

CHAPTER 7

PERSUADING COUNTRIES TO FORGO NUCLEAR FUEL-MAKING: WHAT HISTORY SUGGESTS

Richard S. Cleary

INTRODUCTION

In recent years, there has been a resurgence of proposals designed to limit the spread of nuclear fuel-making facilities, with the understanding that ostensibly peaceful technology can allow for the production of the fissile material required for a nuclear weapon. With U.S. proposals ranging from the Global Nuclear Energy Partnership (GNEP) to a revamped, “Gold Standard” bilateral nuclear cooperation agreement, a wider array of tools has been put at the disposal of American policymakers. Prominent members of the international community have become agitated about the prospect of the proliferation of fuel-making technology as well, with numerous proposals of fuel assurances put forward by such disparate figures as Russian President Vladimir Putin and former Director of the International Atomic Energy Agency (IAEA) Mohamed El Baradei. But renewed enthusiasm for nonproliferation begs questions about how novel are the proposed instruments, and, moreover, how effective they are likely to be, particularly for the country historically at the head of nonproliferation efforts, the United States. A review of this historical record suggests that optimism about the U.S. ability to dissuade countries from this path is misplaced.

This chapter considers supply side proposals of fuel assurance and multilateral fuel-making, as well as specific interventions on both the supply and demand sides, consulting particular cases in Iran (1974-78), West Germany-Brazil (1975-77), South Korea (1974-76), and Pakistan (1972-80) to draw lessons about the effectiveness of U.S. practices under differing circumstances. The record these cases give is mixed, due to two principal causes. The first is the failure of the United States to prioritize consistently nonproliferation efforts, given Washington's global and competing interests that tend to be embraced by different factions in the federal government apparatus but whose ultimate arbiter is the President (along with his close advisors). The second is the tendency of decisions about nuclear fuel-making by the state in question to be influenced more by fundamental trends or factors than diplomatic maneuvering from Washington; diplomacy is most effective when it has the political, economic, and military backing to implicate these issues. The most important factor in U.S. efforts has tended to be the bilateral relationship between Washington and the country at hand. Decisionmakers who consider their country's relationship with the United States to be strategically vital—and believe that fuel-making would threaten this relationship—are most likely to forgo enrichment and reprocessing (ENR) technology. This calculus can be informed by a range of dynamics, some beyond U.S. control, such as security concerns, issues of prestige, and commercial and industrial interests. Domestic politics and public opinion, both in the United States and in the country considering fuel-making, can be influential.

One of the fundamental tensions of American nonproliferation efforts lies with the Nuclear Nonprolifer-

ation Treaty (NPT), the international legal framework of reference in nonproliferation matters. The prevailing interpretation of the NPT centers on what has been referred to as the “fundamental bargain”: in exchange for nuclear-weapons states’ movement toward disarmament and their sharing of technology and expertise for peaceful nuclear energy, non-nuclear weapons states will not pursue the bomb.¹

One portion of the NPT, in particular, has borne on U.S. efforts to persuade countries not to pursue nuclear fuel-making technology: In Article IV, the NPT enshrines the “inalienable right . . . to develop research, production and use of nuclear energy for peaceful purposes,” and pledges signatories to “undertake to facilitate . . . the fullest possible exchange of equipment, materials and scientific and technological information for the peaceful uses of nuclear energy.”² Traditionally, the United States has elected for an ambiguous middle ground, not denying an Article IV “inalienable” right to fuel-making, but not acknowledging it either.³ While U.S. interpretations of the NPT have not, as a practical matter, stemmed its attempts to convince countries to eschew nuclear fuel-making technology, the NPT’s bargain has shaped certain stances, particularly supply side proposals such as fuel assurances.

The application of U.S. national power, on both the supply and demand sides of nuclear fuel-making, can play a role in convincing countries of the benefits of their relationship with Washington and the costs to be incurred if this relationship were fractured. The adroit use of “sticks” and “carrots” can withhold or provide incentives for cooperation, convincing countries considering ENR that the risks of doing so outweigh the benefits. The case studies examined here suggest that

if the United States is to give the impression that a bilateral relationship rests in the balance, Washington may have to undertake risks of its own, perhaps compromising other policy objects for the sake of nonproliferation. When the circumstances have called for Washington to put nonproliferation goals above others, policymakers have often failed to do so.

ASSURANCES OF SUPPLY AND MULTILATERAL ARRANGEMENTS

The earliest American efforts to dissuade countries from developing nuclear fuel-making facilities were offers of international control of the atom. When the Soviet Union developed a nuclear arsenal, proposals of international control gave way to multilateral fuel-making facilities and fuel banks. There is a consistency of spirit in these proposals, grounded in the belief that a positive inducement is possible on the supply side and, more particularly, that countries will forgo nuclear fuel-making if satisfied by disarmament, or promises thereof, as well as fuel supply and other assurances.

The first systematic American attempt to grapple with the potential for nuclear weapons proliferation—and the role of fuel-making facilities in proliferation—was the so-called Acheson-Lilienthal Report. This document was the product of a committee organized by Secretary of State James Byrnes, and which included Under Secretary of State Dean Acheson, Tennessee Valley Authority chairman David Lilienthal, and a number of prominent members of the Manhattan Project, notably Robert Oppenheimer. The committee was charged with elaborating a U.S. nuclear policy to be put forward to the newly-created United Nations

Atomic Energy Commission (UNAEC).⁴ The Acheson-Lilienthal Report, drafted over the course of only a few months, proposed that all fissile material – and its means of production – be concentrated in an “Atomic Development Authority.” The text acknowledged explicitly the connection between fuel-making, both in enrichment and reprocessing, and the manufacture of nuclear weapons:

Operations, like those at Hanford and Oak Ridge and their extensions and improvements, would be owned and conducted by the Authority. Reactors for producing denatured plutonium will be large installations and by the nature of the process they will yield large amounts of energy as a byproduct. . . . These production plants are intrinsically dangerous operations. Indeed they may be regarded as the most dangerous, for it is through such operations that materials can be produced which are suitable for atomic explosives.⁵

The hope of the Acheson-Lilienthal Report was that by investing an international body with authority over fuel-making facilities, uranium ore mining assets, inspections powers, and “licenses to those countries wishing to pursue peaceful nuclear research,” proliferation of nuclear weapons could be averted.⁶ A key portion of the text was the elimination of the “national nuclear arsenals” – that is, the only then-extant arsenal, the American one – and the report implied that U.S.-Soviet cooperation would be crucial. This grand bargain, premised on U.S. generosity in giving up its nuclear weapons and Soviet compliance in not developing them, was intended to give the world the benefits of peaceful nuclear energy, while keeping a close hold on sensitive facilities. While the hope for Soviet cooperation was misplaced – Moscow was hard in

pursuit of a nuclear weapons capability – the authors did have a clear-eyed understanding of the dual nature of nuclear fuel-making technology.⁷

The next major proposal, closely based on the Acheson-Lilienthal Report, would come from Bernard Baruch, the U.S. delegate to the UNAEC. Baruch's insistence that UN Security Council members should forgo their vetoes on proliferation-related matters, as well as his modified stance on U.S. nuclear disarmament – Washington should only disarm when "guarantee[d] of safety" – were objected to by the Soviet Union, which refused to agree to the proposal. However, Baruch's plan did retain the Acheson-Lilienthal elements related to international control of fuel-making facilities, seeing their utility both in the nonproliferation of nuclear weapons and the spread of peaceful nuclear power.

Just as Acheson-Lilienthal had, Baruch envisaged an international body that "should exercise complete managerial control of the production of fissionable materials in dangerous quantities and must own and control the product of these plants." The rejection of the Baruch Plan spelled the end of U.S. proposals for international control of nuclear fuel-making. Later proposals of multilateral or international fuel-making facilities would not concentrate all fuel-making capacity in a single body. Rather, they would see multilateral facilities as enabling the spread of peaceful nuclear energy to nonweapons states, while minimizing the threat of diversion toward nuclear weapons. These facilities were understood as part of a grand bargain whereby nonweapons states would be assured of fuel for peaceful purposes in exchange for eschewing nuclear weapons.

U.S. President Dwight Eisenhower's "Atoms for Peace" speech, delivered to the UN General Assembly in 1954, outlined this basic bargain, later enshrined in the NPT. By the time of Eisenhower's speech, the Soviet Union had conducted nuclear weapons tests—including at least one hydrogen bomb test—and the United Kingdom (UK) and Canada also had access to "the secret."⁸ Atoms for Peace kept the spirit of earlier proposals, which had emphasized disarmament, nonproliferation, and the spread of "peaceful" nuclear energy, but the President never touched on the danger of fuel-making facilities and their dual application. In his speech, Eisenhower called for the creation of an international body that would both conduct inspections and, by receiving contributions of fissile materials in what might be called today a fuel bank, ensure that all states would receive the benefits of peaceful nuclear energy. Eisenhower's proposal was premised in part on the idea that "the knowledge [of nuclear weapons development] now possessed by several nations will eventually be shared by others, possibly all others."⁹

Just as the Acheson-Lilienthal and Baruch plans had reflected the dynamics of a world where only one nation held nuclear weapons, Atoms for Peace was penned in a period when the peaceful benefits of nuclear power were expected to be great. To some, there was good reason to think that the trade-off between civilian and military nuclear power could be a favorable one. Eisenhower's speech resulted in a program, also called Atoms for Peace, whereby the United States transferred small-scale research reactors and fuel to developing countries around the world. The Atoms for Peace program has been criticized for spreading sensitive technology to countries that went on to develop nuclear weapons. Still, the basic bargain

elaborated in *Atoms for Peace* would be incorporated in the 1968 NPT, which remains the legal framework of reference in matters of nonproliferation.

In recent years, the United States has again proposed a multilateral fuel facility as a means of resolving supply side concerns – and denying countries the argument that building fuel-making facilities is necessary. U.S. President Barack Obama, in a noted speech in Prague, The Czech Republic, has called for an international fuel bank.¹⁰ Obama’s proposal follows a number of appeals for multilateral, or international, facilities following Mohamed ElBaradei’s 2003 proposal for putting all fuel-making facilities under “multinational control.”¹¹ U.S. President George W. Bush also proposed, while not a multilateral facility, assurances by fuel-cycle states to those seeking fuel for peaceful purposes.¹²

The persistence of fuel-assurance proposals, particularly those related to multilateral fuel-making facilities, is striking – as is the absence of a multilateral facility in the mold proposed by Eisenhower, Obama, ElBaradei, and others. While there are a number of reasons why such a facility has not materialized, the best explanation seems to be that, other than satisfying the demand for equity as understood in the NPT grand bargain, there would be little discernible commercial advantage to one. An ample supply of nuclear fuel already exists and is priced on the international marketplace, and most countries have no difficulty in accessing this supply.¹³ This supply side solution, then, has not taken hold because it has not assured the commodity in demand.

MULTILATERAL REPROCESSING IN SHAH REZA PAHLAVI'S IRAN

The multilateral fuel-making facility has not simply been an abstract offer reserved for international fora. This concept, supported publicly by U.S. Secretary of State Henry Kissinger, was folded into negotiations between the Gerald Ford administration and Shah Reza Pahlavi's regime toward a bilateral nuclear cooperation agreement.¹⁴ The multilateral option figured prominently in a proposed text of the agreement in May 1976, but was rejected by Iranian negotiators, and eventually discarded by U.S. negotiators.¹⁵ Amid increasingly strict oversight from Congress, the multilateral option was absent altogether from the second proposed agreement text, presented in August 1978.¹⁶ Indeed, negotiations between the United States and Iran never materialized in a signed, binding agreement, interrupted first by the 1976 presidential election and later by turmoil in Iran that led to the Shah's overthrow.¹⁷ This case raises larger questions about how the United States has prioritized nonproliferation, how the policymaking process works, the means the United States has had at its disposal to combat the proliferation of sensitive fuel-making technologies, and, finally, what motivates countries to pursue nuclear fuel-making facilities.

Negotiations between Washington and Tehran, lasting from 1974 until late-summer 1978, came in a period of great nonproliferation concern internationally in the aftermath of the May 1974 Indian nuclear test. The U.S. Congress was particularly exercised about the prospect of the further spread of fuel-making technology, and multilateral ownership of ENR facilities was embraced as a potential solution. The

U.S. National Security Council's Under Secretaries Committee reached the same conclusion, advising a policy "encouraging multinational plants" (or bilateral plants involving the U.S.) in order to "restrict the spread of independent national uranium enrichment and chemical reprocessing facilities."¹⁸ The multilateral option was attractive in part because it did not deprive countries of fuel-making technology, thereby adhering to promises made in NPT negotiations.¹⁹

Limiting the proliferation risk of the Shah's nuclear program would be crucial, given U.S. suspicions about Tehran's true intent. In an interview in Paris following the 1974 Indian nuclear test, the Shah was quoted as saying that Iran would have a nuclear weapon "without any doubt, and sooner than one would think."²⁰ This gaffe echoed the conclusions of the U.S. intelligence community that Iran was a proliferation threat, albeit not in the short-term.²¹ Another indication, perhaps, of the Shah's ultimate objective came with the attempted May 1975 purchase of Lance surface-to-surface missiles, judged to be uneconomical for any nonnuclear purpose by the U.S. Department of Defense (DoD).²²

Despite these concerns, there were several perceived advantages to reaching an agreement with the Shah, advantages that, in the eyes of some, could be compromised by over-zealous nonproliferation efforts.²³ First, the Shah's regime was a cornerstone of U.S. policy in the greater Middle East. National Security Study Memorandum (NSSM) 219, which would inform an April 1975 presidential directive on the nuclear negotiations with Iran, described the discussions as critical to the U.S.-Iran relationship:

Our [the U.S.'] ability to reach a mutually satisfactory agreement with Iran on the proposed nuclear accord is expected to have a very considerable political as well as economic importance to U.S.-Iranian relationships. . . . Conversely, failure on our part to resolve the remaining issues could have serious short, as well as long-term, adverse effects in our relations, given the Shah's sensitivity towards U.S. attitudes and Iran's strong desires to be treated in a non-discriminatory manner and as a nation that often has supported U.S. interests.

Second, the potential commercial benefits to reaching an agreement with Iran were substantial: The Shah planned a 20,000-megawatt civilian nuclear system, with 6-8 reactors presumably coming from the United States, for an estimated total of \$6.8 billion.²⁴ Were the Shah to invest in an enrichment plant on U.S. soil, he would have brought an additional \$1 billion to U.S. hands. Finally, and counterintuitively, there was a nonproliferation advantage to reaching an agreement: Should the United States demand overly stringent guidelines, it might drive the Shah away from the U.S. and toward less scrupulous nuclear suppliers, undermining U.S. goals in this area.²⁵ Iranian dealings with France and West Germany seemed to affirm this concern.²⁶

The multilateral option figures prominently in early proposals as a way to soften Washington's "veto" on the reprocessing of U.S.-origin spent fuel. For example, U.S. negotiators indicated to their Iranian counterparts that Washington, despite its veto:

would look sympathetically on Iran's request to perform such reprocessing services. We [the U.S.] have indicated that one factor favoring U.S. approval would be a decision on the part of Iran to establish any repro-

cessing plant on a multinational basis with the active involvement of the country helping to establish the facility.²⁷

The multinational option, however, was quickly derailed. In negotiations in Vienna, Austria, in October 1975, the U.S. veto over reprocessing, as well as the multinational concept, was rejected by Iran for both principled and practical reasons. According to Richard Helms, U.S. Ambassador to Iran:

Iranians recognize and resent the regional reprocessing plant concept as a device to impose international control on this very sensitive stage in the nuclear fuel cycle. Iranian bruised honor aside, they believe the idea is ridiculous in the Middle East setting. The concept may have validity and a chance [of] success in a part of the world which is highly integrated economically, such as the EC [European Community], but the likelihood of Iran being able to work out close functional relationships with its neighbors for reprocessing appears remote.²⁸

Meanwhile, Kissinger himself began to voice doubts in private about the effectiveness of the multinational concept, which he labeled a “fraud” — despite his public position that multilateral approaches could be effective. Furthermore, Kissinger noted the danger of placing a fuel-making facility in a proliferation-sensitive country, where the plant would be “just a cover” for the production of weapons-grade material.²⁹ Kissinger also put his finger on a critical weakness of the multilateral plant, that, if the foreign participant were “kicked out,” it might be unwilling to protest for fear of jeopardizing other interests: Nonproliferation required fortitude.³⁰

As negotiations ground to a halt and the multinational facility was found wanting, U.S. negotiators turned to another solution to Iran's quest for reprocessing: the "buy back" option, where the United States would be able to elect to purchase spent fuel of American origin while supplying fresh fuel for reactors in Iran. In May 1976, the United States proposed a draft agreement with the "buy back" option front and center, but retaining language requiring that reprocessing be "performed in facilities acceptable to the parties." Iran would be obligated to "achieve the fullest possible participation in the management and operation of such facilities of the nation or nations that serve as suppliers of technology and major equipment," but, should this fail—and should the United States not elect to buy back spent fuel—it could reprocess nationally.³¹ While Kissinger insisted that the Iranian right to reprocess independently would never be realized—the United States would exercise its right to repurchase fuel in every instance—the willingness to allow, even in principle, reprocessing of U.S.-origin fuel was controversial within the Ford administration.³²

The Shah's negotiating team, led by chairman of the Atomic Energy Organization of Iran Ahmad Etemad, rejected this proposal—despite its recognition of an Iranian right to reprocess—leading to a stalemate that persisted until 1977, when Jimmy Carter succeeded Gerald Ford in the White House following a campaign where nonproliferation policy had figured prominently.³³ With Carter promising a tougher nonproliferation stance on the campaign trail, Etemad seemed more open to the multilateral option and went so far as to eschew national reprocessing altogether.³⁴ With the April 27, 1977, announcement by Carter that

the United States would insist on a veto of reprocessing of U.S.-origin spent fuel, the dynamics of negotiations were beginning to shift, and an agreement later initialed by negotiators in August 1978, though never signed by Carter or the Shah, would include this veto and preclude reprocessing of U.S.-origin spent fuel on Iranian soil.³⁵ This agreement followed the Glenn Amendment of 1977, which allowed for no aid for those countries that transferred or received reprocessing technology, multinational ownership or not; despite the sympathies of some in the executive branch toward permitting reprocessing in Iran, Congress had put its foot down. Though Iranian negotiators eventually came around to Washington's tougher line, Tehran's nuclear planning grew more suspicious. In particular, U.S. scientists from the Oak Ridge National Laboratory were wary of the proposed Esfahan Nuclear Technology Center (ENTEC) facility, noting "that the unusually large size of the planned facility makes it theoretically possible to produce weapons-grade plutonium."³⁶

This episode is most notable, first, for the gradual marginalization of the multilateral option during negotiations and, second, for the flexibility that the Ford administration displayed regarding fuel-making technology. The multilateral option was shown to be intrinsically weak as a nonproliferation tool – simply to meet U.S. nonproliferation objectives, it had to be coupled with a veto and, as Kissinger suggested in private, it was hardly foolproof, with success contingent on political dynamics in the country in which the facility was located. But the balance of key interests at stake, namely the relationship with a major partner, the prospect of lucrative nuclear sales, and the wish to adhere to Article IV of the NPT for a signatory such as

Iran, was enough to drive U.S. policymakers, at least initially, to propose the multilateral reprocessing facility. Furthermore, the Ford administration's decision to sanction in principle a national reprocessing facility despite Iran's proliferation risk illustrates the way in which competing priorities can win the day over non-proliferation.

INTERVENTION WITH A SUPPLIER: WEST GERMANY'S SALE TO BRAZIL

The negotiations between the Ford and later Carter administrations and the Shah's regime took place amidst a considerable amount of activity in the non-proliferation realm. One of the most notable cases during this period was the 1975 deal between West Germany, a close U.S. ally, and Brazil, ruled by a military junta and not party to the NPT. U.S. efforts to thwart the deal, despite its close relationship with West Germany, were unsuccessful, though Washington was able to convince Brasilia, Brazil, and Bonn, Germany, to enter into a safeguards agreement with the IAEA.³⁷ Although the deal would not live up to expectations due to financial constraints, higher-than-expected costs, questions about the need for significant increases in energy output, and the poor performance of the West German "jet nozzle" enrichment technology, it represented the limits of Washington's ability to convince even its closest allies of the virtues of nonproliferation.³⁸ Because Brazil would go on to master fuel-making on its own in a secret, parallel program, this case suggests that intervention with nuclear exporters is not a definitive solution (a point the Pakistan case soon to be discussed echoes).

In what was called the “most controversial deal in the history of West German industry,” Bonn agreed to sell between two and eight reactors, as well as enrichment and reprocessing technology, to Brazil.³⁹ This was a major sale by any measure and the first to include the full fuel cycle. It also came on the heels of spurned attempts by Brazil to secure enrichment technology from the United States and in the aftermath of the 1974 decision not to sign any new contracts for the provision of enriched uranium. According to a Central Intelligence Agency (CIA) report, Bonn had gained a decisive advantage in the sale through its willingness to share fuel-making technology: “Brazil chose West Germany as its major nuclear supplier primarily because Bonn was willing to provide a uranium enrichment plant.”⁴⁰ In addition to financial compensation of between \$2 and \$8 billion for the reactors (depending on the number sold), West Germany stood to receive 20 percent of the uranium ore recovered in Brazil.⁴¹

The motives of Brazil and West Germany, and their relationships with the United States, would play a large role in the unfolding of this drama. Brazil, referred to as a “potential third-generation proliferator” by the CIA in a 1974 National Intelligence Estimate, was in a rivalry with neighbor, Argentina.⁴² Brazil’s military government, headed by Ernesto Geisel, held “what later proved to be very unrealistic estimates of growing energy demand” and valued the independence and prestige that mastery of the fuel cycle would bring.⁴³ Having fallen behind Argentina’s nuclear program, the deal with West Germany would allow Brazil to “leapfrog” its competitor.⁴⁴

Bonn, a close strategic ally of Washington, was central to American security and defense policy in Europe. West Germany was also a commercial competi-

tor of the United States, increasingly so in the nuclear field. For Bonn, the financial advantage of the deal was considerable, ensuring a way to “pay off” German government subsidies for the nuclear industry, provide work for 300 companies in the Federal Republic, and give long-term security to Kraftwerk Union, the firm responsible for building the reactors. German banks, at the government’s behest, would lend the capital for the first two reactors to Brazil’s newly created *Nuclebras* organization responsible for the nuclear program.⁴⁵ The sale came at a time of economic duress in Germany, promising a much-welcomed commercial boost.⁴⁶

The Ford administration’s intervention yielded little result, except convincing Bonn to adopt safeguards on the technology to be transferred.⁴⁷ These safeguards were secured through a multilateral agreement among Brazil, West Germany and the IAEA, which did go beyond traditional Agency measures by applying safeguards to the use of know how gained from the deal in facilities across Brazil.⁴⁸ Furthermore, in the spirit of the multilateral controls that would appear in the Iranian negotiations, the Ford administration convinced Germany to play a role in the management of the enrichment project, with German nationals intimately involved.⁴⁹

Counterintuitively, Germany’s close relationship with the United States afforded Bonn latitude in this deal: The Ford administration proved unwilling to jeopardize their relationship with Bonn in order to persuade German Chancellor Helmut Schmidt to forgo the sale.⁵⁰ Although Kissinger and Ford “felt uneasy” about the deal, they refused to bring up the subject “during top-level discussions between the German and American governments.”⁵¹ In May, July,

and October 1975 meetings between Kissinger, Ford, and Schmidt, the Brazil deal went untouched, with economic, oil supply, and European political and security issues taking priority.⁵² Kissinger decided not to use U.S. military units in Europe, or agreements with the Soviet Union, to pressure Bonn, even reassuring German Foreign Minister Hans-Dietrich Genscher in June 1975 that the safeguards agreement had met with Washington's approval, giving Genscher the green light to sign the contract later that month.⁵³

The Ford administration's tepid response, at least at the high level, was not shared by all in Washington; certain members of Congress and media outlets voiced their opposition. Senator Abraham Ribicoff of Connecticut noted that the demand for energy had given rise to a:

cutthroat nuclear competition . . . leading to the spread of plutonium reprocessing and uranium enrichment facilities. The capability to produce nuclear explosives is spreading 'like the plague', in the words of the Inspector General of the International Atomic Energy Agency.⁵⁴

The *New York Times* editorial board labeled the arrangement:

a reckless move that could set off a nuclear arms race in Latin America, trigger the nuclear arming of half a dozen nations elsewhere and endanger the security of the United States and the world as a whole.⁵⁵

U.S. President Jimmy Carter, who had criticized the deal in his campaign, did not improve upon the Ford administration's record.⁵⁶ A high-level diplomatic flurry between Bonn and Washington took place in

the early days of the Carter administration, including a visit by U.S. Vice President Walter Mondale to Bonn.⁵⁷ A stalemate had been reached by March 1977, and on April 7, 1977, West Germany confirmed that it would proceed with the deal. This announcement came the same day as Carter's own announcement on the issue of nonproliferation. Schmidt was politically invested and felt he could not back down.

The Brazil-West Germany sale exposed, similarly to Iran, unwillingness in Washington to prioritize nonproliferation if doing so might sow discord in a crucial bilateral relationship. The proliferation risks of making the technology transfer itself, however, were minimal. Jet nozzle enrichment technology had not yet been demonstrated commercially and performed poorly. The pilot reprocessing plant was delayed indefinitely as the costs of Brazil's nuclear program, and the true need for this expensive technology, came under scrutiny in Brasilia. In June 1977, West Germany announced that it would not grant any further license for the export of reprocessing facilities, following in the footsteps of a similar decision by France in 1976.⁵⁸

The close U.S. relationship with West Germany failed to translate into an immediate nonproliferation victory. In fact, the inter-reliance of the two countries may have limited Washington's leverage, making instruments, particularly on the "stick" side, less credible. The decision not to bring up the deal in high level diplomatic exchanges, despite public and congressional pressure, does suggest that preventing fuel-making in Brazil did not fall among the administration's top priorities.

INTERVENTION ON THE BUYER: SOUTH KOREA

Over the course of the 1970s, the Park Chung-hee regime in South Korea (Republic of Korea [ROK]) pursued reprocessing technology with the purpose of developing a nuclear weapons option in light of uncertainty over U.S. security guarantees.⁵⁹ The Ford administration, making clear that the relationship between the two countries would be jeopardized should Seoul continue down this path, convinced Park's government not to go forward with the transfer of a crucial piece of technology, a pilot reprocessing plant from France.⁶⁰ The alignment of nonproliferation with other U.S. policy objectives, namely stability in Northeast Asia, the security of South Korea, and détente with the great powers, meant that the Ford administration avoided the difficult decision it had faced in the cases of Iran and the Brazil-West Germany deal of balancing competing policy objectives.⁶¹ Willing to apply more fully its diplomatic leverage on Seoul—and employ credible threats of deeper retrenchment—and the beneficiary of intervention in the early stages of the South Korean program, Washington tasted success.

Seoul was a close U.S. ally, bound by the 1954 Mutual Defense Treaty, occupying a critical cog in the front against communism, contributing troops to the war in Vietnam, and enjoying a high-level political relationship with Washington. It was also reliant on American security assurances, particularly after a series of arms transfers from the Soviet Union and China to North Korea gave Pyongyang significant numerical advantages in materiel.⁶² As the balance of power on the Korean Peninsula tilted, however, and North Korean provocations continued, Washington embraced

a policy of retrenchment, beginning with the 1969 announcement of the Nixon Doctrine, which asked that the burden for defense be increasingly shifted to U.S. allies.⁶³ The March 1970 disclosure to ROK President Park that the U.S. military presence on the Korean peninsula would be decreased from 63,000 to 42,000, the political fallout from the Vietnam War in the United States, and the period of détente, particularly dialogue between the United States and China, have been understood as major drivers of Korea's twin conventional forces modernization and nuclear weapons programs.⁶⁴

The South Korean nuclear weapons program's origins can be traced to two agencies created in the aftermath of the Nixon Doctrine's announcement, the Agency for Defense Development and the Weapons Exploitation Committee, the latter recommended the pursuit of nuclear weapons to President Park.⁶⁵ With Park taking the decision in December 1974 to proceed with a nuclear weapons program, secretly of course, Seoul entered negotiations with France in 1975 to purchase a pilot reprocessing plant.⁶⁶ These talks triggered a U.S. response—unlike in the West German-Brazil deal, U.S. officials engaged their South Korean counterparts at the highest level, threatening to withdraw U.S. assistance with Korea's civilian nuclear program and, more importantly, U.S. troops from the peninsula.⁶⁷ American diplomats also pressured Seoul to sign the NPT, which it did in April 1975, leading to the adoption of IAEA safeguards in September 1975.⁶⁸ U.S. efforts, though most notable on the demand side of the deal, were also important in persuading the French to go along with the South Korean decision to cancel the reprocessing plant deal in December 1975.⁶⁹

The stakes were high for South Korea. As Mitchell Reiss notes, had Washington withdrawn its forces from the peninsula, Seoul would have lost its ability to deter the North, at least for a period of time.⁷⁰ But the United States also, irrespective of the state of the weapons program, held significant advantages in its relationship. It was Seoul's top trading partner, holding significant amounts of South Korean debt.⁷¹ Furthermore, in the great geopolitical game on the Korean Peninsula, the United States provided certain assurances that Seoul required, making it more likely that China and the Soviet Union would value "stability on the peninsula."⁷² In an August 1975 meeting, U.S. Secretary of Defense James Schlesinger explained to Park that the United States was:

best suited to provide nuclear deterrence on behalf of its allies. We can deal with nuclear threats against a central power in a way that smaller nuclear powers cannot. We can deter Soviet nuclear threats while the ROK could not and a ROK effort to develop its own nuclear weapons would end up providing the Soviets with justification for threatening the ROK with nuclear weapons.⁷³

South Korean goals of force modernization also relied heavily on U.S. assistance; if South Korea was to achieve conventional independence, it would be best served by continued U.S. support.⁷⁴ Finally, while the Nixon Doctrine and related messaging lent credibility to U.S. threats to withdraw all troops from the peninsula, Washington continued to respond forcefully to North Korean provocations, such as the August 1976 Panmunjom incident, which led to U.S. and South Korean forces being placed on high alert, U.S. naval assets being dispatched to the area, and U.S. B-52 bombers conducting exercises.⁷⁵

There are less auspicious aspects to the South Korean case, however. First, the pursuit by South Korea of reprocessing and a broader military nuclear program was calculated in part on half-hearted U.S. nonproliferation efforts elsewhere. Park and his close associates, looking to the example of Israel, hoped that Washington would reconcile itself to a South Korean nuclear program, even retaining significant benefits from its relationship with the United States. Second, although the Ford administration's intervention regarding the pilot reprocessing plant was successful, the Carter administration allowed the transfer of a post-irradiation examination facility, the use of which can imitate an important part of chemical reprocessing, protesting only then, asking that the size of the facility be limited.

The South Korean episode was a success, and the Ford administration pursued nonproliferation aims vigorously. But the particularity of the South Korean case raises questions about how replicable it might be. The South Korean decision to forgo the pilot reprocessing facility in 1975 was based less on U.S. diplomatic maneuvering than the fundamental economic and strategic relationship of the two countries, developed over time and bound by a bloody conflict little more than 2 decades before. American willingness to prioritize South Korea's incipient nuclear weapons program in its communication with Seoul, and to use sticks and carrots to its advantage, meant that this relationship could be exploited. But even the decision in Washington to apply pressure was an easy one: The development of a nuclear weapons program on the Korean peninsula could have been disastrous, setting off a chain of events implicating the great powers.

PAKISTAN: THE LIMITATIONS OF SUPPLIER CONTROLS

Pakistan, also a U.S. ally, embarked on a nuclear weapons program in the aftermath of its 1971 war with India. Islamabad's disastrous military defeat and partition led Pakistani Prime Minister Zulfikar Ali Bhutto, who entered office after the war, to initiate the program. These efforts would be accelerated following India's May 1974 nuclear test and would result in an established weapons program by the 1980s, with a series of tests in 1998. From the mid-1970s onward, successive U.S. administrations attempted to dissuade Pakistan from pursuing the nuclear fuel-making facilities necessary for a weapons program. While U.S. efforts on the supply side had some success, namely in convincing France to defer and later cancel the sale of a reprocessing plant to Pakistan, they failed to persuade Islamabad from developing an indigenous enrichment facility.⁷⁶ While, given Pakistan's abiding interest in developing nuclear weapons, preventing Islamabad from developing ENR technology would have been difficult, the Ford and Carter administrations' unwillingness to apply more fully and consistently diplomatic, political, economic, and military tools ensured that Pakistan's efforts would go unchecked. In this case, broader U.S. goals in South Asia won the day, precluding tougher nonproliferation measures. As Secretary of State Henry Kissinger in a July 1976 briefing said tersely, "Non-proliferation is not our only objective in South Asia."⁷⁷

The Pakistani nuclear weapons program was understood as a way of shoring up Pakistan's defense and correcting a shifting balance of power in the subcontinent. Particularly since the 1965 war between

India and Pakistan, India had pulled ahead in conventional fighting ability, an advantage demonstrated decisively in the short 1971 war. The Pakistani military leadership, which had once seen the United States as a dependable supporter, was disenchanted with Washington after an arms embargo on both India and Pakistan during and after the 1965 conflict. Between 1965 and 1971, absent U.S. arms sales, Islamabad turned to Beijing for military support. Although the Richard Nixon administration did, contrary to Congress' wishes, facilitate arms transfers from other states to Pakistan during the 1971 war and went so far as to dispatch the U.S.S. *Enterprise* off the coast of Pakistan, it was still seen as an ally of dubious commitment. Still, Pakistan played a crucial role in enabling Nixon's outreach to China and remained in close political contact with the United States.

Thus, particularly for Bhutto, who had expressed sympathy for a Pakistani nuclear arsenal before, proclaiming in 1965, "If India builds the bomb, we will eat grass or leaves, even go hungry, but we will get one of our own," a nuclear weapons program was essential.⁷⁸ Only weeks after assuming the prime ministry, Bhutto convened Pakistan's top nuclear scientists and instructed them to build a nuclear weapon within 3 years. In 1973, Pakistan began negotiating with a French corporation regarding reprocessing technology. The Indian test of May 1974 would only serve to accelerate this drive, with the chief of Pakistan's Atomic Energy Commission commenting after the detonation that India had "opened the floodgate for nuclear weapons" and implying that Pakistan might be next to join the "nuclear club."⁷⁹ A U.S. intelligence report issued shortly after the Indian test indicates concern that Islamabad may be next.⁸⁰

Following the Indian test, Pakistan sought a U.S. security guarantee and “arms for cash” transfers, where Pakistan would, as other allies did, compensate the United States for weapons sales.⁸¹ The Ford administration, though unwilling to extend a security guarantee, did remove its embargo on weapons sales to Pakistan and India, after persistent requests from Islamabad in February 1975.⁸² This decision, however, yielded relatively little in the way of actual arms transfers, and the balance of power on the subcontinent continued to drift in India’s favor even after the embargo was lifted.⁸³

Meanwhile, Islamabad continued its nuclear weapons program, turning to France for a reprocessing facility in February 1976.⁸⁴ With Pakistan having only a single reactor, a heavy water model from Canada similar to that used by the Indian program, the ambitions of Bhutto were clear: In the words of U.S. Under Secretary of State Philip Habib in an exchange with Kissinger, “What he [Bhutto] wants is to build a bomb.”⁸⁵ With this in mind, the administration moved to intervene, and Ford himself sent a letter to Bhutto in March 1976 asking “that you . . . give serious consideration to foregoing present plans to acquire reprocessing and heavy water facilities. . . .”⁸⁶ When Bhutto rejected this offer, the Ford administration applied only limited pressure. For example, rather than withholding all military aid from Pakistan, Kissinger insisted on withholding only the sale of A-7 fighter aircraft, suggesting that some military aid was appropriate, given Pakistan’s alliance with the United States, and that providing such assistance now would be necessary if it was to be used as leverage later.⁸⁷ Despite the promise of 100 A-7 fighter aircraft in exchange for forgoing reprocessing in August 1976 and

repeated threats after the 1976 elections that the incoming Carter administration might “make an example” of Pakistan, the Ford administration was unable to dislodge Pakistan.

In large part, the Ford administration was constrained by recent history and events beyond its immediate control, namely a lack of faith in American promises after the 1965 and 1971 wars and a deeply held belief in Pakistan of the importance of a nuclear option. The United States also was unable to address Pakistan’s conventional security concerns: As Kissinger observed, because U.S. arms sales did not flow as quickly to Pakistan following the lifting of the embargo (mostly for administrative reasons) as some had hoped, the threat of not selling them implied practically the status quo. Ford’s team, despite securing a commitment from France not to sell any additional reprocessing plants, was unable to convince French President Valérie Giscard d’Estaing to renege on the deal with Pakistan.

The arrival of the Carter administration opened a new chapter in U.S. negotiations with Pakistan, one where Islamabad would lose its contract with France for the reprocessing facility but, through the leadership of Abdul Qadeer Khan, open a new path to a nuclear weapon: uranium enrichment. The Carter administration, too, decided not to use its full leverage in Pakistan. When presented with a package in April 1977 that would have provided military aid, economic assistance, and a financed French reactor, Carter favored only the military sale of the A-7 and not of more advanced U.S. technology and questioned the need for U.S. financing of the “French purchase,” no matter the nonproliferation gain to be had.⁸⁸ By September 1977, with Bhutto ousted in a coup by General Muhammad

Zia-ul-Haq, the Carter administration had eliminated development aid to Pakistan on the grounds of the reprocessing deal with France.⁸⁹

Meanwhile, the sale of French reprocessing technology to Pakistan was foundering, thanks in part to U.S. pressure. French officials had begun to push an alternative to reprocessing, called “co-processing,” which would produce a mixed oxide fuel that was understood to be proliferation-resistant.⁹⁰ After Pakistan rejected this proposal, Giscard d’Estaing’s administration decided to cancel the sale altogether, informing Kissinger on Memorial Day of 1978.⁹¹ At the time, U.S. intelligence believed that this would make the “odds favoring any sort of explosive program [in Pakistan] . . . sharply diminish.”⁹²

Soon thereafter, despite intelligence that Pakistan was considering indigenous fuel-making options, certain State Department officials began to advocate considering a return of arms sales and economic aid.⁹³ But mounting evidence of a uranium enrichment program led to the invocation of the 1976 Symington Amendment of the Foreign Assistance Act, which precluded aid for countries that operated national uranium enrichment facilities outside of safeguards.⁹⁴ With the Symington Amendment enforced, the United States moved with little success to rally western allies to maintain export controls and reached out to China, a close partner of Pakistan.⁹⁵ Administration officials also reached out to India’s Prime Minister, hoping to reach some kind of regional solution, such as a joint commitment not to use or develop nuclear weapons, but to no avail.⁹⁶ However, writings within the White House suggested concerns that U.S. nonproliferation efforts had come at an inopportune time with instability in Iran and Afghanistan, and that Pakistan was

a more reliable partner.⁹⁷ With more disturbing news coming of the extent of Pakistan's enrichment program, U.S. officials were at a loss to find a solution. In the words of Charles van Doren at a meeting of the General Advisory Committee on Arms Control and Disarmament, "We have a great deal of talent within the U.S. government scratching its head."⁹⁸

If the Carter administration was ambivalent about what steps to take regarding the Pakistani nuclear program, this would soon cease to be the case. The December 1979 Soviet invasion of Afghanistan fixated Washington and transformed perceived U.S. interests in the region; suddenly, Pakistani acquiescence with U.S. policy goals in Afghanistan became vital. In January 1980, Carter offered not only to restore the transfer of aid, but also to increase it dramatically to a total of \$400 million per annum, split between military and economic assistance. Islamabad, well aware of its newfound leverage, spurned the offer—the American package was too modest. Within the next year, the Ronald Reagan administration had agreed upon a new assistance package extended over several years, and soon an exception to the Symington Amendment had been crafted so as to allow for U.S. aid to Pakistan.⁹⁹ While the drama surrounding the Pakistani nuclear program was far from over—it was October 1990 before the U.S. executive branch confirmed that Islamabad did not have nuclear weapons—the pattern of vacillation, mixed messaging, and half-hearted effort had been established and would continue.

CONCLUSION

The cases presented offer a common lesson: The United States, though constrained or empowered by circumstance, can exert considerable sway in nonproliferation matters but often elects not to apply the most powerful tools at its disposal for fear of jeopardizing other objectives. The persistent dilemma of how much to emphasize nonproliferation goals, and at what cost, has contributed to cases of nonproliferation failure. The inconsistent or incomplete application of U.S. power in nonproliferation cases is most harmful when it gives the impression to a nation that either sharing sensitive technology or developing it is, or will become, acceptable to Washington. U.S. reticence historically, with some exceptions, to prioritize nonproliferation—and in so doing reduce the chance of success in these cases—does not leave room for great optimism about future U.S. efforts at persuading countries to forgo nuclear fuel-making.

The most successful case, South Korea, saw the United States put in question the basis of its relationship with Seoul, its security assurance, for nonproliferation aims. The potential near-term consequences of a South Korean nuclear weapon made this bold diplomatic maneuver worth the risk. But in other cases, competing U.S. aims, often worthy, have impinged on nonproliferation goals, diluting efforts and sending mixed signals. In the case of Pakistan, for example, even well before the Soviet invasion of Afghanistan, the United States failed to use sufficiently forceful sticks or attractive carrots. U.S. efforts were bound by increasing distrust between Islamabad and Washington, a delicate geopolitical situation in the subcontinent given India's close relationship with the Soviet Union,

and facing a great challenge in a Pakistani leadership that was humiliated in 1971 and keen to reestablish some power equity with India. In negotiations with Iran regarding the nuclear cooperation agreement, U.S. policymakers—hoping to reinforce the NPT after the Indian test, avoid offending the Shah, and secure civilian nuclear contracts—were initially willing to make concessions on the issue of national reprocessing. In the case of the West Germany-Brazil contract, Kissinger went so far as to tell his counterpart in Bonn that, with expanded safeguards, the deal would be acceptable to Washington despite the clear proliferation risk from Brasilia.

The previous examples show the limitations of both demand and supply side efforts. Supply side diplomatic interventions, made before the transfer of technology, have been at times effective, particularly in precluding nuclear fuel-making in the short term and buying time for more lasting solutions. However, as the Pakistan and Brazil cases illustrated, supply side interventions are no substitute for demand side solutions: Countries face political choices regarding nuclear fuel-making. A nation set upon an independent fuel-making capacity, such as Pakistan or Brazil, is unlikely to give up efforts because of supply side controls. Multilateral fuel-making arrangements, as proposed repeatedly by the United States, have not materialized and therefore seem to have had little tangible influence.

In recent years, a new nonproliferation instrument has appeared: a restructured 123 nuclear cooperation agreement, developed in the course of negotiations with the United Arab Emirates (UAE) and signed in 2009. This agreement, unlike previous bilateral nuclear cooperation agreements, offers a model for demand

side nonproliferation, with the UAE vowing to forgo all enrichment and reprocessing technology on its own soil. It goes far beyond, for example, the “veto” on reprocessing of U.S.-origin spent fuel broached in the negotiations with the Shah. This “Gold Standard” agreement, much hailed at first, particularly in contrast to Iran’s enrichment activities, has begun to lose its luster as, once again, competing priorities marginalize nonproliferation. In January 2012, the Obama administration announced that a “case by case” approach would be taken to the application of the Gold Standard. Countries such as Vietnam, where the United States holds out hope for a grander partnership aimed at countering China, may not be held to the UAE’s standard.¹⁰⁰ Today, as in the 1970s with the Symington and Glenn Amendments, Congress seems most concerned about the prospect of proliferation of ENR technology.

The UAE case is a striking reminder of the lasting challenge facing American nonproliferation efforts. As a global power with ranging interests, governed by a political system where dissenting factions in Congress, the White House, and bureaucratic organs can influence policy in a number of ways, and operating in an international system with its own constraints on U.S. power, the United States has struggled to marshal its strength toward persuading countries to forgo nuclear fuel-making. While there is no guarantee that the decisive and steadfast application of “sticks and carrots” in the cases presented would have changed the outcomes—it may have brought unintended consequences of its own—a commitment to doing so would have improved the chance of persuading countries to eschew fuel-making.

ENDNOTES - CHAPTER 7

1. Norman A. Wolf, "Misinterpreting the NPT," *Arms Control Today*, September 2011, available from www.armscontrol.org/2011_09/Misinterpreting_the_NPT.

2. The Treaty on the Non-Proliferation of Nuclear Weapons, July 1, 1968, available from www.fas.org/nuke/control/npt/text/npt2.htm.

3. There have been exceptions, most notably Ambassador John R. Bolton, who, while in office, rejected the per se right to reprocessing and enrichment technology.

4. Office of the Historian, "The Acheson Lilienthal and Baruch Plans," Washington, DC: U.S. Department of State, available from history.state.gov/milestones/1945-1952/BaruchPlans.

5. Department of State "A Report on the International Control of Atomic Energy," Washington, DC: U.S. Government Printing Office, March 16, 1946, pp. 35-36, available from www.learnworld.com/ZNW/LWText.Acheson-Lilienthal.html.

6. "The Acheson Lilienthal and Baruch Plans."

7. Bernard Baruch, "Baruch Plan," Presented to the United Nations Atomic Energy Commission, June 14, 1946, available from www.atomicarchive.com/Docs/Deterrence/BaruchPlan.shtml.

8. Dwight D. Eisenhower, "Address by Mr. Dwight D. Eisenhower, President of the United States of America, to the 470th Plenary Meeting of the United Nations General Assembly," New York, December 8, 1953, available from www.iaea.org/About/atomsforpeace_speech.html.

9. *Ibid.*

10. Barack Obama, "Remarks by President Barack Obama," Prague, The Czech Republic, April 5, 2009, available from www.whitehouse.gov/the_press_office/Remarks-By-President-Barack-Obama-In-Prague-As-Delivered.

11. Mohamed ElBaradei, "Towards a Safer World," *The Economist*, October 16, 2003, available from www.economist.com/node/2137602.

12. Mark A. Christopher, "International Fuel Supply Guarantees," Washington, DC: Center for Strategic and International Studies, available from csis.org/images/stories/poni/110921_Christopher.pdf.

13. Pierre Goldschmidt, "Multilateral Nuclear Fuel Supply Guarantees and Spent Fuel Management: What Are the Priorities?" *Daedalus*, Vol. 139, No. 1, Winter 2010, available from carnegieendowment.org/2010/01/01/multilateral-nuclear-fuel-supply-guarantees-and-spent-fuel-management-what-are-priorities/2a7s.

14. Harold Feiveson *et al.*, "Can Future Nuclear Power Be Made Proliferation Resistant?" College Park, MD: Center for International and Strategic Studies at Maryland, July 2008, available from www.cissm.umd.edu/papers/files/future_nuclear_power.pdf.

15. Richard Helms, "Iranian Counterproposals for Atomic Energy Agreement," State Department Cable Tehran 7485, July 23, 1976, available from www.gwu.edu/~nsarchiv/nukevault/ebb268/doc21.pdf.

16. Secretary of State, "US-Iran Nuclear Agreement," State Department Cable State 125797, May 17, 1978, available from www.gwu.edu/~nsarchiv/nukevault/ebb268/doc31a.pdf.

17. William Burr, "US-Iran Negotiations in 1970s Featured Shah's Nationalism and U.S. Weapons Worries" The National Security Archive Electronic Briefing Book No. 268, January 13, 2009, available from www.gwu.edu/~nsarchiv/nukevault/ebb268/index.htm.

18. NSC Under Secretaries Committee, "US Nuclear Nonproliferation," December 4, 1974, enclosing Memorandum for the President from Robert S. Ingersoll, Chairman, December 4, 1974; and NSSM 202 Study, "Executive Summary," SECRET, available from www.gwu.edu/~nsarchiv/nukevault/ebb268/doc03.pdf.

19. *Ibid.*; National Security Study Memorandum 219 Working Group, "Nuclear Cooperation Agreement with Iran," April 1975, SECRET, available from www.gwu.edu/~nsarchiv/nukevault/ebb268/doc05a.pdf.

20. American Embassy Paris, "Interview with Shah," State Department cable 15305, June 24, 1974, available from www.gwu.edu/~nsarchiv/nukevault/ebb268/doc01a.pdf.

21. Director of Central Intelligence. "Prospects for Further Proliferation of Nuclear Weapons." Special National Intelligence Estimate 4-1-74, August 23, 1974, available from www.gwu.edu/~nsarchiv/NSAEBB/NSAEBB240/snie.pdf.

22. Live Leak, "A Brief History of Iranian Missile Technology," June 9, 2007, available from www.liveleak.com/view?i=6a6_1181429741.

23. American Consulate Shiraz, "The Persepolis Conference on Transfer of Nuclear Technology: A Layman's View," State Department Cable A-16, April 18, 1977, available from www.gwu.edu/~nsarchiv/nukevault/ebb268/doc27.pdf.

24. National Security Study Memorandum 219 Working Group, "Nuclear Cooperation Agreement with Iran," April 1975, SECRET, available from www.gwu.edu/~nsarchiv/nukevault/ebb268/doc05a.pdf.

25. *Ibid.*

26. Office of Assistant Secretary of Defense for International Security Affairs, "Nuclear Energy Cooperation with Iran—Action Memorandum," enclosing Atomic Energy Commission and Department of State memoranda, CONFIDENTIAL, with handwritten note attached, June 1974, available from www.gwu.edu/~nsarchiv/nukevault/ebb268/doc02.pdf; and Office of the Secretary of State, "The Secretary's Meeting with FRG Ambassador Von Staden on the FRG/Iran Agreement for Nuclear Cooperation," Memorandum of Conversation, Washington, D.C. July 2, 1976, SECRET, available from www.gwu.edu/~nsarchiv/nukevault/ebb268/doc20.pdf.

27. National Security Study Memorandum 219 Working Group, "Nuclear Cooperation Agreement with Iran," April 1975, SECRET, available from www.gwu.edu/~nsarchiv/nukevault/ebb268/doc05a.pdf.

28. Richard Helms, "US/Iran Nuclear Agreement," State Department cable Tehran 11539, November 26, 1975, SECRET, available from www.gwu.edu/~nsarchiv/nukevault/ebb268/doc09c.pdf.

29. Department of State, "Proposed Cable to Tehran on Pakistani Nuclear Reprocessing," Memorandum of Conversation, May 12, 1976, available from www.gwu.edu/~nsarchiv/nukevault/ebb268/doc17.pdf.

30. *Ibid.*

31. *Ibid.*

32. Richard Helms, "Nuclear Energy Discussion," State Department cable Tehran 7886, August 3, 1976, available from www.gwu.edu/~nsarchiv/nukevault/ebb268/doc22.pdf.

33. "Presidential Campaign Debate between Gerald R. Ford and Jimmy Carter," San Francisco, CA, October 6, 1976, available from www.fordlibrarymuseum.gov/library/speeches/760854.asp; Gerald R. Ford, "Statement on Nuclear Policy," October 28, 1976, available from www.presidency.ucsb.edu/ws/index.php?pid=6561#axzz1uo0bKAxs.

34. American Embassy Tehran, "Nuclear Power: Comments of Head of Atomic Energy Organization of Iran (AEOI)," State Department cable Tehran 1232, February 7, 1977, available from www.gwu.edu/~nsarchiv/nukevault/ebb268/doc25a.pdf.

35. Jimmy Carter, "Nuclear Non-Proliferation Fact Sheet on the Proposed Nuclear Non-Proliferation Act of 1977," April 27, 1977, available from www.presidency.ucsb.edu/ws/index.php?pid=7409#axzz1uo0bKAxs.

36. American Embassy Tehran, "GOI/AEOI Plans for Isfahan Nuclear Technology Center, Entec," State Department cable Tehran 1437, February 14, 1977, available from www.gwu.edu/~nsarchiv/nukevault/ebb268/doc25b.pdf.

37. David Binder, "US Wins Safeguards in Brazil Deal," *The New York Times*, June 4, 1975.

38. Director of Central Intelligence, "Brazil's Changing Nuclear Goals: Motives and Constraints," Special National Intelligence Estimate, October 21, 1983, pp. 5-6.

39. Norman Gall, "Atoms for Brazil, Dangers for All," *Foreign Policy*, No. 23, Summer 1976, pp. 157, 160.

40. Director of Central Intelligence, "Brazil's Changing Nuclear Goals: Motives and Constraints," Special National Intelligence Estimate, October 21, 1983, p. 6.

41. Gall, p. 160.

42. Director of Central Intelligence, "Prospects for Further Proliferation of Nuclear Weapons."

43. Michael Barletta, "The Military Program in Brazil," Stanford, CA: Stanford University, Center for International Security and Arms Control, February 1985.

44. Mitchell Reiss, *Bridled Ambition: Why Countries Constrain Their Nuclear Capabilities*, Washington, DC: Woodrow Wilson Center Press, 1995, p. 50.

45. Gall, p. 158.

46. The White House, Memorandum of Conversation at the Ambassador's Residence, Brussels, Belgium, May 29, 1975, available from www.fordlibrarymuseum.gov/library/document/0314/1553091.pdf.

47. David Binder, "US Wins Safeguards in Brazil Deal," *The New York Times*, June 4, 1975; Karl Kaiser, "The Great Nuclear Debate: German-American Disagreements," *Foreign Policy*, No. 30, Spring 1978, p. 89.

48. Gall, p. 159.

49. Kaiser, p. 89.

50. *Ibid.*, pp. 89-90.

51. *Ibid.*

52. Memorandum of Conversation at the Ambassador's Residence, Brussels, Belgium; The White House, "Memorandum of Conversation at the Chancellery," Bonn, Germany, July 27, 1975, available from www.fordlibrarymuseum.gov/library/document/0314/1553186.pdf; and The White House, Memorandum of Conversation in the Oval Office, Washington, DC, October 3, 1975, available from www.fordlibrarymuseum.gov/library/document/0314/1553253.pdf.

53. Kaiser, pp. 89-90.

54. U.S. Congress, Senate, Congressional Record, 94th Cong., 1st sess., June 3, 1975, p. S9323, quoted in Norman Gall, "Atoms for Brazil, Dangers for All."

55. "Nuclear Madness," *The New York Times*, June 13, 1975, p. 36.

56. Kaiser, p. 97.

57. "Schmidt May Modify Rio Pact," *The New York Times*, January 27, 1977; and Kaiser, pp. 99-100.

58. Kaiser, p. 100.

59. National Foreign Assessment Center, "South Korea Nuclear Development and Strategic Decisionmaking," National Intelligence Estimate, Washington, DC: Central Intelligence Agency, June 1978, pp. 1-2; Memorandum from Richard Smyser and David Elliott of the National Security Council Staff to Secretary of State Kissinger, Washington, DC, February 28, 1975, *Foreign Relations of the United States, 1969-1976*, Vol. E-2, Documents on East and Southeast Asia, 1973-76, Document 264.

60. "South Korea Nuclear Development and Strategic Decisionmaking," pp. 1-2; Jungmin Kang and H. A. Feiveson, "South Korea's Shifting and Controversial Interest in Spent Fuel Re-

processing," *The Nonproliferation Review*, Vol. 8, No. 1, Spring 2001, p. 71.

61. Smyser and Elliott.

62. "South Korea Nuclear Development and Strategic Decisionmaking," p. 1.

63. Richard Nixon, "Informal Remarks in Guam with Newsmen," July 25, 1969, available from www.presidency.ucsb.edu/ws/?pid=2140#ixzz1uyyKCC8j; "South Korea Nuclear Development and Strategic Decisionmaking," p. 2; Rebecca K. C. Hersman and Robert Peters, "Nuclear U-Turns: Learning from South Korean and Taiwanese Rollback," *The Nonproliferation Review*, Vol. 13, No. 3, November 2006, available from cns.miis.edu/npr/pdfs/133hersman.pdf.

64. "South Korea Nuclear Development and Strategic Decisionmaking," pp. 1-2.

65. Kang and Feiveson, p. 71.

66. "South Korea Nuclear Development and Strategic Decisionmaking," pp. 5-7.

67. "Nuclear Peril," *The New York Times*, June 9, 1975, p. 30.; Hersman and Peters, "Nuclear U-Turns: Learning from South Korean and Taiwanese Rollback," p. 541.

68. Smyser and Elliott; Kang and Feiveson, p. 71.

69. "Korea's Atomic Reversal," *The New York Times*, February 15, 1976, p. E12.

70. Hersman and Peters, p. 541.

71. *Ibid.*

72. "South Korea Nuclear Development and Strategic Decisionmaking," p. 17.

73. Memorandum of Conversation, Seoul, Korea, August 27, 1975, *Foreign Relations of the United States, 1969-1976*. Vol. E-12, Documents on East and Southeast Asia, 1973-1976, Document 272.

74. "South Korea Nuclear Development and Strategic Decisionmaking," p. 17.

75. Peter Hayes and Chung-in Moon, "Park Chung Hee, the CIA & the Bomb," *Global Asia*, September 2011, p. 52.

76. Flora Lewis, "France Holds Up Proposed Sale Of a Nuclear Plant to Pakistan," *The New York Times*, June 1, 1977, p. 42.; American Embassy, Paris, France, "French Complaint Concerning US Action on Pakistan Reprocessing Plant," State Department cable Paris 24112, August 1, 1978.

77. Department of State, "Pakistani Reprocessing Issue," Memorandum of Conversation, July 9, 1976.

78. "The Spider's Stratagem: Pakistan's Nuclear Ambitions," *The Economist*, January 3, 2008.

79. Central Intelligence Agency, "Indian Test Will Spur Pakistani Effort," *National Intelligence Daily*, May 24, 1974, available from www.foia.cia.gov/sites/default/files/document_conversions/89801/DOC_0000845822.pdf.

80. *Ibid.*

81. "US Arms Policy Toward Subcontinent Following Indian Nuclear Test," State Department cable, June 12, 1974.

82. National Security Council, "National Security Decision Memorandum 289," March 24, 1975, available from www.fordlibrarymuseum.gov/library/document/0310/nsdm289.pdf.

83. "Pakistani Reprocessing Issue," pp. 6-8.

84. Central Intelligence Agency, "Pakistan Nuclear Study," Memorandum, April 26, 1978, TOP SECRET, excised copy, available from www.gwu.edu/~nsarchiv/nukevault/ebb333/doc05.pdf.

85. "Pakistani Reprocessing Issue," pp. 6-8.
86. Gerald Ford, Letter to Prime Minister Zulkifar Ali Bhutto of Pakistan, March 19, 1976, available from 2001-2009.state.gov/documents/organization/97435.pdf.
87. Department of State, Memorandum of Conversation, July 9, 1976, pp. 4-5, available from history.state.gov/historicaldocuments/frus1969-76ve08/d232.
88. Warren Christopher, "Reprocessing Negotiations with Pakistan: A Negotiating Strategy," Memorandum for the President, April 2, 1977, SECRET, available from www.gwu.edu/~nsarchiv/nukevault/ebb333/doc02.pdf.
89. William Burr, "The United States and Pakistan's Quest for the Bomb," December 21, 2010, available from www.gwu.edu/~nsarchiv/nukevault/ebb333/index.htm#12.
90. "Pakistan Nuclear Study."
91. Secretary of State, "Reprocessing Issue," State Department cable State 136685 May 30, 1978, SECRET, available from www.gwu.edu/~nsarchiv/nukevault/ebb333/doc06.pdf.
92. "Pakistan Nuclear Study."
93. Memorandum to Chris [Warren Christopher] from Steve [Oxman], enclosing edits to draft cable to Islamabad and "Evening Reading" reports to President Carter on Pakistan, October 4, 1978, SECRET, available from www.gwu.edu/~nsarchiv/nukevault/ebb333/doc18.pdf.
94. "Pakistan," Presidential Review Committee Meeting, March 9, 1979, available from www.gwu.edu/~nsarchiv/nukevault/ebb333/doc29.pdf.
95. Paul H. Kreisberg to David D. Newsom, "Presidential Letter on Pakistan Nuclear Program to Western Leaders," Department of State action memorandum, March 30, 1979, SECRET, available from www.gwu.edu/~nsarchiv/nukevault/ebb333/doc33.pdf; Gerard Smith to the Secretary, "Consultations in Europe on Paki-

stan," November 15, 1979, available from www.gwu.edu/~nsarchiv/nukevault/ebb333/doc45.pdf.

96. Smith to the Secretary, "Consultations in Europe on Pakistan."

97. *Ibid.*

98. Advisory Committee on Arms Control and Disarmament, Friday Morning Session, September 14, 1979, General SECRET, excised copy, available from www.gwu.edu/~nsarchiv/nukevault/ebb333/doc42.pdf.

99. Peterson Institute for International Economics, "Case Studies in Sanctions and Terrorism: Case 79-2: US v. Pakistan (1979-Nuclear Missile Proliferation)," available from www.iie.com/research/topics/sanctions/pakistan.cfm.

100. Elaine Grossman, "Nuclear Trade Reform Faces Hostile Lobbying, as Obama Team Renews Policy Review," *National Journal.com*, May 12, 2013, available from www.nationaljournal.com/congress/nuclear-trade-reform-bill-faces-hostile-lobbying-as-obama-team-renews-policy-review-20120504.