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# SOUTH AFRICA'S NUCLEAR WEAPONS POLICIES

**Stephen F. Burgess**

*South Africa's transition away from being a U.S. ally toward being a neutral country was followed by the development and then rollback of a nuclear weapons program. In South Africa's case, paranoia that the United States was abandoning it was a significant motive for going nuclear. Realism does not fully explain South Africa's desire for nuclear weapons, since the country faced no major strategic threats. Paranoia about communists and the loss of the United States as a major ally increased South Africa's sense of insecurity, thus it began to develop weapons and missiles. U.S. pressure increased in the late 1980s, and in 1989 the apartheid government began the process of surrendering power. South Africa signed the NPT, and in 1990 and 1991, it unilaterally disarmed. Lessons from the South Africa case include the critical role played by leaders in setting the direction of a country's strategic policy, and the unintended consequences of Western programs to promote peaceful energy. Democratic reforms may prove to be a successful long-term factor in reversing the development of nuclear weapons.*

**KEYWORDS:** South Africa; Atoms for Peace; Peaceful nuclear explosions; Nuclear weapons; Disarmament; Dismantlement; Nonproliferation; Encirclement

South Africa is the most extreme case of a country that developed nuclear weapons without a clear strategy for using them.<sup>1</sup> A neutral power in the 1970s and 1980s that clandestinely built a small nuclear arsenal—and then voluntarily dismantled it—South Africa benefited in its nuclear pursuits from its earlier alliance with the United States and the United Kingdom in the 1940s and 1950s. To understand why and how South Africa covertly pursued the development of nuclear weapons, one needs to appreciate three characteristics usually associated with crime: motive, opportunity, and means. The historical record clearly indicates that apartheid-era decisionmakers' threat perceptions and motivations were important in initiating and sustaining support for the development of nuclear weapons and missiles. Leaders increasingly adopted a siege mentality as the country became isolated from former Western allies and as increasingly severe international economic sanctions were implemented. Most Afrikaans-speaking South Africans held beliefs that grew out of their shared cultural experiences of being dominated politically and economically by English-speaking South Africans after the defeat of the "Boers" in the 1899–1902 Anglo-Boer War. Thus, psychology in the form of strong nationalist sentiments, paranoia about what the government felt was "an onslaught by communists and blacks," and a sense of abandonment by the United States played a role in South Africa's nuclear weapons development decisions.<sup>2</sup>

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The Afrikaner scientists (and many English-speaking ones) who worked on the covert nuclear weapons program shared a strong sense of patriotism and were united by a firm commitment to ensuring the success of the program. This shared commitment was vital: The well-trained scientists and engineers formed the human capital needed to design and build sophisticated weapons systems in an increasingly isolated scientific environment.

The large deposits of uranium and other strategic natural resources available in South Africa at the beginning of the nuclear age provided the raw materials for nuclear development. The desire to exploit these uranium reserves for industrial development catalyzed South Africa's interest in harnessing the new technology of nuclear power. After the pro-apartheid Afrikaner National Party gained political power in 1948, leaders and scientists continued nuclear research for peaceful purposes—and then began researching military uses in the late 1960s.

Timing played a role in South Africa's decision to secretly develop nuclear weapons. A confluence of events figured into the decisionmaking calculus of key senior political, military, and nuclear power officials. South African scientists had demonstrated the feasibility of nuclear uranium enrichment in 1967, and the country was developing an increasingly sophisticated defense industry. At the same time, South Africa's leaders faced growing threats domestically, regionally, and globally. Confronted with these threats—and possessing the capability to build nuclear weapons—in 1970 the South African government opted to reject the Treaty on the Non-Proliferation of Nuclear Weapons (NPT) and to pursue a nuclear arsenal. Several events led to the acceleration of the nuclear weapons program, including the Angolan Civil War in the mid-1970s, intervention in Angola by Cuban troops backed by the Soviet Union, and "abandonment" of South African forces by the United States that increased leaders' perceptions of isolation and siege.

### **Toward a Covert Program**

Over time, technical abilities and increased threat perceptions fueled support for building more sophisticated nuclear weapons and missiles capable of carrying tactical and strategic warheads. South African decisionmakers came to view smaller nuclear warheads and longer-range missiles as important force multipliers for a military that was having trouble obtaining parts and new technologies from abroad for its air force. In the 1970s and 1980s, South Africa's senior politicians increasingly became committed to the belief that secret nuclear weapons were useful tools that complemented diplomatic and military instruments for coping with threats.<sup>3</sup>

South African leaders were adept at exploiting opportunities in a changing domestic, regional, and international environment. In the 1950s and 1960s, technical exchanges with the West (including the U.S. Atoms for Peace program and the Plowshares peaceful nuclear explosions program) helped South Africa obtain nuclear training and knowledge. This dual-use education was enough from which to launch a covert nuclear weapons program. As South Africa increasingly became viewed as a pariah state in the 1970s, it forged covert relations with Israel, France, Switzerland, and Belgium, as well as some Western firms. In the 1980s, South Africa built six nuclear bombs and then decided to develop more sophisticated tactical and strategic nuclear warheads and missiles.<sup>4</sup>

The concept of “encirclement” figured prominently in the minds of senior South African political and military officials in the 1970s and 1980s who perceived heightened threats from all quarters—at home, in the region, and abroad. The feeling of encirclement increasingly became both the motive and the rationale for undertaking weapons research and development.

Evidence of the interaction between heightened threat perception and the development of capabilities and strategies was confirmed in a recently declassified top-secret South African national security memorandum from March 1975. The “Jericho Weapons Missile System” memorandum noted that the South African government was considering buying Israeli nuclear-tipped ballistic missiles that had a 500-kilometer range.<sup>5</sup> Had such missiles been deployed at or beyond South Africa’s borders, several African capitals, like Lusaka, Zambia, would have been within its reach. The memo cites the director of strategic studies of the Ministry of Defence saying that “a direct and/or indirect nuclear threat against [South Africa] had developed to the point of being a real danger,” requiring a reappraisal of strategic policy. The memo stressed both “the deterrent effect and additional flexibility which [nuclear warheads] offer. . . as well as the reduction in losses of vital aircraft.”<sup>6</sup>

South Africa’s commitment to building nuclear warheads covertly necessitated the formulation of a strategy for nuclear use, so officials devised schemes to threaten African capitals, to threaten to test nuclear weapons, and to draw in the United States, but these ploys did not make strategic sense. The nuclear commitment also required consensus among those who knew about the secret program on what parts of the “nuclear story” would be disclosed to the outside world. Although the complete archival record necessary to understand the full range of nuclear programs supported by the apartheid regime has not yet been disclosed, much of what South Africa developed under the rubric of the nuclear bomb program is now known. Enough of the story has been published or leaked to glean insights that are useful for understanding contemporary nuclear proliferation trends.

South Africa’s nuclear weapons experience is especially relevant to better understand the factors that influence whether the leaders of a country decide to “go nuclear.” The general contours of South Africa’s program underscore several points that led to covert nuclear weapons development, including:

- Highly nationalistic leaders, feeling increasingly isolated, besieged, and abandoned, set the priorities and direction of nuclear energy and weapons programs.
- Western programs that were designed to promote the development of peaceful uses of nuclear energy also spread the knowledge necessary to build nuclear weapons.
- A supply of highly enriched uranium provided the foundation for a weapons program.
- The indigenous nuclear energy program, and later the covert weapons program, were aided by several economic sectors, and substantial funding and covert relations were vital to buying technology and expertise through secret means.

- A core group of scientists and engineers who had not only technical expertise but also nationalist commitment aided the weapons program and enabled the maintenance of secrecy.
- Weapon construction was made possible by access to state-of-the-art foreign technology and training.
- Personal relationships determined national policy interests, shaped inter-state relationships, and laid the groundwork for covert collaborations that led to the development of nuclear weapons and missiles.
- The nuclear nonproliferation regime and sanctions were unable to prevent a committed deviant state from obtaining the needed materials, technology, and expertise to build nuclear weapons.
- The unintended effects of bilateral international sanctions and export controls led South Africa to build an indigenous highly enriched uranium (HEU) production line, rather than rely on foreign sources of fuel, and to engage in extensive covert cooperation with Israel, another regional NPT deviant.
- For decades, the authoritarian government was able to keep secret many details about its extensive covert nuclear weapons program.<sup>7</sup>

South Africa was able to develop a nuclear arsenal in large part because a series of leaders understood the importance of maintaining access to state-of-the-art nuclear knowledge, equipment, and fuel supplies. They were able to maintain such access through participation in programs on peaceful nuclear energy and explosions programs, covert cooperation and linkages, and, when all else failed, illegal purchases. The benefits South Africa gained from participating in peaceful nuclear energy programs and military-related exchange programs demonstrate the clear need to track nuclear developments in states perceived as friends. South Africa's early commitment to developing a peaceful nuclear program also highlights the problems inherent in the dual-use nature of nuclear research and development—peaceful research can be difficult to distinguish from military work. Virtually every country that has covertly developed nuclear weapons in recent years first developed an indigenous enrichment process, ostensibly for peaceful purposes.<sup>8</sup>

One of the few difficulties South Africa encountered in its nuclear program was the need to coordinate the production of HEU supplies with the demands of the bomb construction program. Doubts remain about the unilateral means used to dispose of South Africa's HEU stockpile before the International Atomic Energy Agency (IAEA) was able to perform inspections—and whether a secret HEU stockpile might still exist. The South African case underscores the benefits that a Fissile Material Cut-Off Treaty could achieve. Thus, the South African case may be cited by those who advocate strengthening existing safeguard agreements and monitoring procedures, even though “denial policies” to prevent or prohibit potential proliferators may only slow down nuclear proliferation. Improved safeguards and monitoring procedures at existing uranium enrichment plants, as well as safeguards checks on HEU stockpiles, stand out as special concerns.

South Africa's decision to pursue nuclear weapons also illustrates how the enforcement of international sanctions, embargoes, export license agreements, and other restrictive measures may have unintended consequences. The South African nuclear saga

suggests how difficult it is to prevent a committed nation from going nuclear when it is willing to use illegal methods.

### **Motivations for Disarming**

By 1989, several factors made the nuclear program less attractive to senior National Party politicians and top national security and military officials. Particularly among the highest echelons of the South African Air Force, concern was growing that the projected costs of nuclear-related programs would crowd out plans to upgrade key conventional systems such as fighter-bombers.<sup>9</sup> High-level National Party leaders recognized that some form of negotiated governmental power-sharing arrangement with the African National Congress (ANC) would soon be reached. South Africa's security environment had also changed over the years. Regional threats had been eliminated with an internationally brokered regional settlement that linked the independence of Namibia and the withdrawal from Angola of Cuban troops and Soviet advisers. The demise of the Soviet Union was imminent, and there was growing pressure from Western countries for South Africa to accede to the NPT. Similar pressures developed in the early 1990s for South Africa to renounce its missile and space-launch vehicle program and join the Missile Technology Control Regime.

U.S. pressure on South Africa to dismantle its nuclear weapons program grew substantially in the late 1980s. The United States, as the main supporter of the NPT, did not want weapons in the hands of the ANC. In late 1986, Reagan administration officials realized that rapid change could take place in South Africa after the imposition of sanctions by Congress. Consequently, the United States increased pressure on President P.W. Botha to dismantle the nuclear weapons program.<sup>10</sup> In 1987, Mikhail Gorbachev signaled that the Soviet Union would begin withdrawing from Africa, and in 1988 Cuba withdrew troops from Angola.<sup>11</sup> In 1989, with the rise of F.W. de Klerk to the presidency and with increasing likelihood that the ANC would take power in South Africa, the United States threatened to treat South Africa as a "hostile nation" to induce disarmament, according to Renfrew Christie, a noted South African expert on the nuclear weapons program.<sup>12</sup>

De Klerk came to office committed to implementing a reform process that would ensure a continuing lead role for the National Party in government. While most outside observers believed by the beginning of the 1990s that a majority-rule government headed by the ANC would gain power in the near term, National Party leaders, including de Klerk, disagreed. De Klerk and his government disliked the idea of turning over access to nuclear weapons to the ANC. This view complemented the opinion widely shared among U.S. government officials that it would be unwise to have nuclear weapons in the hands of a majority-rule government that was friendly with Libya's Muammar el-Qaddafi and Cuba's Fidel Castro, among others. The United States quietly communicated its position to the de Klerk government via diplomatic and back channels. The de Klerk regime hoped that eliminating its bomb program would improve its relations with Washington.

Shortly after his September 1989 inauguration, de Klerk initiated a series of basic reviews of policies and spending priorities. His government wanted to cut defense

spending in light of the dramatically altered regional strategic context in order to free up money to pay for social and economic reforms that the National Party planned to implement as part of a wider reform initiative.

The South African Defence Force, Armscor (the state's weapons manufacturer), and the Atomic Energy Corporation (AEC) were all under pressure to cut expenses. By the late 1980s, defense-related industries were one of South Africa's most significant economic sectors, accounting for nearly 10 percent of all manufacturing jobs. Approximately 130,000 people worked directly or indirectly for defense industries, but over the next decade the resources available for defense would be cut by more than 50 percent.<sup>13</sup>

In November 1989, de Klerk initiated a review of South Africa's nuclear bomb program, and on February 26, 1990, he issued internal orders to terminate it and dismantle all existing weapons.<sup>14</sup> The South African government was not interested in negotiating concessions from Western powers and did not seek help from the IAEA to dismantle its program. Instead, the South African Air Force, the AEC, and Armscor developed a joint plan for the safe and secure dismantlement of the bombs.<sup>15</sup>

The dismantlement process proceeded swiftly. At the beginning of July 1990, the uranium enrichment plant at Pelindaba East was decommissioned, the six devices were dismantled, the hardware and technical documents were destroyed, and the Advena production facility was decontaminated and converted for commercial use. By early September 1991—just 10 days before South Africa signed a full-scope safeguards agreement with the IAEA—all its HEU had been recast and sent to the AEC for storage. Under the agreement, all of South Africa's nuclear plants and all of its previously produced enriched uranium were placed under IAEA safeguards. The unilateral dismantlement process was completed by 1992.<sup>16</sup>

As a precursor to signing the NPT, which it acceded to in the summer of 1991, South Africa invited the IAEA to make on-site inspections. During a series of visits, the South African government permitted IAEA personnel unprecedented access for their inspections of HEU facilities and weapon production sites. South Africa and the IAEA established new procedures and important precedents for the future by working out explicit guidelines for on-site inspections and safeguard procedures at nuclear enrichment facilities.

By the time de Klerk officially and publicly acknowledged the program's existence in a March 1993 speech to parliament, the government had already dismantled the nuclear bombs, destroyed much of the documentation associated with the nuclear weapons programs, and shut down or converted several research and test facilities. On August 14, 1994, the IAEA confirmed the complete dismantlement of the South African nuclear weapons program.<sup>17</sup>

Several aspects of South Africa's denuclearization may be relevant for understanding the factors that influence when and why a country's political leaders decide to engage in nuclear weapons rollback. Factors that contributed to South Africa's successful disarming include:

- The end of existential threats.
- The prospect of regime change in which a new party—previous adversaries—would take power.

- Opposition within the military and bureaucracy to the high costs of building nuclear weapons and advanced, space-based delivery systems.
- Pressure from the international community (especially the United States).
- A new commitment to democratic reforms, transparency, and to nonproliferation norms, cemented by the international community.
- Progress toward further nonproliferation commitments, sustained by the government, the scientific community, and civil society.<sup>18</sup>

A review of de Klerk's decisions to disarm and join the nuclear nonproliferation regime underscores the importance of both macro- and micro-level factors. Emphasis is often (and rightly) given to changes in South Africa's security environment and to the demise of the Soviet Union, as well as the rising demand for domestic political reform. However, too little attention has been paid in the nonproliferation literature to the importance of the longer-term effects of economic and psychological factors associated with the increased isolation and economic costs of comprehensive sanctions. In the South African case, international isolation and sanctions took a long time to have a major impact. Over time, these factors became increasingly important. As the economy shrank in the late 1980s, it was clear to business leaders—and gradually also to members of the ruling political elite—that the time had come to enter into negotiations designed to effect a gradual and controlled political transition away from apartheid. The impact of outside pressure, particularly applied by the United States, to dismantle the nuclear bomb and missile programs completely underscores the fact that South Africa, and presumably other states undergoing political transitions, are more susceptible to international and domestic counterproliferation pressures than well-entrenched regimes.

Finally, the South African case demonstrates the importance of a well-managed and tightly supervised nuclear dismantlement plan and the need to involve IAEA inspectors *before* a bomb program is dismantled. In South Africa's case, early involvement would have reduced questions about whether all bombs and components were in fact dismantled, over which uncertainty still lingers.

## NOTES

1. Portions of this article are based on Helen E. Purkitt and Stephen F. Burgess, *South Africa's Weapons of Mass Destruction* (Bloomington: Indiana University Press, 2005); and Helen E. Purkitt and Stephen F. Burgess, "Correspondence: South Africa's Nuclear Decisions," *International Security* 27 (Summer 2002), pp. 186–194.
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4. Purkitt and Burgess, *South Africa's Weapons*, pp. 59–60.
5. See Memorandum dated March 21, 1975, Lt. Gen. R.F. Armstrong, "The Jericho Weapon System," SADF HS/11/4/34, top secret, declassified Sept. 25, 2003 (SAHA reference no. AL2878,A 3.1.1, 1975) p. 1. See also, Peter Liberman, "Israel and the South African Bomb," *Nonproliferation Review* 11 (Summer 2004), pp. 77–80, for a copy of the memo.
6. *Ibid.* See also, Michael Schmidt, "Proof of SA Nuclear Plan," *Sunday Times* (South Africa), Oct. 12, 2003, p. 5.
7. Purkitt and Burgess, *South Africa's Weapons*, pp. 55–56.
8. David Albright and Kevin O'Neill, "Jury Rigged, But Working," *Bulletin of the Atomic Scientists* (Jan./Feb. 1995), p. 20.
9. Purkitt and Burgess, *South Africa's Weapons*, p. 131.
10. Purkitt and Burgess, *South Africa's Weapons*, p. 130; Dr. Renfrew Christie, interview by author, Bellville, South Africa, June 25, 2000.
11. Chester A. Crocker, *High Noon in Southern Africa: Making Peace in a Rough Neighborhood* (New York: W.W. Norton, 1992), pp. 373–464.
12. Renfrew Christie, interview by author, University of the Western Cape, June 24, 2000. Dr. Christie helped to expose the nuclear weapons program in the 1970s and 1980s and was punished with seven years in prison.
13. Purkitt and Burgess, *South Africa's Weapons*, p. 120.
14. Steyn et al., *Armament and Disarmament*, pp. 98–99.
15. *Ibid.*
16. Joseph Cirincione, Jon B. Wolfsthal, and Miriam Rajkumar, *Deadly Arsenal: Nuclear, Biological, and Chemical Threats*, 2nd ed. (Washington, DC: Carnegie Endowment for International Peace), pp. 407–418. See also the Nuclear Threat Initiative's Web Site. "South Africa Profile," <[www.nti.org/e\\_research/profiles/SAfrica/index.html](http://www.nti.org/e_research/profiles/SAfrica/index.html)>, and Stumpf, "South Africa's Nuclear Weapons Program," pp. 4–7.
17. Purkitt and Burgess, *South Africa's Weapons*, p. 126.
18. Purkitt and Burgess, *South Africa's Weapons*, pp. 143–144.