

THE ATOMIC BOND

The Israeli–South African Nuclear Connection

IN THE EARLY 1960S, soon after Israel and France broke ground in the Negev Desert, South Africa began to seek its own nuclear capability. But South Africa's role as a global nuclear heavyweight goes back much further, to the final days of World War II, when South Africa's emergence as one of the world's primary uranium producers suddenly made it a strategically vital ally for the United States.

Prior to World War II, uranium was not considered a commercially significant product, let alone a strategic asset. But as scientists in the late 1930s discovered its fissionable properties, strategists began to worry about uranium falling into German hands. At the time, the world's largest reserves were found in the Belgian Congo, specifically in the Shinkolobwe mine in the southern Katanga Province.

After Hitler's forces took control of Belgium in June 1940, U.S. president Franklin Roosevelt's advisers urged the Belgian mining company operating in Shinkolobwe to move all extracted uranium out of the region for safekeeping. Over one thousand tons were shipped across the Atlantic and stored in a warehouse on Staten Island. Five years later, those same minerals, enriched and reprocessed, exploded over Hiroshima and Nagasaki.¹ At the time, as historian Thomas Borstelmann notes, "few people in the world had any idea where the ingredients for this extraordinary power came from. The men of the Truman administration, however, knew that they had found the key to unprecedented power in the mines of southern Africa."²

As the Cold War arms race intensified, American planners worried about their excessive dependence on the Congolese mine and its finite supply. In order to fuel a massive nuclear buildup, finding new sources of uranium became a paramount concern. Two days after D. F. Malan's his-

toric election victory in May 1948 ushered in the era of apartheid in South Africa, the British-American Combined Policy Committee on atomic energy development projected that South Africa would become the United States' primary source of uranium by 1952 and recommended signing import deals immediately in order to gain access to as much of it as possible. The State Department warned policymakers to "bear in mind the importance of South African uranium in all our future dealings with the Dominion."³

Anticipated dependence on South African uranium led the administration of Harry Truman to adopt an extremely soft policy toward the newly installed apartheid regime. South Africa became the eighth largest market for American products in 1948 in the midst of a postwar export boom. Pretoria was an especially favored customer as it paid for imports not in currency but in gold.⁴ In 1950, South Africa agreed to produce and sell uranium ore to the United States and sent one of its air force squadrons, led by an ace pilot named Jan Blaauw, to fight on the American side in Korea.

Responding to this show of goodwill, an appreciative Secretary of State Dean Acheson assured South Africa's ambassador in Washington that Pretoria's requests for American arms would receive "the most sympathetic consideration."⁵ Then, in 1957, the Eisenhower administration signed an agreement with the South Africans under the auspices of the American Atoms for Peace program—an effort to provide nuclear infrastructure, materials, and training to other countries in order to further the peaceful uses of atomic energy. Washington offered to provide South Africa with its first research reactor, SAFARI-1, at Pelindaba, outside Pretoria, and the highly enriched uranium needed to fuel it.⁶ Two decades later, South Africa would have the bomb.

Israel, too, received a small research reactor from Washington under the Atoms for Peace program; but without its friends in France, Israel may have never become a nuclear power.

In October 1956, before Israel agreed to launch the invasion of Egypt that set off the Suez War, Shimon Peres had insisted that the French provide Israel with a nuclear reactor for research purposes. Defense Minister Maurice Bourgès-Maunoury, Foreign Minister Christian Pineau, and

Prime Minister Guy Mollet gave Peres a verbal commitment but no mention of a nuclear deal appeared in the Sèvres protocol signed by Britain, France, and Israel on the eve of the war.⁷ Although some French officials believed it was intended solely for civilian purposes, Peres and his pro-Israel allies in the French defense establishment knew that the promised research reactor could make a far more significant contribution to Israel's nascent nuclear weapons program than the smaller 5,000 kilowatt reactor the United States had provided three years earlier.⁸

The Suez War may have been a failure for all three invading armies, but Israel still had its promise from the French. It would take another year before they sealed the deal. Bourgès-Maunoury, an enthusiastic supporter of Israel, succeeded Mollet as prime minister in 1957, but his government faced a crisis of confidence after only three months in office.⁹ As the French administration faltered in September 1957, the Israelis feared that their nuclear program would collapse unless the reactor agreement was signed. Ben-Gurion began to panic.

Israel's scientific attaché in France told Shimon Peres to fly to Paris immediately to salvage the reactor deal.¹⁰ By November, Bourgès-Maunoury's coalition government was crumbling and Peres began a furious round of lobbying, relying on all the contacts he had cultivated during his years as Israel's deputy defense minister and unofficial ambassador to the French military establishment. Abel Thomas, the man who had lost his brother to the Nazis and helped Peres craft the French-Israeli relationship, convinced the head of the French Atomic Energy Commission to go along with the plan; the approval of leading scientists satisfied former prime minister Mollet; and Mollet persuaded his successor, Bourgès-Maunoury, to close the deal. The French prime minister's signature on the pact was his last official act as head of state.

The agreement provided Israel with a 24 megawatt reactor that both parties knew was not going to be used exclusively for peaceful purposes.¹¹ While France agreed to supply some fuel for the new Israeli reactor being built in Dimona, the Israelis were forced to seek other sources of uranium to power their covert nuclear weapons program. They found a willing seller in Pretoria.

South Africa's status as a major nuclear player was well established by the late 1950s thanks to its key role as a uranium supplier to the United States. Pretoria sent representatives to international atomic energy meet-

ings and played an influential role at the newly created International Atomic Energy Agency (IAEA) in Vienna. Other nations soon began to turn to South Africa for uranium as well, including Britain and Sweden. Only one of these new customers would end up acquiring the bomb covertly: Israel.

Initially, Pretoria refused to sell any uranium to Jerusalem due to the loose conditions the Israelis insisted upon. Most troubling was their opposition to South African inspections, which Israel believed would limit its sovereignty.¹² These were the days before the 1968 Nuclear Non-Proliferation Treaty (NPT) and mandatory IAEA safeguards, which subjected nuclear transactions between signatories to much closer international scrutiny.¹³ At the time, contracting governments were left to sort out issues of peaceful use and inspections on their own, and Israel's demands made South Africa suspicious.

Pretoria was concerned that the Israelis "certainly possess the know-how to make a bomb and . . . there is considerable incentive for them to construct one"; Israel's close ties to black African states at the time did not endear it to South African diplomats either. For these reasons, they concluded that it was not in South Africa's interest to sell "anything but an insignificant quantity of uranium to Israel in this troubled year 1960."¹⁴

A year later, however, South Africa became a republic, loosening its ties to the British Commonwealth and reshuffling the Foreign Ministry's leadership. The new crop of diplomats was more open to a deal with Israel, and in 1962 the two countries finally signed an agreement. South Africa pledged to supply Israel with yellowcake—a uranium compound that, after extensive processing, can be enriched in centrifuges to make weapons-grade uranium or used to fuel nuclear reactors. The amount of yellowcake South Africa shipped to Israel—ten tons—was fairly small and both parties agreed that the shipment would be registered with the IAEA after delivery. The sale was duly reported to the Vienna agency in 1963.¹⁵ Two years later, in 1965, the governments reached a formal bilateral agreement on safeguards.¹⁶ It included detailed provisions forbidding the use of South African uranium for atomic weapons or weapons research and allowing South African inspectors to view the reactors used to process the material and their operating records.¹⁷ Sealed three years before passage of the NPT—a treaty that neither Israel nor South Africa

would sign due to their covert weapons programs—the uranium deal seemed as safe and secure as was possible to the atomic scientists and policymakers in Pretoria.

The 1965 agreement not only governed the ten tons sent to Israel, but envisioned a constant flow “for purposes of stockpiling and not for immediate use.” The Israelis agreed to keep these future uranium shipments in sealed storage facilities and to allow one inspection by South Africa each year.¹⁸ The IAEA was not mentioned anywhere in the detailed five-page document or in the letter signed by South African prime minister Hendrik Verwoerd attached to it; rather, regulation and inspection of the uranium in Israel would be the sole responsibility of the agency that had sold it: South Africa’s Atomic Energy Board.

In the early 1960s, both Israel and South Africa were beginning to take the first tentative steps toward a nuclear weapons capability. This required both savvy sourcing and subterfuge. As Pretoria and Jerusalem sought to acquire the physical infrastructure and nuclear fuel needed to expand their respective programs, they had to deceive both their Western patrons and each other.

J. P. Hugo, the former administrator of the Atomic Energy Board’s uranium enrichment program, recalls that the government decided that “we’ll sell secretly to Israel because they’d felt the pulse of the Americans and British and others and had been turned down.”¹⁹ By the mid-1960s, Washington and London had found other uranium suppliers—namely Australia, Canada, and domestic supplies in the United States—and were no longer dependent on the increasingly vilified apartheid government for this crucial resource. Israel, on the other hand, needed uranium and South Africa was looking for new customers.

Sitting in his backyard in a leafy diplomatic enclave of South Africa’s capital, Hugo explains that the initial ten-ton sale helped the Israelis to build uranium-tipped bullets capable of piercing tanks. Hugo remains proud of the project and keeps a replica of one of the foot-long Israeli shells on his desk at home, mounted on wood alongside a plaque bearing his name.

As Hugo explains, stringent safeguards were included in the agreement because he and other scientists at the Atomic Energy Board

insisted on them. Hugo conducted an inspection himself in 1966 and recalls seeing the uranium in welded drums—evidence that it was not being used. He is confident that the South African uranium did not end up in Dimona, the heart of the Israel's clandestine nuclear weapons program; and in the mid-1960s it probably didn't. Instead, as predicted in the bilateral agreement, a growing stockpile of South African uranium began to build up in Israel. This stockpile would reach five hundred tons by 1976, when a South African minister of mines, enamored of Israel and facing near certain bankruptcy, would agree to lift the bilateral safeguards that had ensured its annual inspection and prevented its military use.

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OFFICIALLY, THE STATE OF ISRAEL does not acknowledge that it has nuclear bombs even though it is well known that the nation possesses a formidable arsenal of close to one hundred of the most advanced weapons.²⁰ This “opaque” policy is exemplified by the oft-repeated phrase that “Israel will not be the first nation to introduce nuclear weapons to the Middle East,” which became the declared policy under Prime Minister Levi Eshkol during the crucial years 1963–66, when Israel was busy producing its first weapon and deceiving the United States about its level of nuclear advancement.²¹ The definition of “introduce” was left deliberately vague to allow interpretations ranging from develop and build, to deploy and launch.²²

Israel never debated the nuclear option openly in parliament and only a select group—Ben-Gurion's most trusted associates and the scientists involved—was privy to early discussions of Dimona. The divisions in this secret debate did not fall along predictable political lines. Instead, it pitted ambitious young technocrats set on the idea of going nuclear against those who preferred to invest the state's limited funds in conventional military power. By the early 1960s, many generals saw the nuclear and missile programs as fanciful. At a time when the army needed boots and bullets, they argued, the government was pouring all of its money into a project that many in the military regarded as “hallucinatory.”²³ With a sufficient territorial cushion separating the Jewish state from its hostile neighbors, most generals believed, Israel would not need a nuclear deter-

rent. Arguing in favor of the bomb were Peres and Dayan.²⁴ With a nuclear deterrent, they insisted, the country's narrow nine-mile "waist" would no longer be such a dangerous liability. By openly declaring Israel's nuclear capability, it was unlikely that anyone would dare lay a finger on it.²⁵

During the mid-1960s, diplomatic contact between Israel and South Africa was minimal. It was the Six-Day War of June 1967 that changed everything. In mid-May, Egyptian president Nasser unilaterally dismissed the U.N. peacekeeping force in the Sinai Peninsula as his troops built up their positions in the desert and the U.N. stood idly by.²⁶ Then, on May 22, Nasser closed the Straits of Tiran to Israeli vessels. The narrow maritime passage into the Red Sea was a commercial lifeline for Israel, and closure was seen in Jerusalem as a major provocation.

Without a security guarantee from Washington or the assent of the U.S. government, Israel launched a daring preemptive attack on the morning of June 5. As Egyptian pilots sat down to breakfast at 8:15 A.M. after returning from their morning patrols, more than two hundred planes—almost the entire Israeli Air Force—took off flying west just fifty feet above the Mediterranean, leaving the skies over Israel empty and exposed.²⁷ As the Israeli fighters banked south and ascended into the view of Egyptian radar, the Egyptian pilots on the ground ran to their planes. They were too late: in less than two hours, the Israeli Air Force destroyed thirteen Egyptian bases and 286 of the 420 aircraft in Nasser's arsenal. Israel's air force commander reported to IDF chief of staff Rabin that "the Egyptian Air Force has ceased to exist."²⁸ In less than a week, Israel proceeded to conquer the Jordanian West Bank, the Syrian Golan Heights, and take the entire Sinai Peninsula and the tiny Gaza Strip from Egypt, nearly doubling the amount of territory under its control. In the eyes of Israel's admirers in Africa, this stunning and unexpected victory marred its image as a socialist beacon and instead cemented its reputation as a colonial outpost aligned with the West.²⁹

In 1969, the Harvard sociologist Seymour Martin Lipset declared that "Israel is now held to be a strong and rich nation, whereas the Arabs are weak, underdeveloped, poor."³⁰ The sentiments of radicals everywhere, he observed, were shifting to support the new Arab underdogs. The Old Left that had aggressively supported the creation of a Jewish state in 1948 had been replaced by a New Left that painted Israel as an imperial-

ist aggressor. "The only way Israel can change it is to lose," wrote Lipset.³¹

In the United States, militant African-American groups targeted Israel in their publications, depicting it as a colonial aggressor and American Jews as economic oppressors of the black community. Israel's relations with African states gradually soured as well. The Arab attempt to brand Israel as a Western imperialist stooge was finally beginning to stick.

Arab countries soon redoubled their efforts to compete with Israel for influence over black African leaders. Wealthy Gulf states offered attractive aid packages to poor African nations in exchange for their support of the Palestinian cause. At the same time, the OAU began to throw its unequivocal support to the Palestine Liberation Organization. It didn't help that the apartheid government had lifted all restrictions on South African citizens wishing to transfer funds to Israel during the war, allowing South African Jews to raise \$30 million for the Israeli war effort.

To add to the complications, the Suez Canal was closed for eight years in the wake of the Six-Day War as Egypt and Israel continued to fight in the Sinai Peninsula. East African states were hit hardest; close to a third of their dry cargo had been shipped through the canal. While these countries lost more than \$100 million per year in export revenues, the Suez closure enriched their greatest enemy, apartheid South Africa, by diverting the bulk of international freight around the Cape of Good Hope. Israel's occupation of Egyptian territory and its consistent refusal to give back the Sinai led most African states to blame the Jewish state for the post-1967 canal closure.³²

The reaction to Israel's victory in the Six-Day War was markedly different in South Africa. There, government officials and military officers clamored to visit Israel and learn from the victorious generals, leading the Board of Deputies' journal, *Jewish Affairs*, to declare proudly, "The destinies of the two countries are . . . so alike in a much more meaningful sense than any enemy propagandist could conceive."³³ The euphoria was not confined to the Jewish community. The South African press's attitude toward the Jewish state also warmed considerably as more and more white South Africans began to sense that they and the Israelis shared a common lot. The mouthpiece of the National Party government, *Die Burger*, declared, "Israel and South Africa . . . are engaged in a struggle

for existence. . . . The anti-Western powers have driven Israel and South Africa into a community of interests which had better be utilized than denied."³⁴

It was a remarkable change of tone. The same South African newspapers that had denounced Israel for taking in the escaped "terrorist" Arthur Goldreich four years earlier were now singing its praises. When Goldreich escaped from prison and chose to settle in Jerusalem, he had viewed Israel as a true light unto the nations.³⁵ Little did he know that merely a decade later he would find himself leading Israel's anti-apartheid movement, attempting in vain to convince his new government to cease its growing economic and military ties with the apartheid regime that had once imprisoned him and still kept his comrade Mandela behind bars.

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THE SIX-DAY WAR OF 1967 widened Israel's waist, giving it the territorial buffer the generals craved. A more comfortable strategic cushion between Israel and its enemies proved no obstacle to Israel's nuclear ambitions, however, nor did it stop the defense establishment from deceiving the international community—as it had done for years.³⁶

During the 1960s, as Israel was working tirelessly to develop its nuclear capability, it succeeded in hiding the true capacity and output of Dimona from a succession of pro-Israeli American presidents, from John F. Kennedy to Richard Nixon.³⁷ The deception began in 1961, after Israel refused to allow International Atomic Energy Agency inspectors inside Dimona, claiming it would be an affront to Israeli sovereignty. Aware that Dimona existed, but uncertain of its level of advancement and ignorant of what exactly was happening there, the United States insisted on taking on the role of nuclear watchdog instead of the IAEA—agreeing to disguise the inspections by leading American nuclear experts as scientific exchanges out of respect for Israel's pride. The first inspection took place later that year; thanks to Israel's carefully curated visit, no evidence of a nuclear weapons program was found.³⁸

This policy of deception caused major disagreements within the Israeli government and led to further tension between Golda Meir and younger Labor leaders such as Peres and Dayan. Meir feared that deceiv-

ing the Americans would backfire. She pushed her colleagues to simply tell Kennedy what she saw as the simple truth: Israel's existence was threatened and many of its citizens had almost been exterminated less than two decades before. After the Holocaust, who could deny the moral imperative or practical necessity of the Jewish state's right to defend itself by any means necessary?³⁹ As always, Meir's argument was not simply moral; she was also a savvy realist. "If we deny that Dimona exists, then we can't use it as a bargaining point, because it is impossible to bargain about something that doesn't exist," she told Foreign Ministry colleagues in 1963.⁴⁰

After Kennedy was assassinated in November 1963, Israel found an even more willing friend in the White House. Lyndon Johnson had been told by his pious grandfather to "take care of the Jews," a compulsion heightened by Johnson's own biblical attachment to Israel. As a young congressman in the 1930s, he had arranged visas for European Jews and helped smuggle Jewish refugees with fake passports into Galveston, Texas.⁴¹ Even so, Israel did not trust the United States enough to reveal its biggest secret. The Israelis continued to elaborately conceal their nuclear weapons production facilities, for years fooling inspectors sent from Washington into believing they were not producing plutonium at Dimona.⁴²

During the Johnson administration, American arms sales were made conditional on both Israeli disclosures of all nuclear research activities in Dimona and ongoing U.S. inspections of the reactor. The Israelis made the most of these visits by distracting inspectors with days of "scientific research discussions," thereby limiting the amount of time the visitors could spend inside the Dimona complex. They insisted on scheduling the inspections on Saturdays, when most employees were off for the Jewish Sabbath, and refused to allow American inspectors to bring their own measuring instruments.⁴³ By denying unfettered access to the visiting U.S. scientists, the Israeli government bought itself valuable time and threw American intelligence agencies off the trail. While the CIA suspected that Israel was secretly developing nuclear weapons, it was unaware that Israeli scientists had managed to generate plutonium on their own.* Instead, intelligence analysts assumed that Israel was exclu-

* Nuclear weapons rely on the fission of radioactive isotopes for at least part of their explosive power. These isotopes can be either enriched uranium or plutonium. Both are ultimately derived from yellowcake, but the lengthy production cycle is different. Weapons-

sively seeking enriched uranium supplies and that large amounts of nuclear fuel had been illegally diverted from the United States by Zalman Shapiro, the Orthodox Jewish owner of a nuclear fuel facility near Pittsburgh.⁴⁴

The successful concealment of Dimona's true capabilities allowed Israel to finish producing the plutonium it needed for a bomb by late 1966. By the time of the Six-Day War, Israel had already finished building its first nuclear devices.⁴⁵ The Soviets were keenly aware that Israel had likely achieved a nuclear capability, and there are indications that they monitored Dimona closely from the air in May 1967, perhaps even drawing up plans to destroy it.⁴⁶ Following Israel's stunning victory in June, the government moved to expand its nuclear arsenal. It was then that the Americans finally found out the truth, and it came courtesy of one of the most celebrated and controversial figures in nuclear physics: Edward Teller.

Born in Budapest in 1908, Teller grew up in a neighborhood of eminent Jewish scientists, including Nobel laureate Paul Wigner and chain reaction pioneer Leo Szilard—both of whom would go on to play important roles in the Manhattan Project during World War II. Teller distinguished himself as a physicist, too, and went on to study with giants of the field, including Niels Bohr and Werner Heisenberg. In 1952, J. Robert Oppenheimer, the scientific director of the American nuclear program, joined Teller on a trip to Israel. There, the two men discussed atomic energy with Ben-Gurion, who was at the time weighing the merits of pursuing a nuclear option.

As the Cold War arms race escalated, many nuclear scientists became outspoken doves, but Teller veered to the right. During the McCarthy-era witch hunt, he alienated many of his colleagues by publicly questioning Oppenheimer's loyalty to America and casting doubt on others who objected to his hawkish views and his leading role in the design and development of the more powerful hydrogen bomb. In Israel, a country

grade uranium is produced by enriching uranium hexafluoride, a processed form of yellowcake, to a level at which over 90 percent of the uranium is the highly fissionable U-235 isotope. Plutonium is produced by irradiating uranium fuel rods in an active nuclear reactor, removing these rods, and reprocessing them at a separate plant in order to produce plutonium rich in the isotope Pu-239.

threatened by Soviet-aligned Egypt, Teller's anticommunism was popular. He visited Israel often during the 1960s, lectured at Tel Aviv University, and formed a close friendship with fellow nuclear physicist Yuval Ne'eman.⁴⁷

As a leading nuclear weapons expert, Teller sensed that Israel was building a bomb and he eventually broke the news to Ne'eman at an academic conference in upstate New York in late 1967. Teller sat down beside a tree trunk with Ne'eman and told him, "I am impressed by your high level, and I think that you have already finished." Teller shared Golda Meir's view that "the cat and mouse game" with the Americans was not healthy and let Ne'eman know that he intended to tell the CIA, but assured him that he would "explain that it is justified, on the background of the Six-Day War."⁴⁸ The CIA's science and technology gurus, still beholden to the diverted uranium theory, were reluctant to believe what Teller told them: that Israel had developed its own nuclear capability and that highly enriched uranium from the United States had nothing to do with it. Instead, Israel had fed yellowcake—obtained from South Africa and other sources—into its reactor, reprocessed the spent fuel rods at a well-concealed plant, and built bombs fueled by plutonium rather than enriched uranium.

Indeed, while the CIA and FBI were obsessively investigating Shapiro, Israel had successfully obtained two hundred tons of yellowcake in a 1968 Mossad smuggling operation.⁴⁹ Israel feared that buying uranium on the open market would arouse suspicion at the European nuclear regulatory body, EURATOM, and opted for a clandestine operation instead. The Mossad used a Liberian front company to purchase a ship, the *Scheersberg A*. In Antwerp, workers loaded the ship with a cargo of yellowcake—concealed in barrels marked "Plumbat," which is a lead derivative. Officials in Bonn helped Israel disguise the operation as a transaction between West German and Italian firms, reportedly in exchange for offers to aid the Germans with uranium enrichment technology. The Mossad fabricated a false Italian recipient for its cargo, declaring that a paint company in Milan would be receiving the shipment. But the ship never docked at its stated port of call in Genoa; when it reached Rotterdam, the crew was told that the ship had been sold to a new owner and they were dismissed. With a new Israeli crew on board, the *Scheersberg A* set sail for the eastern Mediterranean, bypassing Italy

altogether. Off the coast of Cyprus, and under tight military supervision, its new crew transferred the secret cargo to an Israeli naval vessel. A few days later, as the uranium was unloaded in Haifa, the *Scheersberg A* arrived in the Turkish port of Iskenderun, empty and with several weeks of pages mysteriously missing from its logbook.⁵⁰

For the South Africans, whose nuclear research reactor had gone critical three years before, in 1965, the Israeli model of nuclear ambiguity coupled with covert weaponization was enticing.* In order to gauge what it could get away with down the road, Pretoria was watching developments in the Middle East closely and, more important, observing the reactions of the superpowers.

Five years later, when Egypt launched a surprise attack on Sinai in October 1973, Israel's undeclared nuclear arsenal had grown to approximately a dozen weapons. Facing the real possibility of defeat, Israel seemed prepared to use them or threaten to do so in order to force Washington to intervene.⁵¹ André Buys, a leading South African nuclear weapons engineer who served as manager of the facility where Pretoria's weapons were built, remembers bearing that Israel's nuclear threat had prompted U.S. aid during the Yom Kippur War. He admits that "the allegation probably subconsciously influenced our thinking. We argued that if we cannot use a nuclear weapon on the battlefield . . . then the only possible way to use it would be to leverage intervention from the Western Powers by threatening to use it."⁵²

Buys is now a professor of engineering at the University of Pretoria. His small office on the quiet campus is a world apart from the secretive environment he worked in for most of his career. Back in the early 1970s, Buys and his colleagues were beginning work on a nuclear explosive device. The scientists involved in the program maintain to this day that their research was inspired by the Atoms for Peace program, which encouraged the production of so-called peaceful nuclear explosives for mining and construction purposes.⁵³ South Africa's Atomic Energy

* A nuclear reactor "goes critical" when there is a sufficient amount of fissile material present ("a critical mass") in an appropriate geometric arrangement to sustain an ongoing nuclear reaction. This is achieved when the number of neutrons produced by fission reactions exceeds the number of neutrons lost.

Board was well aware, however, that its country would soon be producing enough enriched uranium for a nuclear weapon, and they issued a report recommending the development of various devices, many of which were far too powerful for purely peaceful purposes.⁵⁴ A small team of scientists, including Buys, was sent to work on the new designs at Armscor's Somchem explosive and propellant facility near Cape Town.

For all their talk about peaceful commercial use, South Africa's leaders were not naïve, and it is inconceivable that the nuclear option on the horizon did not cross their minds when the peaceful nuclear explosive research began. Indeed, Pretoria's refusal to sign the NPT in 1968 and its highly secretive nuclear research program reveal that a nuclear weapons capability was in fact always the ultimate objective.⁵⁵