

Chapter 6 Nuclear Strategy and Arsenal Expansion

South Africa's formal nuclear strategy evolved throughout the late 1970s and early 1980s. According to a former member of the nuclear weapons program, an adequate strategy was not formulated when Armscor took over the program. Although the basic strategy was approved in 1978, he said that this strategy was only sufficient to support the decision to develop a nuclear deterrent. By 1986 however, a policy document approved by the then Minister of Defense Magnus Malan laid out South Africa's detailed strategy for nuclear weapons.

The strategy was not based on war-fighting, but rather was intended as a political strategy designed to force Western powers, particularly the United States, to assist South Africa against an overwhelming military threat to its territory, or what was referred to in strategy documents as finding itself with "its back against the wall." The most widely feared threat envisioned Soviet-backed forces overrunning South African forces in Angola and invading South Africa itself. If South Africa possessed nuclear weapons, planners reasoned the United States and its allies would step in between the two warring sides and end the conflict.¹ This strategy, sometimes referred to as a catalytic strategy, assumed that the United States would not allow a nuclear war to occur, or allow any country to detonate a single nuclear weapon. The assumption was based on a US fear that the use of a nuclear weapon would set a precedent, and make it easier for the next country to decide to build or use nuclear weapons. South Africa may also have reasoned that any demonstration of its nuclear weapons could cause the Soviet Union to threaten the United States with a nuclear confrontation unless South Africa was adequately constrained, which in turn would motivate the United States to seek an end to the conflict.

In addition, nuclear weapons, according to Prime Minister P.W. Botha in his 1981 speech opening the Circle facility, would "give the RSA [Republic of South Africa] the capability to manage the (superpower) conflict from a power base of nuclear strategy, rather than a power base of black politics." This statement also indicated the resentment held by the political leadership against Western sanctions over its apartheid policies and a desire to change those negotiating and power dynamics. Nuclear weapons would allow South Africa to shift the conversation from its internal affairs to security interests if needed. Botha stated: "Nuclear is primarily a political weapons system, not a military system."²

Unlike any other nuclear strategy, South Africa's strategy envisioned no actual operational use of nuclear weapons. It was designed to be a bluff. However, the challenge was to ensure that if the strategy was exercised, South Africa was perceived as having the means and resolve to use nuclear weapons militarily. The goal was to deter aggression, not to be involved in a nuclear war that South Africa could not survive.

1978 Basic Strategy

¹ Interview with a former member of the nuclear weapons program, October 1995.

² *Draft Speech of Prime Minister P.W. Botha for the Opening of Kentron Circle*, File No. 13/2/8/C, May 4, 1981, in Afrikaans, Original in Nic von Wielligh and Lydia von Wielligh-Steyn, *Die Bom* (South Africa: Litera Publikasies, 2014), Appendix, translated by Schreiber Translations, Inc. for Institute for Science and International Security, July 7, 2015.

In his 1981 Kentron Circle speech, Prime Minister Botha announced that he first ordered the development of the nation's nuclear strategy in July 1977 when he was Defense Minister.³ He and the State Security Council approved the basic strategy, or "national strategic guidelines for nuclear weapons," in April 1978. Within one month after Botha became prime minister in late September 1978, he authorized the creation of a high-level action committee to further develop guidance for the planning of the nuclear weapons program, as discussed in Chapter 4. This group oversaw the production of the first nuclear strategy.

The April 1978 strategy document has never been publicly released or published. The American political scientist Peter Liberman, however, details its initial development. He cites interviews with André Buys, who after being the Plant Manager at Circle moved to a more senior position in Armscor. Buys stated that under Botha's Defense Minister title, which he held simultaneously until 1980 after becoming Prime Minister, Botha asked close advisor and South African Defense Force chief of staff for planning, Army Brig. John Huyser, to prepare a memorandum laying out the potential elements of a nuclear strategy. Huyser returned a six to eight page discussion memo laying out the following options: 1) secret development, 2) covert disclosure, and 3) overt disclosure. Huyser recommended the third option, "openly joining the nuclear club." Botha approved the document but wrote on the memo that "any disclosure should be delayed "until we are ready" and it required government approval. Liberman states that Buys told him the document "did not specify numbers or types of weapons, which left the AEB still uncertain about whether a demonstration capability was sufficient."⁴

The government eventually approved sometime around 1978 an actual range of nuclear weapons to be developed along with turning Huyser's options memo into a linear, three-phase strategy:⁵

- Five to six nuclear weapons would be "kept on the shelf," or developed;
- Should the RSA find itself in a "back against the wall" situation:
 - the existence of the RSA's nuclear weapons would be conveyed to Western countries (primarily the USA) in a covert manner; if this does not alleviate affairs,
 - an underground test will be performed to demonstrate the RSA's capability, and
 - finally, an above-ground test, if the threat persists.

Armscor would have overall responsibility for the nuclear deterrent's development, and the South African Defense Force and AEB would cooperate, according to Botha, on:

...Identify[ing] in which manner the production of suitable nuclear weapons can be brought about for SA [South Africa] – this with consideration for the developments made by the AEB concerning peaceful use of explosive nuclear material, and, after approval of said proposal, to truly implement the suggestions. This Committee proceeded to their task...in such a way that I was able to approve the proposed outline of the intended

³ Draft Speech of Prime Minister P.W. Botha for the Opening of Kentron Circle, op. cit.

⁴ Peter Liberman, "The Rise and Fall of the South African Bomb," *International Security*, Vol. 26, No. 2, Fall 2001, p. 53.

⁵ This plan was reiterated in a 1985 meeting and referred to as the 1978 plan. See *Meeting of Ad Hoc Cabinet Committee Chaired by Honorable State President*, September 3, 1985, *Die Bom*, op. cit., or their English version: Nic von Wielligh and Lydia von Wielligh-Steyn, *The Bomb* (Pretoria: Litera Publications, 2015).

*weapon and establishment of certain facilities, the so-called Project Festival, already on July 4, 1979.*⁶

An important aspect of the nuclear strategy was to maintain uncertainty about the program. Protecting uncertainty required the government to ensure that nuclear weapons activities remained secret. As a result, Armscor imposed a more stringent security regime on the program than the AEB had exercised in the 1970s.

Tasked with planning in the early 1980s, key Armscor officials felt they lacked adequate guidance about the circumstances in which the strategy would be implemented and the number and type of nuclear weapons required. For example, the original 1978 decision that talked about five to six gun-type devices on the shelf had little justification. Moreover, from an engineering standpoint, Armscor needed to know whether to actually make five or six weapons. Buys complained that Huyser's memo, for example, "was not very concise" and they "often had difficulties in interpreting it."⁷ To Buys, the existing strategy was inadequate.

In 1983, while still Plant Manager of Circle, Buys received approval to chair a working group of eight to ten people based at Armscor to develop more detailed guidance on when to move from one phase of the strategy to the next. Since the three-phase strategy moved linearly from disclosure of the bomb's existence to demonstration, Armscor officials were concerned that the guidance was too vague and needed to show prescriptively what had to occur before moving to the next phase. They did not want the phase three testing of nuclear weapons to take place, for example, quickly or without considering the consequences of moving past earlier stages. Nor did they want an irrational politician to be in control of hasty or ad hoc decision making in a crisis situation. It was unclear what Botha's plan for overt disclosure "when ready" meant and whether that needed to happen.

Each escalatory step should be small, according to Buys, starting with low-key steps.⁸ The aim should be to stop as early in the escalatory process as possible, he added.

Buys' working group contacted many people, read many nuclear strategy references, and studied the strategies of other countries. The group "met monthly for a year, conducting war games, reviewing the nuclear strategy literature, and selectively consulting experts, politicians, and even a leading South African theologian."⁹ In the end, by 1985, the working group believed that their strategy, summarized into a 10-20 page document, was different from other nuclear weapon states in that it did not envision the use of nuclear weapons in an offensive mode.

While the working group was developing its more detailed strategy, an Ad Hoc Cabinet Committee, chaired by then-retitled State President Botha¹⁰ and attended by Armscor Chairman Commander P.G. Marais, Minister of Defense General M.A. Malan, Director General of the Mineral and Energy Affairs Ministry Dr. L. Alberts, , and Chairman of the Atomic Energy

⁶ *Draft Speech of Prime Minister P.W. Botha for the Opening of Kentron Circle*, op. cit..

⁷ Liberman, "The Rise and Fall of the South African Bomb," op. cit., p. 55.

⁸ Interview with Buys, April 5, 2001.

⁹ Liberman, "The Rise and Fall of the South African Bomb," op. cit., p. 56.

¹⁰ By 1984 the prime minister title was changed to State President.

Corporation Dr. J.W.L. de Villiers, reconfirmed the 1978 three phase strategy. South Africa's nuclear weapons would be made known to Western countries, primarily the United States, and then if needed, escalated to conveying their presence via underground or above ground nuclear tests.¹¹ The document stated that the strategy specifically excluded the "operational application of nuclear weapons." We were unable to determine if the 1978 document had a similar statement. Moreover, the document also said that any decision to implement the strategy will be authorized solely by the State President.

The main purpose of the 1985 Cabinet meeting was to limit the size of South Africa's nuclear weapons program. It ordered the manufacture of a maximum of seven gun-type devices. However, this represents an increase from the numbers in the 1978 strategy document. Rather than build five or six gun-type devices, as was ordered in 1978, the Committee decided to build seven of them, while committing to developing more advanced weapons, as discussed earlier in the Circle chapter. The main cutbacks were in the production of nuclear materials, which tend to be the most costly part of producing nuclear weapons.

The more detailed, Armscor-developed South African "deterrent" strategy was adopted in November 1986 and was still based on three escalating, step-wise phases but with additional guidance. The updated strategy document, in essence, provided a roadmap for identifying the requirements for progressing through successive phases. Because South Africa could not return to an earlier phase, the document described more criteria and the factors that would lead South Africa to enter the next phase. The document, Buys said, also contained specific language that any actual use of nuclear weapons should never happen. It would be suicidal, given the Soviet Union's vast ability to strike with nuclear weapons.

According to the strategy document, the first phase, "strategic uncertainty," would include the South African nuclear capability neither being acknowledged nor denied "as long as the military threat remained remote."¹² The intention, according to Buys, was to create worry in the world.¹³ South African politicians, with their periodic leaks, he added, created that uncertainty without any guidance.

Phase two, or "the covert condition phase," applied if the country were threatened militarily by Soviet or Soviet-backed forces. At that time, the government would covertly acknowledge the existence of its nuclear weapons to leading Western governments, particularly to the United States and perhaps Britain, and ask for their intervention to end the war. For example, it would state that it has a few nuclear weapons and cannot stand up to the Soviet Union's conventional forces. In interviews, Buys called this phase "arm twisting" of the major powers. Moving to this phase required South Africa to possess deliverable nuclear weapons so that the powers would believe that the implied threat was credible.

If phase two failed to persuade the international community to provide assistance against a military attack and South Africa was starting to lose a war, the government would move to phase three, or the "overt deterrent phase." This phase, which included a series of successive steps,

¹¹ *Meeting of Ad Hoc Cabinet Committee, The Bomb*, op. cit.

¹² Liberman, "The Rise and Fall of the South African Bomb," op. cit., p. 56.

¹³ Interview with Buys, April 4, 2003.

intended to force the intervention of the United States and others to stop a war. The first step would be the public announcement of having nuclear weapons and an appeal for Western government aid. If that failed, South Africa would demonstrate its capability with an underground test. Next, South Africa could invite outside experts to look at the arsenal. The next step would be to demonstrate long-range delivery capability. Others have said that such a demonstration could have involved flying a Buccaneer bomber 1,000 kilometers south of South Africa and launching a nuclear weapon on a Raptor that detonated in the atmosphere.¹⁴ If nothing had worked, the last step threatened “application on the battlefield,” which could be employed as self-defense against an impending conventional military attack.¹⁵

According to Buys as cited by Liberman, actual battlefield use was hotly debated internally. Many members of the committee, including Buys, felt it would have been suicidal to threaten use of nuclear weapons even if South Africa were on the verge of being defeated militarily by the Soviet Union.¹⁶ Buys noted: “Others would argue differently, they would say fight to the bitter end...But there was no strategy for that.”¹⁷ Moreover, some officials who were concerned about the battlefield use provision worried in particular that the leadership may be unpredictable enough to use nuclear weapons even without a clear, imminent military threat. In the end, no operational use remained fundamental to the strategy.

Buys’ strategy document has not survived. All copies were destroyed as part of South Africa’s dismantlement of its nuclear weapons program. Buys said in an interview that security officials even came to his office and took his copy. However, a declassified September 1987 document contains an outline of the new strategy that confirms what Buys has said. In this document, “Kramat [nuclear weapons] Capability: Current Status and Further Developments,” a subcommittee called the Weapons System Working Group (WSWG) submitted a set of nuclear weapons recommendations to the Witvlei Control Committee (known by its Afrikaans acronym WBK), which was a senior coordinating body for the nuclear weapons program.¹⁸ The exact role and membership of the Witvlei Committee, which also translates as a strategy council, remains unclear. Buys called it a committee that dealt with budgets and coordination. The chair of the Witvlei Committee also briefed the Ad Hoc Cabinet Committee chaired by the State President prior to its 1985 decision to limit the nuclear weapons program.¹⁹ Therefore, its role appears critical in the decision making about nuclear weapons.

The recommendations in the “Kramat Capability” document will be discussed soon, but the memo contained a summary of the new strategy. Kramat is a code word for nuclear weapons. The memo specifically states that the updated nuclear strategy was “approved by the Minister of Defense on November 24, 1986.”²⁰ According to Buys, he briefed President Botha on the new

¹⁴ Mitchell Reiss, *Bridled Ambition: Why Countries Constrain Their Nuclear Capabilities* (Washington, D.C.: The Wilson Center, 1995), pp. 15-16; and Interview with Buys, April 4, 2003.

¹⁵ *Presentation to Witvlei Committee: Kramat Capability: Current Status and Further Developments, The Bomb*, Appendix, op. cit., pp 486-496.

¹⁶ Liberman, “The Rise and Fall of the South African Bomb,” op. cit., pp. 56-57.

¹⁷ Liberman, “The Rise and Fall of the South African Bomb,” op. cit., pp. 56-57.

¹⁸ Witvlei means White Marsh in English. The word’s origin is unknown.

¹⁹ *Meeting of Ad Hoc Cabinet Committee, The Bomb*, op. cit.

²⁰ *Presentation to Witvlei Committee: Kramat Capability: Current Status and Further Developments, The Bomb*, op. cit.

strategy. In the meeting, Buys recommended never to use nuclear weapons, and he said that Botha did not object. He was not aware of whether Botha or the Cabinet approved the new strategy document, which had the status of a defense policy document.²¹

According to this Kramat Capability document, the South African escalating, three-phase "deterrent" strategy included:

- During the **strategic uncertainty phase**, the existence of the KRAMAT [nuclear] capability will be denied.
- During the **covert condition phase**, the KRAMAT capability will be covertly revealed as a means of inducement, persuasion, and coercion.
- During the **overt deterrent phase**, the following actions will be considered:
 - Overt announcement.
 - Display of force.
 - Demonstration (underground or atmospheric test explosion).
 - Threatened use.
 - Battlefield application as DETERRENT (*caps in original*) against conventional assault forces.
 - No strategic application foreseen, only the threat of use.

The document continued, "In order to carry out this strategy with credibility, the following weapon systems are required":

- Air-launched weapon for atmospheric demonstration test and use in battle.
- Explosive device for underground demonstration test.
- Long-range ballistic missile for threat of strategic use.

By this time, the air-launched weapon, namely the Raptor discussed in chapter 5, was fully developed and being outfitted with nuclear warheads. However, the nuclear test site had not been visited since 1977, when it was hastily shutdown, and the two deep shafts were sealed. Ensuring that a test was possible became an urgent priority. Moreover, although the ballistic missile was still many years from deployment, it was envisioned by 1987 as a critical nuclear weapons system that would require new warheads. The 500 series production gun-type models were not suitable for use on ballistic missiles, in part because of the safing mechanisms.

Nuclear Test Site

According to Buys, in late 1986 or early 1987, Armscor was told to "make sure that the capability to actually execute the strategy is in place."²² The most urgent priority was ensuring that an underground nuclear test could be carried out.

The Weapons System Working Group report mentioned above offers some insight into the thinking about the nuclear test. Although the request for the inspection of the test shafts had

²¹ Interviews with Buys, April 4 and July 31, 2003.

²² "The Rise and Fall of the South African Bomb," op. cit., pp. 57-58.

occurred prior to the working group's Kramat report, the working group included this issue in its nuclear weapons assessment and made recommendations about how to proceed. The concern was that the deeper of the shafts may have become blocked by an obstruction and that the Melba test device, built in 1979, was viewed as obsolete. The group was also worried that the combined system, codenamed Gardenia/Melba and composed of the Melba device with placement and control systems, while in working order, was no longer reliable and would take 21 days to prepare for deployment. A test under the then existing conditions was also considered as an "open" underground test explosion that would discharge a considerable amount of radioactive material into the atmosphere, apparently because the shafts could not be backfilled after placement of the device deep in the shaft (see also chapter 4). The Group recommended the development of a new test device, codenamed Modulus, accompanied with new placement and control equipment to be finished by about 1991. The group said, "It must be possible to use the Modulus device for a back-filled "clean" underground demonstration test." In addition, it recommended an inspection of the test shafts to determine their condition. However, it said that the inspection should happen "in a manner that will not attract international attention to the test site." If this is not possible, the group was so worried about renewed detection of activity at the site that it recommended that "an alternative test site must be sought."

Armcor visited the site in 1988, according to a former senior member of the nuclear weapons program. The lag time between the timing of the decision to reopen the shaft and the actual reopening resulted from the time to draw up plans, conduct trials at Circle, and obtain the necessary equipment and supplies.

With no intention to send a signal to the United States or the Soviet Union that they were reopening a shaft, possibly triggering worry about an impending nuclear test, Armcor investigated the test shafts clandestinely. To that end Armcor built a hangar, which it called a "shade," over a test shaft, placed dummy military vehicles near around the site, and conducted target shooting during construction to provide a plausible cover for the operation. They opened the shaft, emptied the water within, and tested the shaft's integrity. As will be discussed later, despite all these precautions, this activity was likely noticed by the United States.

Ballistic Missiles

The most dramatic shift in carrying out the new strategy was the decision to arm ballistic missiles with nuclear warheads. The plans for building a nuclear warhead for a ballistic missile grew out of South Africa's evolving security situation and its cooperation with Israel on rocket technology. South Africa's space program had the lead in developing a space launch vehicle in cooperation with Israel. The main purpose of the program was to contribute to South Africa's overall industrial development and launch low orbit reconnaissance satellites. South Africa's military viewed its lack of strategic reconnaissance as a major weakness in confronting the front line states militarily. That the launching rocket could be adapted to carry conventional and nuclear warheads was an added benefit and an opportunity. There is very little difference between a satellite launch rocket and a surface-to-surface rocket.²³

²³ When the rocket has a satellite payload, an apogee kick motor is affixed to the top of rocket so as to propel the satellite into low earth orbit at the top of the rocket's parabolic trajectory. When the rocket has a warhead, it is

Compared to aircraft, ballistic missiles offered South Africa a more reliable nuclear weapons delivery system able to deeply penetrate into Southern Africa. According to a former leader of the nuclear weapons program, South Africa wanted a missile with a range of 2,500-3,000 kilometers, longer than the range of the Israeli rockets that formed the basis of the cooperation. The goal was to be able to strike Luanda, the capitol of Angola, and points further north. Another motivation for a nuclear-tipped ballistic missile is that the Buccaneer bombers, which had been procured from Britain in 1965, were nearing the end of their operational lifetime. Only three were licensed to carry nuclear weapons by the late 1980s, according to this same official. The French-supplied Mirage aircraft could also be modified to carry nuclear weapons, but it did not have the range needed to carry out South Africa's nuclear strategy. There were also increasing concerns about the ability of South Africa's aircraft to penetrate enemy airspace in the future. With international sanctions in place, South Africa was unlikely to be able to buy a long-range, modern bomber or afford the domestic development of one. Thus, the development of a nuclear-tipped ballistic missile emerged as a feasible South African priority, given Israel's willingness to supply rockets.

The rocket of choice to carry a nuclear payload was the RSA-3 missile, which was a three-stage rocket under development by the late 1980s. By then South Africa had constructed a range of facilities to develop, build, and test this and other rockets.²⁴

The new strategy emphasized the need for credible nuclear weapons, which led to the choice of the Raptor and ballistic missiles as the delivery systems of choice. It also led the military to conduct a reevaluation of the number and type of nuclear weapons that would be built.

Plans for Increasing the Number of Warheads

The 1985 Cabinet decision discussed in chapter 5 set a limit of seven nuclear weapons and called for a feasibility study in respect to implosion-type warheads. However, the new nuclear strategy stimulated a new discussion of this limit. Moreover, in April 1986, the SADF's Air Force was appointed as "user of the nuclear and missile programme and went through several processes in the course" of 1986 and 1987 to determine the needs of the SADF.²⁵ Its plans called for doubling the number of nuclear weapons needed.

Again the Weapons System Working Group document offers insight into this decision. This group was instructed by the Witvlei Control Committee in April 1987 to determine a desired number of missiles and nuclear warheads from a strategic and operational point of view. It reported under the recommendation section that the view of the SADF was that a minimum of 14

topped by a re-entry vehicle that protects the warhead as it reenters the atmosphere on the downward portion of the parabolic trajectory.

²⁴ For more details about these sites, see Hannes Steyn, Richardt van der Walt, and Jan van Loggerenberg, *Armament and Disarmament: South Africa's Nuclear Weapons Experience* (Pretoria: Network Publishers, 2003), pp. 75-82.

²⁵ *Programme Dunhill: Development of a Nuclear Capability for the SADF, Decision of the Ad Hoc Cabinet Committee*, April 18, 1988, *The Bomb*, op. cit., p. 497.

Kramat payloads would be required, after taking into account the strategic and operational requirements and financial constraints.²⁶ The specific recommendations were:

- One Modulus device
- Ten gun-type warheads that will be operationally interchangeable between aircraft-deliverable and intermediate range missile-deliverable weaponry.
- Three boosted (A*) for the same type of missiles. (“This choice results in a better balance between circular error probabilities of ballistic missiles and payload yield.”).

The working group also had a series of technological development recommendations, including:

- Continuing the development of the implosion technology and do theoretical studies on the other nuclear technologies.
- Implosion technology is still at an early stage of development and the switch to implosion-type warheads will be possible only after year 2000, if the user [Air Force] decided to update the missiles with these warheads. (Implosion and other types of warheads may be better suited to new generation of lighter and smaller weapon systems that may become available in the future.)

Table 1 1987 Codenames for Nuclear Weapons

Kramat	Nuclear Warhead
Modulus	“Clean” underground test device
Gardenia	System of placement shafts and “dirty” underground test device
Melba	“Dirty underground test device
Cabot	Formerly Hobo (dumb weapon), see chapter 5
Hamerkop	Formerly Bakker or 500 series (smart weapon), see chapter 5
Husky	Intermediate range ballistic missile system
Ostra	Warhead on Husky

Another recommendation was to keep the Y Plant in operation longer than envisioned in the 1985 Ad Hoc Cabinet Committee decision. The group notes, however, that if there was a need for more warheads, switching to implosion warheads could be used to double the number of warheads with existing amounts of highly enriched uranium. (An implosion-type warhead needs about half the amount of HEU as a gun-type device.)

The total projected cost of all these recommendations was about 800 million rand from 1981 to 2006, of which about 265 million rand had been spent by 1986. Most of the monies already spent had been allocated to make HEU. During the next 20 years, annual average nuclear weaponization costs, excluding missile costs, were estimated at about 20 million rand per year. The average annual cost to make HEU and thermonuclear materials was estimated at almost 7 million rand per year. The latter average is misleading because in all likelihood most, if not all, of the HEU would be produced during the first several years of this 20 year period.

²⁶ *Presentation to Witvlei Committee: Kramat Capability: Current Status and Further Developments*, op. cit.

The level of government approval for these plans is not clear in the declassified documents. However, an April 1988 declassified document regarding the Air Force's "Dunhill Program" produced by the SADF's Air Force planning division shows that these recommendations were approved by the Minister of Defense in August 1987.²⁷ The recommendations were sent to the Witvlei Control Committee in September 1987. It is unclear if the WBK committee approved them, or if the President or the Ad Hoc Cabinet Committee approved them. However, what was called a Reduced Witvlei Committee approved them in June 1987, under what was called "Program Olympic."²⁸

The 1988 Dunhill document implies that the AEC may have resisted some of the recommendations. De Villiers, the Chair of the Atomic Energy Corporation, did not want to make the nuclear materials without explicit orders from the Minister of Economic Affairs and Technology.²⁹ By implication, this action may have required Cabinet level approval for this recommendation, instead of just that of the Minister of Defense.

At the time, the AEC was focusing on producing low enriched uranium for the Koeberg nuclear power reactors. Once the Z Plant was finished, it would have taken over this responsibility. The AEC viewed the production of LEU as a national security priority, however, so until that plant was running, it had started using the Y Plant to make LEU and blending down stocks of weapons-grade uranium to LEU for the Koeberg reactors. There could have been another, more mundane reason. The budgets for the military and the AEC were separate, possibly leading de Villiers to want to ensure that the necessary funds would be there to make the additional weapons-grade uranium.

Overall, however, these decisions shaped South Africa's plans for nuclear weapons. It is natural to ask what had happened in the years 1986 and 1987 that motivated this push for an improved, more threatening nuclear arsenal.

Tensions Mount

By 1987 the war in Angola, which had raged for almost a generation, had become South Africa's equivalent of the Vietnam War. The South Africa Defense Force and its ally UNITA were not able to win the war, although they achieved significant battlefield victories over their enemy. Out of fear of sparking direct Soviet intervention, the South African government was constrained from outright defeating its enemies and seize Angola, assuming that such a victory was indeed possible.

After the late 1987 defeat of a major Soviet-Angolan offensive, Cuba decided to escalate its own involvement in the civil war and send an additional 15,000 troops to Angola, bringing the total to

²⁷ *Programme Dunhill: Development of a Nuclear Capability for the SADF, Decision of the Ad Hoc Cabinet Committee, The Bomb*, op. cit., pp. 497-498.

²⁸ *Program Olympic: Corroborative Notes following the briefing of the Minister of Defence in Cape Town on 27 July 1987, July 30, 1987, The Bomb*, op. cit., pp. 484-5.

²⁹ *Programme Dunhill: Development of a Nuclear Capability for the SADF, Decision of the Ad Hoc Cabinet Committee*, op. cit.

about 50,000.³⁰ By early 1988, the Cuban and Angolan forces had started to advance into southwestern Angola near the Namibian border. By late May they had created a new southern front that ran approximately 250 miles and was heavily defended with tanks and artillery, late-model fighter aircraft, and sophisticated air defenses.³¹ According to Chester Crocker, former Assistant Secretary of State for African Affairs who had a major hand in ultimately resolving the tense standoff, although international peace talks had started in London, Fidel Castro "spoke mainly the language of war and military intimidation."³² In Crocker's view, Castro "publicly dared the South African leadership to run the risk of a 'serious defeat' if they tangled with him, and claimed that he had refused to give Pretoria a guarantee that he would not cross into Namibian territory."³³ Yet, interpreting Castro's true intentions during the first half of 1988 was difficult for South Africa and the Western negotiators. Was he headed for a military invasion of Namibia or was he seeking a way to negotiate an honorable exit from Angola?

Although hindsight has shown that Castro indeed was trying to drive South Africa to the negotiating table and never intended to invade Namibia, at the time South Africa was not so sure of Cuba's intention and took several military counteractions that only escalated the crisis. By late May 1988, heavier military units had been deployed in northern Namibia. In early June, the South African government called up its 140,000-man Citizen Force, the backbone of its conventional forces.³⁴ Tensions along the Angolan/Namibian border escalated throughout June, finally resulting in heavy exchanges on June 27. Rarely since 1975 had South African and Cuban forces confronted each other so directly.

Against this background, it is not surprising that the nuclear test site was being readied and the South African air force was interested in upgrading its nuclear forces. In the minds of the South African leadership, Buys recalled, the war was reaching a "semi-conventional state," implying in his statement that South African nuclear weapons could be needed. A common interpretation of the military situation had concluded that if the Soviet Union decided to win the war in Angola, South Africa could not have stopped it with conventional military forces. Another senior official in the nuclear weapons program similarly recalled that during the "Cuban crisis," Circle employees were "under a lot of stress" to produce nuclear weapons.

There is also a question whether in light of the increased threat, the leadership of South Africa was also thinking of escalating its nuclear posture. Buys said in an interview in February 1994 that the decision to reopen a shaft in the Kalahari Desert was a consequence of developments in Angola, although the intent was to do so without being discovered by foreign intelligence services. Despite Armscor's precautions, however, was this activity noticed by foreign intelligence services, and did South African political leaders exploit any such detection to send a signal to the world's powers?

³⁰ Chester Crocker, *High Noon in Southern Africa* (New York: W. W. Norton & Company, 1992), pp. 365-366.

³¹ Crocker, *High Noon in Southern Africa*, op. cit., p. 367.

³² *High Noon in Southern Africa*, op. cit., p. 367.

³³ *High Noon in Southern Africa*, op. cit., p. 367.

³⁴ *High Noon in Southern Africa*, op. cit., p. 372.

Frank Pabian, a leading expert on South Africa's nuclear program, thinks South Africa did so.³⁵ He believes that the United States and probably Russia detected renewed activity at the site. In a recent report, Pabian states that South Africa's Foreign Minister Pik Botha told an interviewer that he was approached about the test site by the US ambassador, who showed him images of the shade over the test shaft.³⁶ In Pabian's view, the building activity over the test shaft had "intentionally or not, provided a means for South Africa to send a signal that a nuclear test was possible."³⁷ That signal may have been exploited by Pik Botha, according to Pabian, to demonstrate a nuclear deterrent capability in the event that Cuba and Angola attempted a surprise conventional military assault against Namibia after South Africa's withdrawal from Angola by September 1, 1988.³⁸ To support his interpretation, Pabian points out that eight days after South Africa agreed to withdraw its troops, Pik Botha suddenly announced at a press conference in Vienna that South Africa had the "capability to make" a nuclear weapon "should [it] want to," but he refused to elaborate on that statement.³⁹ The Foreign Minister may have intended, perhaps on his own, to send a strong signal about South Africa's nuclear capabilities to Russia and the United States, figuring they were already worried about the test site activity.

Although tensions were decreasing by August 1988, the government had already made decisions to improve its nuclear weapons and possibly increase their number in parallel to the development of a more sophisticated nuclear strategy. To develop the capability to build these new weapons, the government decided to build a new facility close to the Circle facility that would make the advanced warhead for ballistic missiles.

³⁵ Frank Pabian, "South Africa's Nuclear Weapon Program: Lessons for US Nonproliferation Policy,"

Nonproliferation Review, Fall 1995, p. 28. <https://www.nonproliferation.org/wp-content/uploads/npr/31pabian.pdf>

³⁶ Frank V. Pabian, "The South African Denuclearization Exemplar," *Nonproliferation Review*, 2015, Vol. 22, No 1, pp. 27-52. <http://dx.doi.org/10.1080/10736700.2015.1071969>. Pabian cites a discussion at an international conference on South Africa's nuclear weapons program held in Pretoria on December 9-12, 2012, titled "The Historical Dimensions of South Africa's Nuclear Weapons Program." The conference is discussed, although not this information from Pik Botha, at <https://www.wilsoncenter.org/article/international-conference-the-historical-dimensions-south-africas-nuclear-weapons-program>

³⁷ "The South African Denuclearization Exemplar," op. cit.

³⁸ "South Africa's Nuclear Weapon Program," op. cit.

³⁹ "Pretoria Says It Can Build A Arms," Reuters. August 13, 1988.