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Brazil's Changing Nuclear Goals: Motives and Constraints

Special National Intelligence Estimate

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SNIE 93-83
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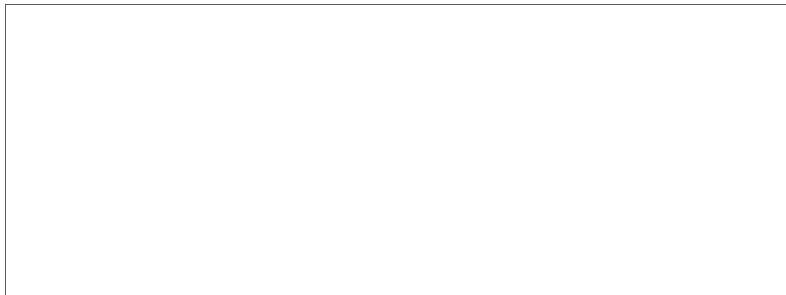
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SNIE 93-83

**BRAZIL'S CHANGING NUCLEAR GOALS:
MOTIVES AND CONSTRAINTS**

Information available as of 18 October 1983 was
used in the preparation of this Estimate.

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THIS ESTIMATE IS ISSUED BY THE DIRECTOR OF CENTRAL INTELLIGENCE.

THE NATIONAL FOREIGN INTELLIGENCE BOARD CONCURS.

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SCOPE NOTE

This Estimate examines the reordering of Brazil's nuclear priorities in light of political, economic, and technological developments. It assesses the reasons for, and the impact of, Brazil's shift from the acquisition of foreign nuclear energy facilities to a more narrowly focused indigenous nuclear development effort. It considers possible motives for a Brazilian decision to seek a weapons capability, the technologies that might be adaptable to such a program, and constraints on such a course of action. The Estimate also considers the potential impact on Brazilian decisions of neighboring Argentina's nuclear developments, in particular the possible construction and testing of an Argentine nuclear explosive. It suggests the kinds of evidence we might see in the 1984-88 period if Brazil were to decide shortly to build a nuclear device. Finally, the Estimate describes Brazil's export ambitions and examines the ability of the United States to influence Brasilia's nuclear policies.

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KEY JUDGMENTS

Brazil has not made a decision to build nuclear explosives and is not able to commit the resources to do so. It is nonetheless exploring two approaches that could eventually give it the option to produce the fissile material for a nuclear explosives capability:

- It is considering the construction of an unsafeguarded natural-uranium-fueled research reactor that could provide plutonium for weapons use. This, however, would also require construction of a reprocessing plant larger than their present laboratory facility.
- Brasilia is also investigating production of highly enriched uranium.

Either approach would probably entail at least five years to produce the necessary fissile material. Both methods would also require the construction of facilities for high-explosive testing and fabrication of the nonnuclear component.

We believe that, even if Brazil began now an intensive effort to build a nuclear device, it probably could not achieve this objective before the mid-1990s. In our view, several problems would combine to impose significant delays:

- There is no consensus within Brazil's nuclear bureaucracy on the future course of the nuclear program.
- The Brazilians have a demonstrated tendency to pursue nuclear technologies that are outmoded or too complex for their resources and capabilities.
- Economic stringencies are likely to constrain the effort for the next several years.
- Complications may be introduced by the democratic transition and reasserted civilian control over the programs.

We believe, however, that if Brasilia became convinced that Buenos Aires had made a firm decision to develop, test, or deploy nuclear explosives, Brazil would initiate a serious effort to achieve its own

[redacted]

nuclear weapons capability. Brazilian leaders are not persuaded today that nuclear explosives are necessary to their national security or prestige. [redacted]

We believe that Brazil seeks eventual mastery of nuclear technology as part of its quest for technological-industrial autonomy and great-power status. This quest has included the development of its own automobile industry, oil technology, conventional weapons industry, computer technology, and civil nuclear program. [redacted]

Brazil has made a massive retrenchment in its civil program that will retard its nuclear development generally for many years. Brasilia has retreated from its 1975 major nuclear accord with West Germany, which was the centerpiece of the program, because of financial pressures and uncertainties about future energy needs. Many other problems—including technology assimilation—have plagued implementation of the agreement. Brazil now is building only two power reactors instead of the eight projected in the German accord. As a consequence, the transfer by Germany of other nuclear fuel cycle components, including uranium enrichment and reprocessing equipment, is in jeopardy. [redacted]

[redacted]

[redacted] Brasilia has made major administrative and organizational changes within its nuclear bureaucracy that are intended to strengthen its indigenous program. In the last two to three years, it has been developing—on its own and without safeguards—technology such as uranium enrichment and reprocessing. Brazil refuses to accept international safeguards on important aspects of its nuclear research, particularly its small reprocessing facility, which could ultimately provide an important link in the chain leading to weapons development.¹ Brazil has not signed the Nuclear Non-Proliferation Treaty (NPT) and insists that peaceful nuclear explosives are permitted by the Treaty of Tlatelolco. We believe that these facts demonstrate a determination on Brazil's part to preserve a nuclear weapons option. [redacted]

We expect support for Brazilian nuclear research to continue, regardless of the outcome of the presidential election in 1985. None of

[redacted]

the candidates suggested thus far are known to be hostile toward nuclear development, and it has not been a campaign issue. []

Brazil and the United States recently have moved to improve bilateral nuclear relations, but important differences over nonproliferation issues that arose in the late 1970s still pose obstacles to a resumption of nuclear cooperation. We believe Brazil will be open to offers of US advice on such matters as nuclear training and safety, but will persist in its refusal to place its nuclear research activities under safeguards and in its resistance to any US effort to constrain its nuclear ambitions. []

If Brazil decides to embark on a nuclear weapons development program within the next five years, some of the following developments might indicate that such a decision had been made:

- An increase in unsafeguarded nuclear research activities, together with increased security measures.
- A substantial increase in funding for indigenous nuclear research.
- The development of a weapons-related high-explosives program and/or ballistic missile research and development.
- Expanded favorable media coverage and an official effort to broaden popular support for nuclear programs. []

Nuclear Facilities



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DISCUSSION

1. Brazil has a major nuclear program that has been going through a period of readjustment during the past three to four years. In 1975, with the assistance of West Germany, it initiated an ambitious program aimed at expanding nuclear power and mastering the fuel cycle. Financial pressures and technical problems, however, led to a curtailment of the nuclear accord and then to recent shifts in indigenous programs that are crucial to how fast Brazil can realize its nuclear potential. []

Ambitious Beginning

2. Brazil's desire to master nuclear technology heightened in the mid-1970s, due to several related factors. First, the nation was passing through a long period of prosperity, known as the Brazilian "economic miracle," which had boosted national confidence across the board. In addition, Brazil, as a large oil importer, was just beginning to feel the effects of the international oil shortage. Brazilian leaders recognized the need for an alternate energy source and, although the nuclear power program was expensive, they apparently believed they could afford it. []

3. In 1975 Brazil signed a sweeping nuclear agreement—a major commercial and diplomatic commitment—with West Germany. Brasilia agreed to purchase the technology for a virtually complete nuclear fuel cycle, consisting of up to eight large power reactors, a uranium enrichment plant, and a fuel reprocessing plant. With much fanfare, the Brazilian Government created a new federal agency, *Nuclebras*, to handle the accord. The agreement was widely viewed at that time in Brazil, as well as internationally, as persuasive evidence of the country's determination to become a world power and to develop its own nuclear capabilities by mastering a complete nuclear fuel cycle. []

Retreat from Nuclear Accord

4. Despite the initial enthusiastic response, the agreement gradually became the subject of bitter controversy. Strong criticism surfaced in the press in early 1978, and by mid-1979 Brasilia publicly acknowledged that the power program would be scaled

back and the transfer of West German technology stretched out. Various sources have attributed the dissatisfaction to both economic and scientific concerns. These included:

- A growing reluctance to make further capital investment in nuclear energy.
- Uncertainty regarding industrial growth and the need for additional energy resources.
- Numerous technical problems, unanticipated delays, and cost overruns in Brazil's absorption of nuclear technology.
- Increased distrust of West Germany's commercially untested jet-nozzle uranium enrichment process.
- Doubts about the cost-effectiveness of reprocessing spent fuel. []

The Key Factors

5. *Costs.* Of the several factors working to limit the nuclear energy program, the most important has been cost. Government officials, sensitive to public criticism of nuclear policy, deliberately underestimated the total nuclear bill. For example, in an effort to help promote the program early projections excluded financing costs. Initial projections also underestimated costs of construction and equipment. The head of *Nuclebras* recently told the Brazilian press that it would cost \$18.4 billion to complete the eight planned power plants—more than triple the cost cited when the plans were originally formulated in 1975. Even this projection could still be on the low side. []

6. *Nuclebras* now maintains publicly that it plans to build four power reactors soon, and possibly four later. It seems more likely, however, that only two reactors will be completed—and those with delays. []

* Construction had begun at Angra II and site preparation was under way at Angra III. []

[redacted] In early January 1983, the Figueiredo administration confirmed that work also had been suspended at the Angra III site, and announced its decision to cut the budgets for most federal agencies, including *Nuclebras*. Subsequent reliable reporting indicates that *Nuclebras*'s [redacted]

7. **Uncertainty About Future Growth.** A related consideration in Brazil's decision to trim the power program is the increased uncertainty regarding the pace of future industrial growth and the energy supplies needed to support it. During the 1970s, when the nuclear agreement was signed, there was near unanimity that Brazil's rapidly expanding industries would require vastly increased power reserves. Some independent studies still predict that nuclear power will be needed to fuel rapidly growing industrial centers beginning in the 1990s and that nuclear energy would be a useful supplement to hydroelectric sources for Rio de Janeiro and Sao Paulo. However, official studies by Brazil's electric utility company, *Electrobras*, show that growth rates for electric energy have dropped since the 1970s—due to both the global economic recession and the conservation effort stimulated by the sharp rise in energy costs. They expect the slowdown to persist over the next decade. Given these divided assessments—against a backdrop of an intense budget squeeze—Brasilia is unwilling to program scarce funds for an uncertain distant payoff [redacted]

8. **Technical Problems.** Other problems that dictate a retrenchment relate to Brazil's difficulties in assimilating complex technology. One of the key bottlenecks has been the lack of skilled Brazilian personnel to absorb the foreign technology and run the program. In addition, Brazilian industry has required longer lead times than anticipated to adapt to the high levels of quality assurance required in any major nuclear program. [redacted]

9. **Doubts About the West German Enrichment Process.** Brazil chose West Germany as its major nuclear supplier primarily because Bonn was willing to provide a uranium enrichment plant. However, Brazilian scientists, in particular, have become increasingly skeptical of the utility of the costly and complicated West German uranium enrichment process. The commercial feasibility of the Becker jet nozzle process has yet to be demonstrated. A small pilot plant,

consisting of 24 nozzle separation enrichment stages, is scheduled to be on line in 1984, two years later than the original plan for a full scale 450- to 600-stage demonstration plant that was to have been operational by 1982—but at the same cost of \$250-300 million. [redacted]

10. **The Reprocessing Issue.** Aspects of Brazil's fuel reprocessing plans apparently also are being overhauled. In late 1982 Brasilia began to question the wisdom of purchasing a pilot reprocessing plant from the West Germans under safeguards that would cost an estimated \$300 million and initially recover 9 to 12 kilograms of plutonium a year. In May 1983, a generally reliable source reported that the reprocessing project had been canceled altogether [redacted]

Disarray at Nuclebras

11. Major personnel shifts within *Nuclebras* also suggest a Brazilian decision to reduce and slow down its commitment to West Germany without renouncing the accord. Early last February the architect and chief Brazilian proponent of the nuclear accord, Paulo Nogueira Batista, was forced to resign as head of *Nuclebras*. His replacement, Dario Gomes, who previously occupied senior positions both within *Electrobras* and the Ministry of Mines and Energy, contrasts with his predecessor in publicly stating that his highest priority is the acquisition of nuclear technology, not the production of electricity. In March, a leading Brazilian newspaper reported that *Nuclebras* had laid off 250 employees from one of its nuclear subsidiaries and that Gomes intended to make further cutbacks. [redacted]

12. We believe that *Nuclebras* probably will not regain the status it previously enjoyed within Brazilian policymaking circles and that serious problems of confusion and disorganization within the entire nuclear program will persist. [redacted]

West German Reactions

13. Bonn has a compelling economic stake in implementing as much of the accord as possible. West

Germany had depended upon the sale of the power reactors to Brazil to provide the economies of scale that would reduce the financial cost of its own nuclear program. Other motivations include the Federal Republic's need to: maintain its reputation as a high-quality supplier of nuclear technology and equipment; gain access to Brazilian uranium deposits; and preserve good relations generally with South America's largest country [redacted]

14. Despite these inducements, the West Germans are disillusioned with the slow pace of the technology transfer and the current status of the accord, and believe that the original contract cannot be salvaged.

[redacted]

[redacted]

The Likely Outcome

16. Despite its slowdown, we believe Brazil is unlikely to go so far as to renounce its nuclear contract with West Germany. Instead it probably will complete two power reactors within the next decade. In early

[redacted]

January 1983, [redacted] Brazil's Energy Minister told [redacted] the nation would be better off without the nuclear accord, but that it probably would not be renounced. Several reasons argue for such a course:

- The 1975 accord is composed of a series of legal contracts, with stiff monetary penalties for breaking any of them.
- Brazil has had a longtime research relationship with West Germany, and we believe that it still needs the latter's nuclear training and assistance.
- Brasilia does not want to offend Bonn and possibly jeopardize other important economic and commercial ties.
- [redacted] the Foreign Ministry fears that Brazil already stands to lose some of its international credibility as the result of unilaterally slowing the execution of the bilateral nuclear agreement. [redacted]

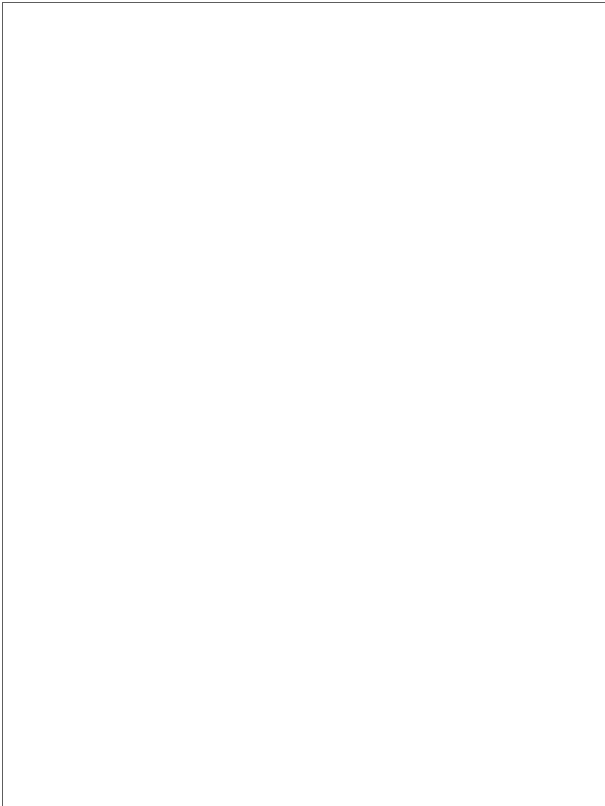
The Shift Toward Indigenous Research

17. The curtailment of the West German accord has been accompanied by what we believe is a considered decision by Brasilia to give more emphasis to indigenous nuclear research. In the short run, the research program will require fewer financial resources. Moreover, Brazil now appears to want to rely on its own efforts to develop indigenous nuclear technology, as opposed to acquiring foreign technology on a "turn-key" basis. [redacted]

18. In effect, the research programs have been given a higher priority, and this is reflected in recent bureaucratic and organizational shuffles. The status of the Institute of Nuclear and Energy Research in Sao Paulo has been elevated in conjunction with the drive to master indigenous technologies. At the same time, policy moves have enhanced the authority of the Nuclear Energy Commission (CNEN) and strengthened its focus on nuclear research. [redacted]

The Start of Consolidation

[redacted]



- Increasing CNEN's budget to \$49.38 million (from \$36.37 million) and doubling the funding for nuclear fuel cycle research, according to press reports.

This funding represents a much smaller share of the total budget than that required for the civilian power program, and we expect it to be relatively less affected by future budget cutbacks. [redacted]

22. We expect Brazil to persist in its unsafeguarded nuclear research even though funding is likely to be quite limited for the next several years. A Foreign Ministry spokesman recently affirmed Brazil's right to develop an indigenous nuclear program for peaceful purposes, and the Minister of Mines and Energy has publicly indicated that Brazil plans to produce plutonium as a nuclear fuel. We believe that these public statements are indicative of continuing official support for Brazil's unsafeguarded nuclear research program. Moreover, the assignment of Rex Nazare to head CNEN has been characterized by various sources, including the US science counselor, as symbolizing a new commitment by Brazil to the development of its own nuclear research technology. [redacted]

Recent Developments

21. Since September 1982, the National Security Council has consolidated nuclear research activities even more under the control of the Nuclear Energy Commission, which in turn designated IPEN Brazil's primary nuclear research center. The most important changes reflecting this consolidation include:

- Appointing Dr. Rex Nazare, formerly the CSN's nuclear adviser, to head CNEN.
- Transferring control of IPEN to the federal government, placing it under the direct supervision of Nazare.

* Brazil accepts nuclear safeguards administered by the International Atomic Energy Agency, which cover only transfers of nuclear technology, equipment, and materials that it receives from foreign suppliers. Comprehensive safeguards, which are now prescribed by US and Canadian laws governing their nuclear exports, require that all nuclear facilities and materials of recipient nations—regardless of origin—be open to international inspection before nuclear transfers are approved. For example, a reprocessing plant—or any other nuclear facilities—built in Brazil outside the IAEA's safeguards system would have to come under safeguards before Washington could authorize assistance to the Brazilian nuclear program. [redacted]

Weapons Potential

Motives and Incentives

23. [redacted] Brazilian leaders clearly see the eventual mastery of nuclear fuel cycle technology as necessary for the great-power status to which they aspire. [redacted]

[redacted] some influential figures within the Brazilian military, including those with technical expertise, see the development of nuclear submarines, ballistic missiles, and nuclear weapons as important concomitants of Brazil's emerging world-power status. Moreover, as a rapidly industrializing nation that is highly competitive in world markets, Brazil strongly resists what it perceives as foreign efforts to limit its access to new equipment and technologies. It has a long history of seeking—and largely gaining—technological-industrial independence. This quest for autonomy has included the development of its own automobile industry, oil technology, conventional arms industry, computer technology, and the nuclear program. Brazil's adamant refusal to sign the Nuclear Non-Proliferation Treaty (NPT) or to

wave into force the Treaty of Tlatelolco, which designated Latin America a nuclear-weapons-free zone, allows Brasilia to retain the freedom to develop nuclear explosives. [redacted]

Argentina's Role

24. Brazil's determination to keep its options open to develop a nuclear weapons capability derives both from its desire for great-power status and the realization that Argentina has outpaced it in nuclear development. Relations between the two nations are marked by intermittent rivalry rather than overt hostility. A bilateral nuclear agreement signed in 1980 provides for training, joint uranium exploration and various kinds of technical cooperation in nonsensitive areas. We believe, however, that Brazilian officials are distressed by their inability to match the nuclear advances of their unpredictable neighbor. [redacted]

25. Nonetheless, we believe that Brazil has not made a decision to build nuclear explosives and is not able to commit the resources to do so. This situation could change, however, if Brazil were to feel threatened or challenged by Argentine developments. Brazilian officials have been circumspect in their comments on Argentina's nuclear program. [redacted]

[redacted] From Brazil's perspective, a growing Argentine capability to design and build nuclear explosives could quickly become an incentive for Brazil to proceed along similar lines, particularly if Brasilia becomes convinced that Buenos Aires has made a firm decision to develop, test, or deploy nuclear weapons. [redacted]

26. If Brazil were to learn that Argentina had built a device, we believe it would probably exert strong [redacted]

diplomatic pressure on Buenos Aires to refrain from conducting a test. Should a test occur, however, Brasilia would be constrained by its own advocacy of peaceful nuclear explosives from initiating any punitive or retaliatory measures. It would probably accelerate its own efforts to match Argentina's explosives capability. It might also seek through diplomatic channels to respond with countermeasures designed to place limits on Buenos Aires's effective use of its capability. These could include: persuading various international forums, such as the Organization of American States and OPANAL—the organization established by the Treaty of Tlatelolco to keep nuclear weapons out of Latin America—to voice concern for the peace and security of South America; exerting pressure on Buenos Aires directly, and through other Western nations, to leave future devices untested. [redacted]

Capabilities and Limitations

27. If a determined military effort were to begin shortly, we estimate that Brazil could not achieve the construction of a nuclear device much before the mid-1990s. In contrast to neighboring Argentina, Brazil currently lacks a source of fissile material suitable for weapons. Brazil's light water reactors, the type used in the United States, will produce spent fuel containing plutonium that is largely unsuitable for weapons purposes. Moreover, the power reactors to be acquired from West Germany will be placed under IAEA safeguards. [redacted]

28. *Acquiring Fissile Material.* The most expeditious method for Brazil to acquire fissile material would entail the construction of a reactor that utilizes natural uranium as fuel. A well-placed Brazilian source of undetermined reliability reported in January 1983 that \$50 million had been allocated over the next five years to build a heavy water-moderated, natural uranium-fueled research reactor at IPEN in Sao Paulo. If construction begins now, the source estimates that the reactor could produce enough spent fuel to separate more than 3 kilograms⁶ of plutonium annually beginning in 1988-89. [redacted]

[redacted]

29. Once such a reactor were completed, Brazil could reprocess the spent nuclear fuel to obtain plutonium in the small unsafeguarded reprocessing laboratory at IPEN, which was completed in January 1982 with West German assistance and some French equipment. [redacted]

[redacted] If the facility were upgraded, it could produce possibly 3 to 4 kilograms a year by 1989. Should Brazil decide to construct a larger reprocessing plant, it would probably have to be done clandestinely because Brazil's nuclear agreement with West Germany forbids the replication of reprocessing technology. We have no indication that such a facility is planned or even contemplated. [redacted]

31. We judge the Brazilian effort to develop the necessary technology and equipment to enrich uranium

um by means of gas centrifuge to be serious, even though it is still in an early stage of development. It appears that the Brazilian Government has authorized and intends to fund the project as an alternative to the West German Becker jet nozzle process described earlier in this Estimate. [redacted]

32. Since 1981 various sources, including the Brazilian press, have confirmed the existence of a centrifuge research project for the enrichment of uranium. According to Brazil's Minister of Mines and Energy, the project, authorized by CNEN, is being carried out at three Brazilian institutes. IPT is providing the micro-electronic instrumentation and control equipment for gas centrifuges, CTA/IEAV is conducting tests to eliminate problems arising from the high velocity of the rotor system, and IPEN is responsible for coordinating the project. IPEN is also comparing the older West German centrifuges with designs of similar modern equipment. [redacted]

33. *High Explosives.* If Brazil decides to develop a weapons capability we would expect it to build additional facilities for high-explosive (HE) testing and the fabrication of the nonnuclear component. We believe that Brazil has neither plants capable of producing a wide range of high explosives suitable to nuclear-related HE development, nor the experience pertinent to nuclear explosive design. [redacted]

Weapons Delivery System

34. Various sources indicate that Brazil intends to develop its own medium-range ballistic missile for commercial satellite launch and possibly for military purposes. Without considerable foreign assistance, however, we judge it unlikely that Brazil will produce a ballistic missile weapons system, either as a spinoff of its space launch vehicle program⁹ or as a separate

⁹ Brazil has developed a solid fuel rocket propellant in support of its space program, which ostensibly is devoted to scientific research. [redacted]

venture, before the late 1990s. Brazil has built rockets and small tactical missiles, and it has begun to acquire the guidance and control technology required for such missiles. The technological and industrial support for its space program, however, is still quite limited. It also lacks the sophisticated propulsion and materials technologies necessary to develop a ballistic missile system, although several sources report that research and acquisition efforts in these specific areas are continuing. []

Constraints on a Nuclear Future

35. We believe that several serious problems continue to constrain Brazilian nuclear ambitions in general. For example, overlapping lines of responsibility retard progress and contribute to low morale at working levels. In addition, partly because nuclear programs and institutes are still in flux, we believe Brazil's pursuit of nuclear technologies is unfocused, encompassing processes that are outmoded or too complex for Brazil's limited resources and capabilities. []

Bureaucratic Infighting

36. We believe that present bureaucratic infighting and inefficiency will persist and continue to impede nuclear progress. This stems from the fact that Brazil's nuclear establishment is so diffuse that, even with recent moves toward some consolidation, there is no clear chain of command or mechanism for setting goals and priorities. []

[] fierce struggles over energy policies between *Electrobras*, *Nuclebras*, and CNEN as well as a continuing rivalry in nuclear research between CTA and IPEN. As a result, rival programs are still pursued and scarce resources expended unnecessarily. For example, beginning in 1980, both CTA and IPEN were charged with developing gas centrifuge technology. This rivalry was not resolved until late 1982, when full responsibility for research and development was assigned to IPEN. []

The Effect of Political Liberalization

37. The process of political liberalization in Brazil, which has already begun to affect nuclear developments, could also eventually serve as a brake to

¹⁰ These include work with centrifuge equipment dating from the late 1950s and, conversely, the development of highly sophisticated laser isotope separation technology. []

nuclear ambitions. The increasingly open Brazilian press over the last several years has exposed various sensitive aspects of the nuclear program, including military-related research activities. Most of the press statements thus far have been critical of the program, focusing on such issues as the high cost of foreign nuclear technology, dangers of radioactive contamination, and the inadvisability of building nuclear explosives. The more liberal environment has also facilitated the organization of small antinuclear groups, consisting mainly of civilian scientists and environmental protectionists, who would like to see Brazil's nuclear programs terminated. There also have been some scattered antinuclear demonstrations, attracting support mainly from youth groups and residents in areas close to nuclear facilities. []

38. President Figueiredo has decisively altered the nuclear policies of the Brazilian Government by scaling down and stretching out the West German accord and placing new emphasis on the development of indigenous technologies. We expect support for Brazilian nuclear research to continue, regardless of the outcome of the presidential election in 1985. None of the candidates suggested thus far are known to be hostile toward nuclear development, and it has not been a campaign issue. A new civilian government may have to be more responsive than the present military incumbents to political pressure from a wide variety of constituencies. Alternatively, civilian leaders may seek to ensure military support by emphasizing programs in which the military and national security establishments have an interest, including the nuclear program. []

Continuing Economic Constraints

39. We believe that, if current economic problems persist, even a civilian government favorably disposed toward nuclear development might be forced to trim existing programs. Civilians have complained for many years that the regime has emphasized industrialization at the expense of a more equitable distribution of income or improved living standards. Riots this year in major Brazilian cities indicate, in part, the willingness of Brazilians to demonstrate their dissatisfaction, and their impact on national policy may grow. []

Nuclear Export Ambitions

40. Brazilian nuclear development, however, will probably have some nearer term impact on the global

nonproliferation regime in the area of nuclear exports over the next four to six years. Brazil's shift in emphasis from the acquisition of foreign nuclear power facilities to the development of indigenous nuclear technology dovetails with its export-oriented development strategies and its pursuit of political prestige. Brasilia is proud of its nuclear industrial achievements, which include:

- The development of a uranium dioxide production line.
- A pilot-scale uranium hexafluoride line.
- An export-quality reactor vessel production plant.
- Uranium conversion facilities.
- The West German-supplied Resende fuel fabrication plant, built with Brazilian participation. (S NF)

41. Brazil's interest in promoting its exports in the nuclear field is growing. Recently, Brazil seems much more inclined to compete aggressively against Argentina—which heretofore has had the regional market largely to itself.

[Redacted]

[Redacted] Brazilian exports are beginning to include nuclear materials and technical assistance, and, although these have been limited to date, they can be expected to grow as Brazil's industrial capability develops.

42. Brasilia has also already signed nuclear agreements with nations that have signaled an interest in a nuclear weapons capability, such as Iraq and Libya. Prior to the Israeli destruction of Iraq's nuclear facilities, Brazil had concluded an agreement—still in effect—with Baghdad.

[Redacted] Brazilian press sources alleged, the secret transport of unsafeguarded uranium dioxide from Brazil to Iraq in 1981. Although the current level of Brazilian involvement in the Iraqi program cannot be precisely determined.

[Redacted]

[Redacted]

Nuclear Relations with the United States

43. Brazil's nuclear development ambitions were a major irritant in its bilateral relations with the United States in the late 1970s, when Washington strongly objected to the planned transfer of uranium enrichment and reprocessing technology under the Brazilian-West German nuclear accord. Prior to the signing of that agreement, the United States had been Brazil's principal source for enriched uranium and nuclear reactors: it provided a small research reactor to IPEN and Westinghouse built Angra I. Relations deteriorated further in 1981 when Washington refused to provide any more enriched uranium on the grounds that Brasilia had not placed all of its nuclear facilities under international safeguards. Brazil subsequently turned to a European consortium for its nuclear fuel and, according to reliable sources, clandestinely began to seek alternative unsafeguarded supplies from China.

44. Brazil's refusal to sign the NPT or to adopt the full-scope safeguards required by US nuclear export law continues to prevent a resumption of major nuclear trade relations with the United States. This issue, however, appears to have been pushed to the side—at least temporarily—by recent US initiatives, including the formation of a bilateral nuclear working group. The Brazilians have been receptive to the possibility of cooperation in such areas as nuclear safety and spent fuel storage. We do not believe that the United States can deter Brazil from pursuing its fundamental objective of mastery of the nuclear fuel cycle, but the improved atmosphere does serve to lessen the impact of what has been a major irritant in bilateral relations.

45. Nevertheless, we believe that Brasilia will persist in its refusal to place its indigenous nuclear activities—on which it is apparently concentrating

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current efforts—under full-scope safeguards. As a result, it will be difficult for the United States—or any other nation—to have a major impact on its nuclear policies.

46. Brazil has not become openly hostile towards the International Atomic Energy Agency, and has recently sought the chairmanship of the Board of Governors. Brazil is not one of the more aggressive nuclear threshold states. It is critical, however, of the

allegedly discriminatory nature of the NPT and has been so since the inception of the Treaty. Brazilian leaders have a strong determination to pursue their own self-interest—especially with regard to the acquisition and development of nuclear technology—and the confidence to oppose those who stand in their way, but they are not convinced today that nuclear explosives are necessary to national security or prestige.

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