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## Nuclear Overview

### Introduction

Israel is the sixth nation in the world, and the first in the Middle East, to develop and acquire a nuclear weapons capability. Israel initiated its nuclear program in earnest in the mid-to-late 1950s, and by late 1966, it had completed the R&D phase of its first nuclear weapon device. Since 1970, Israel's status as a nuclear weapon state (NWS) has become an accepted international fact.

However, Israel's behavior as a NWS has been distinctly different from the behavior of the five official members of the nuclear club that have signed the Nuclear Non-Proliferation Treaty (NPT)—the United States, Russia, France, China, and the United Kingdom; and India and Pakistan, which have not signed the NPT. While these nations have publicly declared their nuclear status, Israel, to this day, has never confirmed or denied its nuclear status and remains outside the NPT. Since Prime Minister Levi Eshkol pledged in the mid-1960s that "Israel will not be the first nation to introduce nuclear weapons to the Middle East," all his successors have adhered to this opaque declared policy. This policy has become known as Israel's policy of "nuclear opacity" or ambiguity, perhaps the most distinguishing Israeli contribution to the nuclear age.

Israel is now an advanced NWS, in both quality and quantity of its arsenal. Estimates as to the size of Israel's nuclear arsenal vary significantly and range from fewer than 100 warheads to as many as 300. It is believed that Israel's current nuclear arsenal, along with its related delivery and command and control infrastructure, is comparable in quantity and quality to that of the United Kingdom and France (superior to that of India and Pakistan).

### History

The history of the Israeli nuclear project is still shrouded in a great deal of secrecy. As part of Israel's policy of nuclear opacity (see below), Israel's military censorship disallows publication of any factual Israeli-based information on the nuclear project.<sup>[1]</sup> Consequently, only fragmentary bits and pieces of information on the topic have ever been published, and most commonly only in the form of unconfirmed press reports by the non-Israeli press. Thus, the historical narrative offered here is sketchy and incomplete. Its main source for the period up to 1970 is Avner Cohen's book *Israel and the Bomb*, while for the more recent period, it is based on various non-Israeli reports and publications (all unconfirmed), including the so-called Vanunu testimony, the disclosure made on 5 October 1986 in the *London Sunday Times*, based on a testimony of Mordechai Vanunu, a technician who had worked at the Dimona nuclear facility and subsequently broke his oath of secrecy.<sup>[2]</sup>

### The Initiation Phase

In many ways, the story of Israel's nuclear project parallels the larger Zionist narrative of the creation of the state of Israel. The idea that Israel should establish itself as a nuclear-capable nation is as old as the state

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itself, but in the early 1950s, it took more than a little *chutzpa* to believe this little nation could launch a nuclear program. But for David Ben-Gurion, a visionary leader of a nation just born out of the ashes of the Holocaust and surrounded by neighbors committed to its destruction, the idea that science and technology could transcend his nation's limitations was most natural.

David Ben-Gurion, Israel's first prime minister, was obsessed and driven by the vision that a nuclear capability would be the answer to Israel's security predicament. He considered the Arab-Israeli conflict to be deep and enduring, and, consequently, he believed that the resolution of the conflict could come only after the Arabs were compelled to accept the existence of the state of Israel. Until that time, Israel would have to rely on its sword. Furthermore, only technology, he believed, could provide Israel the qualitative edge necessary to overcome its inferiority in population, resources, and size. As Shimon Peres (his aide at the time) once put it, "Ben-Gurion believed that science could compensate us for what Nature has denied us."<sup>[3]</sup> This phrase is, in essence, the whole rationale for Israel's nuclear project.

Two other men were instrumental in making Ben-Gurion's nuclear vision a reality. The first was Professor Ernst David Bergmann, an organic chemist by training, who was Ben-Gurion's close scientific advisor. In 1952, Bergmann founded the Israeli Atomic Energy Commission (IAEC) as the vehicle through which to realize this nuclear vision. The second was Shimon Peres, then young director-general of the Ministry of Defense, who was the administrator-politician who promoted that vision. As the architect of the "special relations" between Israel and France in the mid-to-late 1950s, Peres was the man behind the French-Israeli nuclear deal under which the nuclear complex in Dimona was built. For all practical purposes, Peres was the chief executive of the project during its initiation stage (a role he filled until he left the Ministry of Defense in 1965).

From early on, Peres recognized that it would be impossible for Israel to fulfill its nuclear dream on its own. He concluded that Israel needed a major foreign nuclear supplier. In 1955, Israel was the second nation in the world to sign an agreement under the Eisenhower administration's "Atoms for Peace" program, but it soon recognized that this program could not be the prime vehicle for Israel through which to build an ambitious nuclear program aimed at military applications. France, on the other hand—which at the time was considering its own military nuclear program—seemed the most logical choice as the project's primary foreign supplier. The nuclear issue was clearly one of the underlying motives behind Peres' efforts to build the France-Israel alliance in the mid-to-late 1950s.

Israeli-French nuclear discussions about a major nuclear deal had been initiated prior to the 1956 Suez campaign—a brief armed conflict in which Israel, with the backing of Britain and France, attacked Egypt in response to the Arab nation's blockading of the Suez Canal and its support of border-area attacks by Arab fighters. But it was that joint military campaign—and in particular the Soviet Union's veiled nuclear threats against both countries during the campaign—that gave impetus to the sensitive talks between Israel and France. Still, it took Peres another year of on-and-off negotiations to produce the entire package, while in the meantime a heated—but quiet—debate took place in Israel itself about the technological, financial, and political feasibility and desirability of the project. Ultimately, however, it was Prime Minister Ben-Gurion's project, and he gave the necessary support to Peres to complete the deal.

The French-Israeli nuclear deal was secretly signed in Paris on 3 October 1957. The details of the bilateral agreement are still unknown, but it is believed to have consisted of two sets of agreements. The first was a political agreement between the two governments; it was general and vague and dealt with the political and legal obligations of the two parties. The second was a technical agreement between the two nations' nuclear

commissions; it referred to the specifics of the scientific and technological cooperation between the two states. According to French author Pierre Pean, the most sensitive aspects of the package were not spelled out in any of the official documents but were left as verbal understandings. Pean suggests also that the governmental documents did not reflect the full scope of the Dimona deal. For example, the most sensitive and secret component of the entire package, the reprocessing plant, apparently has no explicit reference in the official documents.[4]

Sometime in early 1958, Israel started the excavation and construction work at the Dimona site. When French President de Gaulle learned soon after his election about the secret project, he acted to end French participation in it, but it took almost a year until his decision was translated into meaningful action. When de Gaulle informed Ben-Gurion in June 1960 about his decision, Israel decided to complete the project on its own.[5]

Not until December 1960, almost three years after the Dimona project had been initiated, did the United States learn about it. As the departing Eisenhower administration made its discovery public, it demanded an Israeli explanation as to the nature of the project. In response, the Israeli government told the US government that the new project was for "peaceful purposes." On 23 December 1960, Ben-Gurion informed the Knesset (the Israeli parliament) that the 24-megawatt (MW) research reactor under construction would be "peaceful," designed for scientific, industrial, and medical applications. This was the first and last time that the Israeli government made a public statement about the Dimona project.[6]

In retrospect, this statement entailed the strategy that Israel would use to overcome US opposition to the project in the early mid-1960s. From the outset, the Israeli nuclear case posed a great challenge to US nonproliferation policy. President Kennedy was determined to thwart Israel's efforts to acquire a nuclear capability, fearing that it could undermine his nonproliferation efforts. He firmly insisted that US scientists be allowed to visit Dimona to verify Israel's claims that the facility was not for producing plutonium for nuclear weapons. Such a visit took place in May 1961, setting the stage for a meeting between Ben-Gurion and President Kennedy. The meeting resulted in the nuclear issue being removed from the Israeli-US agenda for two years.

Two years later, as construction at Dimona neared completion, Kennedy reapplied the pressure on Israel over Dimona. In a tough exchange of letters with Prime Ministers Ben-Gurion and Levi Eshkol (who replaced Ben-Gurion in July 1963), Kennedy demanded semi-annual US inspection visits in Dimona, threatening that bilateral relations would be "seriously jeopardized" if Israel did not comply with his demands. By late August 1963, after weeks of intense consultations, Israel appeared to agree with Kennedy's demands—or at least so Kennedy was led to believe.

By the time US scientists began the visits to Dimona in early 1964 according to the Kennedy-Eshkol deal, Kennedy had been assassinated, and President Johnson was less committed to nonproliferation in general and to the Israel case in particular. While Kennedy's effort to halt the Israeli nuclear project failed, it shaped the very special mode under which Israel became a NWS. The United States was not in a position to stop the Israeli nuclear program—Israel, by that time, was already fully committed to creating a nuclear option—but US policies determined the way in which Israel acquired the bomb. Israel developed the bomb opaquely, in a manner that avoided defying US nonproliferation policies. A policy of ambiguity was born.

It was during the years of the Johnson administration that Israel crossed the technological nuclear threshold. While Israel completed the R&D work on its first nuclear device sometime in late 1966, it continued to pledge to the Johnson administration that "it will not be the first to introduce nuclear weapons to the region." Clearly, Israel was committed to having a nuclear

option, but this did not mean necessarily a commitment to becoming a NWS. In fact, Israeli hesitation as to the future of its nuclear program seemed to intensify in the wake of a major accident at the Dimona facility in December 1966, which caused the shutdown of the nuclear plant for three months.

### Crossing the Nuclear Threshold

The 1967 Six-Day War was a turning point in Israel's nuclear history. In *Israel and the Bomb*, author Avner Cohen revealed that on the eve of the Six-Day War, in late May 1967, Israeli engineers improvised rudimentary, but operational, nuclear weapons—the first time that Israel assembled nuclear devices.<sup>[7]</sup> The 1967 war brought about a new political and strategic reality, as well as domestic changes in Israel itself that significantly decreased Israel's nuclear inhibition. The fear that Israeli nuclear development could bring about a Middle East war was moot now. With its victory in the 1967 war, Israel had passed the vulnerable transition period with little opportunity for an Arab reaction.

However, by 1968 a new factor came into the picture and started to play a significant role in Israel's nuclear behavior. The advent of the Nuclear Non-Proliferation Treaty (NPT), co-sponsored and signed by the United States in the summer of 1968, reshaped the US-Israeli dialogue on the nuclear issue. By November 1968, against the background of strong US pressure to join the NPT—a demand that was linked to the first sale of Phantom aircraft to Israel—Israel told the United States that, given its unique security needs, it could not sign the NPT at the present time. President Johnson ultimately approved the Phantom deal without linking it to Israeli concession on the NPT issue.

Less than one year later, in September 1969, Israeli Prime Minister Golda Meir reached a secret agreement with President Richard Nixon on the Israeli nuclear issue. Meir explained to Nixon why Israel had been compelled to develop a nuclear capability, why it could not sign the NPT, but also stated that Israel would not become a declared nuclear power. That meant, operationally, that Israel would not test nuclear devices, would not declare itself a NWS, and would not use its nuclear status capability for diplomatic gains—but keeps its bomb "in the basement." While Israel would not join the NPT, it would not defy it either.

In the wake of the Meir-Nixon agreement, the United States ended its annual visits in Dimona; in addition, the United States no longer pressured Israel to sign the NPT, adopting instead a de facto policy of "don't ask, don't tell." This policy was perceived by both Israeli and US policymakers as the only possible policy, both for Israel and the United States, capable of addressing both the uniqueness of Israel's nuclear case in tandem with the United State's own commitment to the nonproliferation regime. To this day, all Israeli and US governments have adhered to this policy, and likewise, all subsequent US administrations have looked the other way on the Israeli nuclear case.

In July 1970, the *New York Times* disclosed that Israel was considered by the US intelligence community to be a NWS.<sup>[8]</sup> Shortly after, Israel started to deploy its first nuclear-capable missiles, the Jericho-I, a delivery system that had been initially built by a French contractor but, due to the French embargo, was transferred to Israel and completed in one of the plants of the Israeli Aviation Industries. By the time of the 1973 Yom Kippur War, Israel was already a small nuclear power.

The 1973 Yom Kippur War had a nuclear dimension even though the full drama has never been told (or even officially confirmed). It has been reported that during the early phase of the war, Minister of Defense Moshe Dayan readied the nuclear weapons infrastructure system, apparently even proposing to Prime Minister Golda Meir to arm the weapons in case Israel suddenly reached the point of "last resort." It is believed that Prime Minister Meir refused to concede to Dayan's "last resort" thinking, and did not authorize the arming of the weapons. US

intelligence picked up signs that Israel put its nuclear-capable Jericho missiles on high alert—apparently in a way that was designed to be noticed. In her decision not to follow Dayan's advise, Meir raised the bar on the issue of "last resort": situations of "last resort" that could invoke use of nuclear weapons would be the most extreme situations a nation like Israel could ever face, and should be limited only to situations in which Israel's survival was at stake. Israel's policy of nuclear opacity had survived. Many Israelis believe that by her reluctance to slip into the nuclear brink, Meir made Israel a responsible and trusted nuclear custodian.

### **Nuclear Opacity: From Improvisation to Semi-Permanent National Posture**

Israel's nuclear history in the period from 1973 until the first Gulf War in 1990-91 can be recounted along two distinct themes. First, it was the period in which Israel's policy of nuclear opacity was transformed from a short-lived improvisation to a semi-permanent strategic posture. In retrospect, the period from 1974 to 1990 was the golden age of nuclear opacity. By the end of the period, Israelis came to view the policy as a great strategic success because it provided Israel the benefits of existential deterrence at a very low political cost. Nuclear opacity became an indispensable pillar in its national security doctrine. Many Israelis came to believe that the low-profile nuclear deterrent played a constructive role both in making peace (in the case of Egypt) and in deterring regional war (in the case of Iraq). In particular, the policy of nuclear opacity seemed to have removed the nuclear issue from the US-Israeli agenda, without restricting Israel's freedom of action in this field. For Israeli strategists, opacity was the best of all possible worlds. Even Vanunu's public disclosure of Dimona's secrets in 1986 (see footnote 2 and below) was not politically sufficient to shake Israel's posture of opacity.

Second, it was a period of rapid growth for Israel's nuclear arsenal, with Israel taking advantage of its freedom of action under opacity. It is widely believed (and supported by Vanunu's information) that during this period, Israel's nuclear arsenal made a major transformation. Israel no longer possessed a dozen or so low-yield first-generation bombs; it expanded and modernized its arsenal, which became qualitatively advanced and quantitatively sizable.

It is important to look at the lessons of the 1973 war in order to understand these changes. In the eyes of most Israeli strategists and military historians, Israel almost reached the brink, the moment of "last resort." Had the Syrians been able to cross the Jordan River, this could have called for "last resort" nuclear use. Yet, it appears that Israel's dozen or so bombs did not fit such a use. To stop armor columns moving on the Golan Heights, in the proximity of Israeli troops, Israel needed low-yield weapons for tactical use. But, presumably, Israel lacked such weapons. Also, if some Israeli leaders (such as Dayan) had concerns about the Soviet Union, Israel had no weapons to constitute even a minimum deterrence vis-à-vis the Soviet Union.

According to Vanunu, since the mid-1970s, Israel had expanded and modernized its nuclear infrastructure in Dimona to be able to produce new types of advanced nuclear weaponry, small and large, and in greater quantities. It is widely believed, based on Vanunu and other sources, that Israel produced in that period both larger advanced weapons (boosted, and possibly even thermonuclear) as well as advanced tactical weapons (possibly enhanced radiation weapons). In addition, by the mid-to-late 1970s, Israel started the development of the Jericho-II missile, a ballistic missile with an operational range of 1,500 kilometers or more. The Jericho-II was tested in the late 1980s, and it was deployed in 1989-90.

Israel significantly expanded its nuclear capability throughout that period, but it did not move to establish a secured second-strike capability. While apparently there were occasional discussions about this, operational and costly decisions were deferred. The underlying assumption that guided

Israel's strategic planning was that Israel's regional nuclear monopoly was still holding, and if and when this situation changed, Israel would have ample time to adjust. This assessment was reinforced by the success of Israel's attack on the Iraqi Osiraq reactor in 1981. Until the late 1980s, Israel assumed that Saddam's nuclear vision was for all practical purposes dead. But this assumption came under scrutiny by the late 1980s. As the Iran-Iraq War came to a close, Iraq emerged as a regional Arab power with strong nuclear aspirations. In 1990, before Iraq invaded Kuwait, Israeli strategists believed that Israel and Iraq were on a path to conflict within a few years.

The Gulf War was the third time that Israel placed its nuclear/strategic forces under alert. In line with its opaque strategy, Israel made a deliberate effort to "remind" Iraq of its nuclear capability. Israeli Prime Minister Yitzhak Shamir pushed the policy of nuclear opacity to its limits when he issued a solemn warning to Iraq, promising to inflict "terrible and awful" pain on Iraq without ever using the "n" word; Israel conducted a "visible" missile test in December 1990 to highlight this message. During the war, US Secretary of Defense Richard Cheney, for the first time, referred directly to Israel's nuclear capability as a deterrent to Iraqi use of chemical or biological weapons (CBW) against Israel.

By the war's end, some 40 Iraqi Scud missiles had been fired at Israel, most of them aimed at Israel's population centers. Had Iraq escalated its Scud attacks to the non-conventional level, Israel would have found itself in an extremely difficult situation. The fact that Iraq did not launch a CBW attack against Israel led many Israelis to believe that the veiled nuclear deterrent had proven successful. This assertion may have some grain of truth, but is also overly simplistic. It leaves many nagging questions: Can nuclear weapons effectively deter the use of lower-level WMD? Under what circumstances is such a deterrence posture likely to work? Are there situations in which nuclear weapons cannot deter a non-nuclear adversary equipped with CBW?

Facing the specter of Iraqi CBW attacks on Israel, Israeli leaders and strategists could not fail to recognize the profound limitations of nuclear weapons vis-à-vis CBW. After all, under almost any circumstances, Israel could not use nuclear weapons in retaliation against an Iraqi CBW attack. To employ nuclear weapons justifiably, Israel must face a true last-resort situation. It is unlikely that CBW attacks would ever pose an existential threat to Israel. Could Israel then use nuclear weapons in retaliation? If not, could Israel make a demonstration of nuclear use over Iraq's unpopulated territory as a final act of deterrence?

The post-Gulf War nuclear developments, both in Iraq and Iran, compounded by the international community's intelligence failure in detecting Iraq's nuclear program, were critical in Israel's strategic decision to establish its own sea-based strategic force. By July 2000, Israel completed taking delivery of three Dolphin-class submarines it had ordered from the Thyssen-Nordseewerke shipyard in Kiel, Germany in the early 1990s. In doing so, it is widely assumed, Israel moved significantly towards acquiring a survivable second-strike nuclear capability. By all indications, Israel is now on the way to finalizing the restructuring of its nuclear forces into a triad form (delivery capabilities by land, sea, and air), like that of all five declared NWS. This is probably the most important strategic development in Israel.

Since the early 1980s, the Israeli Navy (with the support of other governmental agencies) promoted the idea that Israel should build a small fleet of modern, conventional (diesel) submarines for "strategic purposes," an Israeli euphemism for a sea-launched nuclear capability. Details about the specific capabilities of these submarines remain classified. Many of the navigation, communication, and weapons systems in the submarines were reportedly developed, built, and assembled by the Israeli defense industries. It is also understood (but not confirmed) that the most sensitive aspect of the project, the cruise missile technology, which allows these diesel submarines to become dual-capable (nuclear and

conventional) launching platforms, was developed and built in Israel and would be assembled only after the submarines' arrival in Israel. It is believed that the Israeli-made cruise missiles are capable of hitting strategic targets in a 900-mile range.

A fleet of three submarines is believed to be the minimum Israeli needs to have one nuclear-armed submarine deployed at all times. Such a survivable deterrent is perceived as essential because of Israel's unique geopolitical and demographical vulnerability to nuclear attack, and one that no potential nuclear enemy of Israel can ignore.

### Status

Israel is considered the sixth nation to have crossed the nuclear threshold, as well as the sixth nuclear nation in terms of the size of its arsenal. While current estimates as to the status of Israel's nuclear arsenal vary, it is widely believed that Israel's status as a nuclear weapon state (NWS)—in terms of the quality of its arsenal, along with its related delivery and command and control infrastructure—is more similar to that of the "old" members of the nuclear club, i.e., the United Kingdom or France, rather than the newest members, i.e., India and Pakistan.

As noted earlier, it is widely believed that Israel has been working in recent years to establish a secured second-strike capability by adding a sea-launched nuclear force. Once completed, Israel would restructure and modernize its nuclear capabilities along the US triad model, with the ability to deliver nuclear weapons by aircraft, land-based missiles, and sea-based submarines. It would take years to implement these modernization plans, and their current status is unclear.

External and domestic economic considerations may affect some of these modernization plans. Given that Iraq no longer poses a threat to Israel (conventionally or unconventionally), in combination with Israel's own budgetary crisis, the Israeli cabinet already decided to make broad and deep cuts in the defense budget, both for the Israeli Army (IDF) and the entire civilian defense infrastructure. As of this writing (October 2003), however, it is not clear if, and to what extent, these budget cuts may affect the nuclear capabilities. In fact, Israeli leaders have recently indicated (in a veiled fashion) that as long as Iran is moving forward towards the nuclear threshold, Israel is committed to modernize its own strategic capabilities. [9]

On 21 April 2004, after 18 years in an Israeli prison, nuclear whistleblower Mordechai Vanunu was released. The Israeli government set severe restrictions on his movements and conduct, imposing a virtual gag order on him that forbids him from further disclosing details about the nuclear program. In July of the same year the Israeli Atomic Energy Commission launched an official website providing only general details about Israel's civilian nuclear program. Later that month International Atomic Energy Agency director Mohamed ElBaradei visited Israel to meet with government officials. Despite ElBaradei's visit, Israel continues to assert that it will not discuss disarmament issues until after a comprehensive Middle Eastern peace agreement has been reached.

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[1] When Israeli researcher and author Avner Cohen published, without censorship approval, his book *Israel and the Bomb* (New York: Columbia University Press, 1998)—a political history of the Israeli nuclear project until 1970 based on some exclusive Israeli sources—the Israeli authorities interrogated him at length and considered filing charges against him. This case highlighted the extreme sensitivity of the subject and the effort of the Israeli authorities to ban Israeli-based historical research on the subject.

[2] This was the first, and only, time in which an insider from the Israeli nuclear program divulged information on the program. Those revelations

implied that Israel's nuclear program is more sophisticated and advanced than it had been commonly estimated until then. Some analysts interpreted the information Vanunu provided and concluded that Israel's nuclear arsenal may be at the level of 100 to 200 weapons, possibly even some thermonuclear weapons.

[3]. Shimon Peres, *Battling for Peace: A Memoir* (London: Weidenfeld & Nicolson, 1995), p. 132.

[4]. Pierre Pean, *Les Deux Bombes* (Paris: Fayard, 1981), pp. 95-96, 110.

[5]. Cohen, *Israel and the Bomb*, pp. 73-75.

[6]. Cohen, *Israel and the Bomb*, pp. 79-97.

[7] Cohen, *Israel and the Bomb*, pp. 273-276.

[8]. Hedrick Smith, "U.S. Assumes the Israelis Have A-Bomb or its Parts," *New York Times*, 18 July 1970.

[9] Both Prime Minister Sharon and Treasury Minister Benjamin Netanyahu have indicated in September and October 2003, respectively, that the deep cuts in the defense budget would not affect Israel's "strategic infrastructure and capabilities"—a common Israeli euphemism for its nuclear arsenal.

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