at § 306.

¹¹⁶Atomic Energy Act of 1954, §§ 53, 123, 42 U.S.C. §§ 2073, 2153.

¹¹⁷42 U.S.C. § 2073.

¹¹⁸42 U.S.C. § 2153.

¹¹⁹42 U.S.C. § 2157.

¹²⁰The President signed the NNPA on March 10, 1978.

¹²¹42 U.S.C. § 2153c.

¹²²Section 123 of the Act now requires that all agreements for cooperation include full-scope safeguards, pursuit, and perpetuity. 42 U.S.C. § 2153. India's Agreement for Cooperation was signed before the new § 123 was enacted, and is not subject to the new criteria. Hence the need for renegotiation.

¹²³42 U.S.C. § 2153b.

¹²⁴H.R. Rep. No. 587, 95th Cong., 1st Sess. 12 (Aug. 5, 1977). The Senate version of § 128 actually became law; however, the House version of

§ 128 was substantially similar, so the intention of the House with respect to § 128 is as stated in the House Report.

¹²⁵Id. at 25.

¹²⁶Id. at 12.

¹²⁷Bettauer, supra note 96, at 1125 states:

" . . . the full-scope safeguards requirement mandates termination after a stated time limit of U.S. cooperation with those recipients that do not meet the requirement."

Mr. Bettauer is Assistant Legal Adviser for Nuclear Affairs, United States Department of State. Id. at 1105.

¹²⁸42 U.S.C. § 2153d.

¹²⁹Letter from Powell A. Moore, United States Department of State to the Honorable Richard L. Ottinger, U.S. House of Representatives (Jan. 27, 1983). India has also shown that it regards the Agreement as still in force. In 1980 and 1981 India applied for permission under the Agreement to export spare parts for the Tarapur reactors. United States Nuclear Regulatory Commission, Docket Nos. 1100012, 11002063, 11002071, 11002269, 11002284, 11002327. The applications are still pending, and are opposed by intervenors. Petition of the Nuclear Control Institute, Federation of American Scientists, Union of Concerned Scientists, Greenpeace, U.S.A., Energy Research Foundation, and Committee for a Sane Nuclear Policy for Leave to Intervene and Request for Hearing (July 28, 1983). Resolutions pending in Congress would prevent these exports unless India agreed to forego nuclear explosive devices, to accept perpetuity, and to assure the United States that it is not engaged in a program to develop nuclear weapons. H.R. Con. Res. 156, 98th Cong., 1st Sess. (1983); S. Res. 198, 98th Cong., 1st Sess. (1983). Also, pending amendments to the Export Administration Act of 1979 would prevent these exports unless India agrees to full scope safeguards. S. 979,

98th Cong., 1st Sess. (1983).

¹³⁰ Statute of the International Court of Justice, Article 36; Oppenheim, International Law: A Treatise, 58-59 (H. Lauterpacht 7th ed. 1952).

¹³¹ 1981-1982 I.C.J.Y.B. 71-72 (1982).

¹³² 1981-1982 I.C.J.Y.B. 92 (1982).

¹³³ Interhandel (Switz. v. U.S.), 1959 I.C.J. 6; Gross, Bulgaria Invokes the Connally Amendment, 56 Am. J. Int'l L. 357, 359 (1962).

¹³⁴ Certain Norwegian Loans (Fr. v. U.S.), Judgment, 1957 I.C.J. 9. Under the doctrine of reciprocity, "each party is entitled to invoke to its benefit any relevant reservation appearing in its own declaration or in that of the other party." 1 Rosenne, The Law and Practice of the International Court 386 (1962).

¹³⁵ Certain Norwegian Loans, id.

¹³⁶ Aerial Incident of July 27, 1955 (Isr. v. Bulgaria; U.S. v. Bulgaria; U.K. v. Bulgaria), 1959 I.C.J. Pleadings. The United States conceded Bulgaria's right to invoke the Connally Amendment through reciprocity, but argued that the determination of domestic jurisdiction must be made in "good faith." This implied that the United States' own determination -- made if the United States were being sued -- would be subject to the Court's review. When the United States recognized the contradiction between this argument and its earlier position in Interhandel, it withdrew the argument. Gross, supra note 133, at 371.

¹³⁷ The arguments are presented in Gross, supra note 133, at 375-377. The alternatives seem to be that: (1) the entire United States declaration of acceptance could be invalid; (2) only the Connally Amendment itself is invalid and the remainder of the declaration is preserved; (3) the Connally Amendment

is valid, which deprives the Court of the right to determine its own jurisdiction (and contradicts Article 36, § 6 of the Court's Statute); (4) the Connally Amendment can be invoked only in good faith.

¹³⁸Certain Norwegian Loans, supra note 134.

¹³⁹Statute of the International Court of Justice, Art. 65, § 1.

¹⁴⁰Statute of the International Atomic Energy Agency, Art. XVII B., 3988 U.N.T.S. 4, 34 (1957); Authorization to the International Atomic Energy Agency to Request Advisory Opinions of the International Court of Justice: G.A. Res. 1146 (XII) (Nov. 14, 1957).

¹⁴¹² Rosenne, supra note 134, at 708-709.

¹⁴²Status of Eastern Carelia, 1923 P.C.I.J., ser. B, No. 5 28-29. See also, Western Sahara, 1975 I.C.J. 12.

¹⁴³Loan Agreement Between the President of India and the United States of America (A.I.D. Loan No. 386-H-091) (Dec. 7, 1963) [hereinafter cited as Loan Agreement]. The loan is discussed in R. Wohlstetter, supra note 1, at 82, and in Hart, supra note 9, at 39.

¹⁴⁴Office of Financial Management, Agency for International Development, Status of Loan Agreements 65 (Sept. 30, 1983).

¹⁴⁵Loan Agreement, supra note 143, at § 103.1(d).

¹⁴⁶Id.

¹⁴⁷Id., § 103.1(a). I am indebted to Leonard S. Spector, Senior Associate, Carnegie Endowment for International Peace, for suggesting the connection between the Tarapur loan and other loans to India.

¹⁴⁸AID can suspend disbursements if

"the Borrower shall have failed to pay when due any interest, installment of principal, or other payment required under any loan, guaranty, or other agreement between the Borrower or any of its agencies and the Government of the United States or any of its agencies."

AID, Standard Form Loan Provisions Annex, Section D.3(d).

¹⁴⁹Id. at § D.2(c).

¹⁵⁰Status of Loan Agreements, supra note 144, at 72.

¹⁵¹Id. at 72, 90.

¹⁵²Section 103.2(e) of the Tarapur loan makes any default under another loan to India a cause for suspension of disbursements under the Tarapur loan. If other loans to India contained this same language, a breach of the Agreement for Cooperation, which would be a default under the Tarapur loan, would also be a default under all other loans to India. However, other loans to India do not appear to contain this language. In order for disbursements to be suspended under these other loans, there would have to be a failure to repay the Tarapur loan, not simply a default under it.

¹⁵³AID, Congressional Presentation for Fiscal Year 1984, Annex II, Asia, 43.

¹⁵⁴Id.

¹⁵⁵No nuclear materials . . . shall be exported to --
(1) any non-nuclear-weapon state that is found by the President to have, at any time after the effective date of this section,
(A) detonated a nuclear explosive device; or
(B) terminated or abrogated IAEA safeguards; or
(C) materially violated an IAEA safeguards agreement;
or
(D) engaged in activities involving . . . special nuclear material and having direct significance for the manufacture . . . of nuclear explosive devices. . . .

Atomic Energy Act of 1954 § 129; 42 U.S.C. § 2158.

¹⁵⁶See the text, supra, accompanying notes 115-129.

¹⁵⁷Vienna Convention on the Law of Treaties, U.N. Doc. A/CONF 39/27 (May 23, 1969). The Convention entered into force in 1980 upon accession by thirty-five states. U.N. Doc. ST/LEG/SER.E/1 (1982).

¹⁵⁸Exec. Doc. L., 92d Cong. 1st Sess. 1 (1977).

¹⁵⁹Fisheries Jurisdiction Case, 1973 I.C.J. 1, 18.

¹⁶⁰The Court has applied the doctrine to two cases: Free Zones of Upper Savoy and the District of Gex, 1932 P.C.I.J. ser. A/B, No. 46, and Fisheries Jurisdiction Case, *id.* In neither did it significantly elaborate the doctrine.

¹⁶¹40 Op. Att'y Gen. 119 (1941). The United States position was not adjudicated. This appears to be the only instance in which the United States has invoked the doctrine.

¹⁶²See, e.g., Restatement (Second) Contracts §§ 261, 265 (1979).

¹⁶³Taylor v. Caldwell, 3 B. & S. 826, 32 L.J., Q.B. 164 (1863).

¹⁶⁴Transatlantic Finance Corp. v. United States, 363 F.2d 312 (D.C. Cir. 1966). See also Restatement (Second) Contracts § 281, illustration 10 (1979).

¹⁶⁵Krell v. Henry, 2 K.B. 740 (1903).

¹⁶⁶For a succinct discussion see Murray on Contracts, § 202 (1974).

¹⁶⁷Section 129 also forbids cooperation with any non-nuclear weapon state which abrogates IAEA safeguards or materially violates an IAEA safeguards agreement. Note 155, *supra*.

¹⁶⁸The Symington Amendment to the Foreign Assistance Act of 1961 in the International Security Assistance Act of 1977, Pub. L. No. 95-92, 91 Stat. 620 (1977), 22 U.S.C. § 2429a.

¹⁶⁹See the text, *supra*, accompanying notes 32-39.

¹⁷⁰Letter of Sept. 17, 1974, *supra* note 54.

¹⁷¹"A repudiation is
(a) a statement by the obligor to the obligee indicating that the obligor will commit a breach that would of itself give the obligee a claim for damages for total breach. . . ."

Restatement (Second) Contracts § 250 (1979).

When either party repudiates the contract with respect to a performance not yet due the loss of which will substantially impair the value of the contract to the other, the aggrieved party may

- (a) for a commercially reasonable time await performance by the repudiating party; or
- (b) resort to any remedy for breach . . .; and
- (c) in either case suspend his own performance. . . .

Uniform Commercial Code § 2-610 (1978).

- 172(1) Where reasonable grounds arise to believe that the obligor will commit a breach by non-performance that would of itself give the obligee a claim for damages for total breach . . ., the obligee may demand adequate assurance of due performance and may, if reasonable, suspend any performance for which he has not already received the agreed exchange until he receives such assurance.
- (2) The obligee may treat as a repudiation the obligor's failure to provide within a reasonable time such assurance of due performance as is adequate in the circumstances of the particular case.

Restatement (Second) Contracts § 251 (1979).

- 173(1) A contract for sale imposes an obligation on each party that the other's expectation of receiving due performance will not be impaired. When reasonable grounds for insecurity arise with respect to the performance of either party the other may in writing demand adequate assurance of due performance and until he receives such assurance may if commercially reasonable suspend any performance for which he has not already received the agreed return.

Uniform commercial Code § 2-609 (1978).

174 Uniform Commercial Code, id.

175 Vienna Convention on the Law of Treaties, supra note 157, Art. 60.

176 Id., at Art. 2(1).

177 India has argued that safeguards do not apply to the Tarapur reactors except through safeguards on fuel. Article VI of the Agreement, which establishes safeguards, contains the following provision, which was

added at India's request:

The Government of India emphasizes, in contrast to the position of the United States, that its agreement to the provisions of this Article in relation to equipment or devices transferred pursuant to this Agreement, has been accorded in consideration of the fact that, as provided in this Agreement, the Tarapur Atomic Power Station will be operated on no other special nuclear material than that furnished by the Government of the United States of America . . . in consequence of which the provisions of this Article in relation to equipment or devices in any case ensue from the safeguards on fuel.

It is important to notice that this statement is only an editorial remark. The operative language of Article VI gives the United States the right (in Article VI B.1.) to review the design of any facility used to reprocess spent fuel "produced in the Tarapur Atomic Power Station." This language catches fuel furnished to Tarapur by non-U.S. suppliers, and therefore means that the reactors themselves are safeguarded. Article VI B.2., which requires a system of records, is written the same way. It catches all material, by whatever supplier, "produced in the Tarapur Atomic Power Station." It is clear that these operative provisions override India's editorial remark. Second, the editorial remark pertains only to Article VI. It does not qualify the pledge of peaceful use in Article VII, which expressly applies to any "material, equipment or device transferred to the Government of India" So Article VII clearly restricts the reactors, as well as the fuel, to peaceful use. Finally, there is no connection between the remark and the right of the United States to approve reprocessing under Article II. The remark was directed only to safeguards under Article VI, and cannot be used to suggest that reprocessing approval has any link to fuel supply. If anything, the self-limiting language of the remark is evidence that reprocessing control is not linked to fuel supply.

¹⁷⁸See Last and Kiefer, supra note 18.

¹⁷⁹A decision to cut off India's supply would probably require affirmative action by France's Conseil de Politique Nucléaire Extérieure.

Personal communication with Bertrand Barré, supra note 112.

¹⁸⁰INFCIRC/254, supra note 114, Guidelines at § 4.

¹⁸¹Id. at §§ 1-6.

¹⁸²Id., Guidelines at § 14.

¹⁸³T.D. Davies, A Logistic Concept for Return of Tarapur Spent Fuel (Oct. 31, 1983). The possibility of repurchase was discussed in 1976 but could not be worked out. See Edlow International Company, 5 NRC 1358, 1375, 1378 (1977).

¹⁸⁴Agreement for Cooperation, supra note 6, Art. II F.

