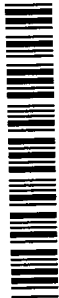


Printed: 1/10/2024 7:34 AM

University of Delaware ILL – RAPID:DLM



ILLiad TN: 994941

Borrower: RAPID:VYF
NEW: Main Library

Journal Title: Strategic nuclear sharing , Julian Schofield

Volume: Issue:
Month/Year: 2014**Pages:** 86-92

Article Author:

Article Title: Israel and South Africa: Nuclear Collaboration

ILL Number: -21845114



**** RAPID Request ****

Call #: U264 .S34x 2014
Location: DLMM

ShipVia: Odyssey
Notes:

Not on shelf	Not found as cited
<input type="checkbox"/> Title not on shelf	<input type="checkbox"/> Vol/year mismatch
<input type="checkbox"/> Volume not on shelf	<input type="checkbox"/> Article not found on cited page
<input type="checkbox"/> Issue missing from volume	<input type="checkbox"/> Checked index
	<input type="checkbox"/> Checked TOC
Searched by: _____	Scanned by: _____

This material may be protected by copyright law (Title 17 U.S. Code).

10

Israel and South Africa – Nuclear Collaboration

The decision to develop nuclear weapons in South Africa came in 1974 under South African prime minister B.J. Vorster (1966–1978). It was driven by the anticipated withdrawal of Portugal from Mozambique and Angola, and the emerging Soviet and Cuban-backed African nationalist movements that were posing a threat to Pretoria's apartheid policy.¹ Pretoria, because of its unpopular system of apartheid, could not expect any extended nuclear deterrence. The first nuclear weapons, without fissile material, were assembled in 1977, a draft plan for the nuclear path was outlined in April 1978,² and the decision to begin assembly came in October 1978. To that end, Prime Minister P.W. Botha (1978–1984) mandated a joint nuclear project between Armscor, the Defense Force and the Atomic Energy Board.³ The first nuclear device was ready in November 1978.⁴ The South African nuclear facilities used to design and build its six nuclear weapons at Advena were dual-purpose, well equipped, and had only 150 persons assigned to the project.⁵

Israel's nuclear weapons and strategic missile assistance to South Africa was essentially a trade of fissile material for technology. However, South Africa had been supplying uranium to Israel already by the 1960s, so it was this, conditioned by a perceived common threat in the rise of post-colonial nationalism that drew the two states together.⁶ South Africa's supply of uranium was significantly more valuable to Israel than any effect South Africa could have on Israel's adversaries.⁷

Early South African–Israeli relations

Israel's victories in the 1967 Six Day War and subsequent October 1973 war alienated Israel's African allies, and saw Israel improve relations with South Africa.⁸ This was facilitated by an economically well positioned

and actively Zionist Jewish community in South Africa.⁹ Israel was dependent on South Africa's diamonds, which made up a substantial part of the 30 per cent of exports that accounted for the Israeli diamond trade.¹⁰ South Africa also had a preexisting commercial armaments relationship with Israel, dating to Israel's independence.¹¹ South Africa, for example, produced under license Israeli patrol craft and anti-ship missiles, development of tank armor, cruise missiles, reconnaissance satellites and mobile missile launchers (of which two were built).¹² There were many military exchanges, including Israeli assistance in base construction in South Africa and South African provision of aircraft parts to Israel.¹³

Israel and South Africa had established a trade entente into the 1950s,¹⁴ and this was formalized in November 1974 with a secret military-related cooperation agreement.¹⁵ A subsequent meeting in Geneva in 1975 between Defense Minister Shimon Peres and Vorster and his Defense Minister Botha established the basis for South African-Israeli nuclear cooperation.¹⁶ Vorster visited Israel in 1976 to confirm an agreement to exchange 30 grams of Israeli tritium for 50 tons of uranium ore concentrate (yellowcake) in 1977.¹⁷ South Africa later sent additional shipments of uranium north for Israel's use and safekeeping.¹⁸ This exchange was the result of an Israeli offer through South African Brigadier J. Blaaw, which thereafter established a close relationship with the Israeli Council for Scientific Liaison and South Africa's Armscor.¹⁹ In 1977, Chaim Weizman, who was sent by Israeli prime minister Menachem Begin (1977–1983) to assess the status of the Israeli-South African accord, reported that Israel had agreed to supply South Africa with nuclear warheads and Begin had agreed to continue the earlier policies of Peres.²⁰ In 1979, Weizman's agreement to sell South Africa 175mm and 203mm tactical nuclear warheads was resisted by the Dimona scientific community, who did not wish to share what was considered cutting-edge Israeli technology at that time.²¹ In 1985, Israel and South Africa concluded a more comprehensive nuclear cooperation agreement.²²

Israel's contribution to the South African effort could have been the enriched uranium that went into producing the warheads for the South African nuclear weapons.²³ The South African pilot enrichment plant could not have supplied more than one warhead as it was offline for technical reasons between 1979 and 1981.²⁴ More likely Israel provided the technical background on aspects of nuclear industry, and left fuel enrichment and warhead design to the South Africans. One Israeli eyewitness assessed the South Africans as lacking many nuclear weaponry

skills.²⁵ South African sources indicate that Israel offered an off-the-shelf nuclear weapon.²⁶ South Africa may have also been interested in Israeli developments in laser enrichment.²⁷ The US and the Soviet Union believed that the tritium supplied by Israel was for research into boosted fission weapons.²⁸ In 1989 South Africa had completed the construction of the Advena Central Laboratories that were capable of producing advanced nuclear warheads for missiles.²⁹

Large numbers of Israelis were identified working at the Valindaba enrichment plant in South Africa in the 1970s.³⁰ Israelis were spotted by the CIA at the Kalahari test site in 1977, which was quickly covered up once its discovery was announced by the Soviet Union.³¹ Mordechai Vanunu reported visits by South African scientists to Dimona, and another 200 South African scientists were working on missile projects in Israel.³² In 1989 there were reportedly 75 Israeli engineers working on South Africa's missile program.³³ Ampie Roux, the principal leader of the South African nuclear program, had frequent trips to Israel.³⁴ Major-General Amos Horev, formerly chief scientist of the Israeli Defense Ministry, toured South Africa's key nuclear facilities in November 1979.³⁵

Some have argued that the technology transfers between Israel and South Africa were non-sensitive and could not contribute directly to a nuclear weapons program.³⁶ This is suggested by the fact that Israel's expertise lies with plutonium warheads, whereas South Africa relied mainly on enriched uranium, although Israel does possess enrichment facilities.³⁷ South African prime minister F.W. De Klerk (1989–1994) stated that South Africa did not receive assistance from Israel, which the IAEA later confirmed during its inspections, but some believed he lied.³⁸ US intelligence confirmed some level of Israeli–South African nuclear collaboration.³⁹

Uranium barter

South African uranium shipments to Israel began in 1963, totaling ten tons of yellowcake.⁴⁰ This may have been part of the unsafeguarded but declared 1963 trade to Israel detailed to the Western Suppliers Group by Pretoria,⁴¹ but by 1968 this reporting system was ended by South Africa, and amounts exported to Israel became unknown.⁴² South Africa's enriched uranium was all under IAEA safeguards, precluding shipment of anything but unprocessed uranium.⁴³ From 1967 South Africa provided uranium for Dimona without safeguards,⁴⁴ and was the primary supplier throughout the 1970s and 1980s.⁴⁵ In the period 1972–1975,

Israel received imports of natural uranium rods.⁴⁶ By 1971 South Africa's unsafeguarded pilot uranium facility at Pelindaba was complete, and in 1977 it began producing enriched uranium at 80 per cent.⁴⁷ In 1977 South Africa sent one shipment of 500 tons, initially for safekeeping, but later for use by Israel.⁴⁸ Israel enriched the uranium experimentally by laser and jet nozzle (jointly developed with South Africa), but was primarily reliant on calutrons.⁴⁹ Later shipments of uranium were as high as 600 tons.⁵⁰ These imports contrast with Israel's mined capacity of 50 tons annually (out of an estimated 25,000 ton recoverable reserve).⁵¹

Uranium was a frequent export of South Africa, as Pretoria had supplied more than a quarter of West Germany's uranium until 1977, 65 per cent of British uranium needs (1,300 tons annually), 900 tons to France in 1977 and 4,000 tons of uranium to Taiwan for the period 1984–1990.⁵²

Though South African supplies were vital, Israel had a diverse source of alternate uranium suppliers, including Argentina, Belgium, the Central African Republic, Gabon and Niger.⁵³ Israel had also imported uranium from Argentina specifically for the manufacture of its own uranium rods.⁵⁴

Missile assistance

The missile facility at Overburg had the same layout as Israel's base at Palmachim,⁵⁵ which Israel used in addition to the site at De Hoop to test its Jericho 2 missile.⁵⁶ South Africa developed an additional site at Marion Island for missile testing,⁵⁷ which was used by both.⁵⁸

South Africa had begun missile-related research with Israel in the late 1970s. Israel agreed to supply South Africa with eight missiles and technical assistance. South Africa sought a two-stage IRBM nuclear delivery vehicle and a three-stage SLV rocket to launch surveillance satellites.⁵⁹ The initial focus was on South Africa's development of Israel's Jericho 1 missile.⁶⁰ Israel subsequently shared the Jericho 2 technology, as well as the 5,000-km range and 750-kg payload Shavit SLV.⁶¹ South Africa used these in its work on the RSA-4 Arniston IRBM,⁶² and the RSA-3 SLV.⁶³ The RSA-4s were flight-tested on July 5, 1989, November 19, 1990, and possibly in 1991.⁶⁴ The July 5, 1989, test launch of the RSA-3 (modified Jericho 2 and Shavit SLV) flew 1,450 km.⁶⁵ South Africa likely benefitted from US technology contained in the Israeli designs.⁶⁶ On discovery in 1991, the US sanctioned South Africa for its work on missile technology and Israel admitted under pressure to having exported the Jericho 1 missile to South Africa in violation of licensing agreements and the 1987

MTCR.⁶⁷ Israel's Jericho-2 sale was in part motivated by commerce,⁶⁸ and its sale was funded from within Israeli-South African trade.⁶⁹ The 12 missiles delivered may have been sent in exchange for 50 tons of uranium.⁷⁰

The Vela test

In 1977 the US and USSR detected, and then pressured South Africa to cancel, an imminent nuclear test in the Kalahari desert of an earlier nuclear warhead design.⁷¹ Subsequently, on September 22, 1979, a US Vela satellite detected a double flash in the southern Indian Ocean near the South Africa's Prince Edward Island, consistent with an atmospheric nuclear test. The apparent detonation of a nuclear weapon in 1979 could not have been of a South African weapon, as their weapons were too large at the time for aerial detonation.⁷² There were claims of Israeli ships in the area, as well three smaller weapons tests being conducted in the area to determine fallout patterns.⁷³ It is likely the test was primarily for the benefit of the Israelis, who were seeking to test a fission trigger for a fusion device. At the time of the test, South Africa had closed access to Simonstown naval base and put search and rescue elements on standby.⁷⁴ US intelligence estimates concluded that the Israelis and South Africans would have had sufficient mutual trust to allow a test to proceed.⁷⁵ Although by 1995 the US intelligence community had not come to an official consensus, the informal view was that there had been a test for which Israel was primarily responsible.⁷⁶ Although South Africa reported no detectable fallout from the test,⁷⁷ others sources argue telltale isotopes were found.⁷⁸

Alternate sources of nuclear assistance to South Africa

Certainly Israeli nuclear assistance was unnecessary for South Africa's early arsenal, which it had created autonomously, and there were plenty of other sources of expertise obliquely contributing to Pretoria's nuclear weapons program. South Africa was involved with the UK in the monitoring of US nuclear tests in the Southern Atlantic in 1958, and in the monitoring of French tests in the Pacific in 1967.⁷⁹ The British had also likely provided assistance to South Africa's Uranium Hexafluoride conversion plant.⁸⁰ The enrichment techniques of interest to South Africa had already been made available from West Germany.⁸¹ Germany had an interest in South African uranium,⁸² and involved South Africa in a process of technological exchange which included sharing the jet nozzle

path for nuclear enrichment, which must have been known to be a path for nuclear weapons.⁸³ Some Chinese enriched uranium may also have been diverted to South Africa.⁸⁴

South Africa had also done early joint sounding rocket research with Germany in 1963–1964 at Tsumeb in Namibia, as well as Prince Edward Island, with financial support from the German Ministry of Defense.⁸⁵ Sounding rockets, used for scientific and meteorological research, were a common antecedent for ballistic missile programs, and were easily available and in the possession of most developed states. Furthermore, South Africa's development of the dual-capable G5 155mm long-range cannon was developed in part by assistance from US research provided by the CIA. This included, in 1977, four cannons and 60,000 shells smuggled from the US to South Africa, initially as a solution to deal with Cuban Katyusha rockets in Angola.⁸⁶

Consequences of Israeli support to the apartheid regime

Even before the Soviet detection of test preparations in 1977 in the Kalahari, both East Germany and China had accused West Germany and Israel of facilitating a South African nuclear weapons program.⁸⁷ Pretoria believed that a nuclear arsenal in South Africa would likely provoke a search for nuclear weapons by other African states like Nigeria, and would intensify any Chinese or Soviet response.⁸⁸ Israel Air Force General Dan Tolkowsky once cautioned Israel that possession of a nuclear weapon would lead the Soviet Union to deliver one to Israel's enemies, but this, and Israel's associated link with South Africa, never produced these effects.⁸⁹

Conclusion

Israel's nuclear assistance to South Africa was primarily a barter arrangement for uranium, an access agreement for missile and nuclear testing, and an opportunity for a commercial transaction. South Africa was distant, and had already mastered the technology needed to achieve nuclear status, so sharing of nuclear expertise was not going to impinge on Israel's sphere of influence (though Israel's willing sale of Jericho 2 rockets to Iran suggests Tel Aviv had low expectations of what it could expect as a sphere of influence). There were important converging experiences for both countries – an operating but constrained democracy, a shared Jewish community, political isolation and a historical philosophy of self-reliance. They faced a common fate, but not a common foe,

so there was little security value to their strategic aggregation, except perhaps for the US which benefitted from their distraction of the Soviet Union's developing world allies. But there were important differences as well, as Israel had been highly critical of apartheid before 1967, as well as the political background of South Africa's Nationalist Party.

Israel took a risk when it bartered to improve nuclear technology in South Africa, knowing the issue of the apartheid government's longevity. South Africa curtailed its nuclear program in 1990 and ended apartheid in 1993, cutting Israel off from a secure and covert supply of uranium. The technology could have just as easily fallen into the hands of a hostile revolutionary regime willing to auction off nuclear expertise to Israel's enemies. Israel took a smaller risk of suffering the disapproval of the US, when its missile exports violated the US-Soviet nonproliferation bargain. If Israel and South Africa are viewed as established powers fending off the rise of indigenous nationalism, then their nuclear collaboration confirms the easy deterrence model. One can only speculate where Israel is now going for its uranium, though the porous former Soviet Union seems a likely candidate.