

**The Relevance of Mordechai Vanunu
Disclosures to Israel's National Security**

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Introduction

I have been asked to address the question of the relevance of Mordechai Vanunu's disclosures to Israel's National Security. There are two parts to this question. First, is the relevance of Vanunu's initial disclosures made ten years ago, as first published in *The Sunday Times* of London on October 5, 1986; and second, is the relevance of any further disclosures should Vanunu be released from prison. To address both of these questions it is useful to begin by reviewing what was known about Israel's nuclear weapons program before Vanunu arrived on the scene, and what we know about Vanunu himself.

The Beginning of the Israeli Nuclear Weapon Program

Israel and France began collaborating on nuclear matters about 1949-1951. The Israeli Atomic Energy Commission was created in 1952 under the Defense Ministry. Shortly after the Suez crisis in 1956, French-Israeli collaborated in building the reactor and reprocessing facility at EL-102 (Dimona). Much of the hardware was secretly made in France. Ground breaking at Dimona took place in early-1958. Construction activities were detected by American U-2 spy-plane overflights. According to Seymour Hersh's book, *The Sampson Option*, the chemical separation plant was completed in early-1965.¹ Israel purchased 20 tons of heavy water from Norway in 1959. Sometime in early-1968—shortly after the Six-Day War—Moshe Dayan ordered Dimona into full scale production and began turning out a few nuclear warheads a year. There were more than twenty-five bombs in the arsenal by the Yom Kippur War in September 1973, according to Hersh.²

Who is Mordechai Vanunu?

Mordechai Vanunu was born on October 13, 1954, in Marrakesh, Morocco, into a middle-class family in the Jewish quarter of the city.³ According to *The Sunday Times*, in 1963 the Vanunu family emigrated to Israel. Vanunu spent three years in the Israeli army rising to the rank of first sergeant. Vanunu entered Ramat Aviv University in Tel Aviv, but failed two exams after the first year of his physics degree course and returned home. In mid-1976 he responded to an advertisement for trainee technicians at Dimona. His application was accepted and in November 1976, at age 22, he went on the payroll of Kirya-le-Mehekar Gariny (KMG), the official title of the Neveg Nuclear Research Center at Dimona. Vanunu was sent back to school for a crash course in physics, chemistry, math and English. He "sailed through the initial entrance exam" and reported for work in January 1977. Vanunu was assigned to Machon 2 ["machon" means "facility" or "institute" in Hebrew], the six level (five underground) building where plutonium is recovered from spent fuel and nuclear weapon components are made. After

¹ Seymour M. Hersh, *The Sampson Option* (New York, Random House, 1991), p. 131.

² *Ibid.*, p. 179.

³ Louis Toscano, *Triple Cross* (New York: Birch Lane Press, 1990), p. 9.

10 weeks of orientation training, which ended in June 1977, and a short recall to active duty, Vanunu reported for his first full day of work as a junior technician on August 7, 1977.⁴

In November 1979, while employed at Dimona, Vanunu enrolled as a part time student at Ben-Gurion University in Beersheba.⁵ Sometime about 1984 Vanunu completed an undergraduate degree in geography, and began studying graduate philosophy studies to earn a masters degree.⁶

Workers at Dimona were free to roam the plant.⁷ Vanunu had unrestricted access to all levels of Machon 2, except Level 5.⁸ Vanunu had worked in one area on Level 5 during his temporary assignment to the lithium-6 project.⁹ Vanunu left Dimona in October 1985. Before leaving, Vanunu smuggled a camera into Machon 2, and for about 40 minutes he roamed the building taking some 57 color photographs on Levels 2-5. On level 5 he photographed glove boxes where plutonium disks were machined into hemispherical shells. He took pictures of what was alleged to be a full-scale model of a hydrogen bomb.¹⁰

Facing plant efforts to transfer him to less sensitive work, Vanunu left Dimona on October 27, 1985. A year later he provided *The Sunday Times* of London with a detailed account of activities in Machon 2, and copies of the color photographs he had taken a year earlier. Vanunu was kidnapped by the Mossad while in Rome and taken to Israel, where he was tried and convicted of treason and espionage. He was sentenced to 18 years in prison. He has served 10 years of his sentence, all in solitary confinement.

What Was Known About Israel's Nuclear Weapon Program before Vanunu?

The French knew of Israel's intention to become a nuclear power from 1956, and in fact, knowingly assisted Israel in the construction of the Dimona reactor and chemical separation plant in Machon 2. The U.S must have suspected Israel had initiated a nuclear weapons development program around 1962, following U-2 overflights that revealed the construction of the Dimona reactor. Edward Teller in 1968 was convinced that Israel already had several nuclear bombs, and he so informed the CIA.¹¹ Although it was never proved, the CIA believed

⁴ *The Sunday Times*, October 13, 1986, p. 2.

⁵ Toscano, *Triple Cross*, p. 25.

⁶ *Ibid.*, pp. 42 and 50.

⁷ *The Sunday Times*, October 13, 1986, p. 2.

⁸ Toscano, *Triple Cross*, p. 44.

⁹ *Ibid.*

¹⁰ *Ibid.*, p. 52.

¹¹ Hersh, *The Sampson Option* p. 187.

some 100 kg of highly-enriched uranium had been diverted from Nuclear Materials and Equipment Corporation (NUMEC) in Apollo, Pennsylvania. NUMEC was owned by Zalman Shapiro, who had close ties with Israel and recruited American scientists to assist Israel in solving a variety of difficult scientific problems. National Security Agency (NSA) electronic eavesdropping had provided evidence the Israeli Air Force had engaged in practice bombing runs that only made sense for delivery of nuclear weapons. On the basis of this information, in 1968 the CIA stated in a top secret National Intelligence Estimate that Israel had nuclear weapons. This assessment was made known to President Lyndon B. Johnson.

In 1968 Israel secretly purchased and diverted 200 tons of natural uranium from West Germany--what came to be known as the Plumbat Affair.¹² The sale was approved by the European Atomic Energy Commission (EURATOM) on the assumption that the uranium was bound for an Italian chemical company. The uranium traveled aboard the *Scheersberg A*, which had been purchased by the Mossad. The *Scheersberg A* set out from Antwerp, and then the cargo was secretly transferred by the Mossad at sea to an Israeli freighter. EURATOM discovered the diversion almost immediately and reported it to the U.S. Atomic Energy Commission (AEC). EURATOM and the AEC then proceeded to cover up the story for ten years.

The general public was well aware of the Israeli nuclear weapons program at least by the late 1970s, when a) the Plumbat Affair was first revealed to the public, b) the alleged diversion from NUMEC became the subject of extensive reporting, c) the CIA inadvertently released its 1968 National Intelligence Estimate on Israel pursuant to a Freedom of Information Act (FOIA) request, and d) the Nuclear Regulatory Commission inadvertently released a classified interview it had conducted with Carl Duckett, the author of the CIA's 1968 National Intelligence Estimate.

On September 22, 1979, in the South Atlantic a U.S. VELA satellite detected a light flash that South Atlantic event. This touched off speculation that Israel and South Africa had cooperated in the detonation of a low-yield nuclear device. To this day the mystery of the South African event has never been satisfactorily settled. There is still a disagreement among experts and intelligence officials as to whether the VELA satellite actually detected an nuclear weapon test.

Relevance of Vanunu's Initial Disclosures

Vanunu's disclosures have been extensively documented in *The Sunday Times*, and have been the subject of at least two books, Louis Toscano's *Triple Cross* and Seymour M. Hersh's *The Sampson Option*.¹³ I will briefly summarize some of the more important revelations:

- The capacity of Dimona to produce plutonium and tritium was higher than previously believed. Dimona had an initial design capacity of about 24 megawatts-thermal (MWt). Operating about 80 percent of the time at this power

¹² See Elaine Davenport, Paul Eddy and Peter Gillman, *The Plumbat Affair* (Philadelphia: J.P. Lippincott Company, 1978).

¹³ Hersh, *The Sampson Option*.

level Dimona could have turned out about 6-7 kilograms (kg) of weapon-grade plutonium (WGPu) annually. The *Fat Man*, the first U.S. plutonium bomb tested at *Trinity* and dropped on Nagasaki, was constructed using 6.2 kg of WGPu. Vanunu revealed that the chemical separation plant was producing an average of nine metal “buttons” a week, averaging 130 grams WGPu per button, for 34 weeks per year, or 40 kg of plutonium per year. This implies that the Dimona reactor had been upgraded to about 150 MWt.

- Highly-enriched (weapon-grade) uranium was being produced by gas centrifuge technology, possibly supplemented by laser enrichment technology, which was known to be under development in Israel since the early 1970s.
- Machon 2 at Dimona was producing deuterium and lithium enriched in the isotope lithium-6. The lithium-6 is used for tritium production, and lithium deuteride (preferably using lithium-6) is a solid fusion material used in thermonuclear weapons.
- Tritium was being produced at Dimona by irradiating lithium-6 in the reactor. For each gram of tritium produced, about 72 grams of plutonium production would have been foregone. During the 20 year period, 1963-1993, Israel could have produced as much as 800 kg of plutonium-equivalent. Thus, Israel could have made about 150 to 200 modern boosted warheads, each using about 3.5 kg of plutonium and 4 g of tritium.
- Beryllium parts were being manufactured at Dimona. Beryllium was used as a neutron initiator in early U.S. weapons. The United States has been using beryllium as a neutron reflectors in stockpiled boosted fission warheads and the boosted primaries of two-staged thermonuclear weapons since about 1958.

That Israel had nuclear weapons was already known. Vanunu’s revelations left no further doubt. His revelations made it clear that Israel’s nuclear weapons program was considerably more advanced than previously believed. Israel was assuredly making hollow-core boosted fission devices with deuterium-tritium (DT) boost gas, and was enriching lithium, i.e., producing lithium-6. Israel, therefore, had the capacity to make thermonuclear weapons—at least single stage thermonuclear weapons using enriched lithium-deuteride. On the basis of the photographs of the weapon models revealed by Vanunu, it is reasonable to conclude that Israeli nuclear weapons ten years ago were smaller, lighter, and more efficient than the early weapons types of the five declared nuclear weapon states.

Vanunu was a technician, not a nuclear weapon designer. It is apparent from his revelations ten years ago that he did not have a good working knowledge of weapon design. The photographs he took ten years ago have been examined by the Z Division, an intelligence unit at Lawrence Livermore National Laboratory (LLNL) responsible for analyzing foreign nuclear weapon programs. Livermore would have compared these to U.S. designs, and used computer codes for weapon design to model the yield and efficiency of the Israeli devices or models in the pictures taken by Vanunu.

There is no doubt that Vanunu's revelations about production activities at Dimona added significantly to what was known by the public and foreign governments about the status of Israel's nuclear weapon program. However, these disclosures do not appear to have damaged in any tangible way Israel's national security. To the contrary, Vanunu's disclosures ten years ago are more likely to have enhanced Israel's national security by making the threatened use of nuclear weapons by Israel appear more credible. In other words, this would have increased—not decreased—the deterrent value of Israel's weapons. For example, some have argued that the potential use of nuclear weapons by either the United States or Israel may have deterred Saddam Hussein from using chemical weapons in the Gulf War. While there is no proof, this possibility is plausible at the very least.

Some may argue that since the revelations of Israel's enhanced nuclear capability were made by Vanunu, and not by the government, Israel was able to maintain its ambiguous declaratory nuclear weapons policy. This is a weak argument, in that Vanunu's revelations made Israel's ambiguous declaratory nuclear policy less credible than it was previously. Had Israel desired to reveal more information about its weapons program to enhance its deterrent value, it would have been in Israel's interest to have this information revealed by Vanunu rather than by the government.

Relevance of Possible Future Disclosures

In addressing whether there is any additional information that Vanunu could reveal that might be detrimental to Israel's national security, it is useful to examine the information related to Israel's nuclear weapons program under its declaratory, employment, deployment and acquisition policies. With regard to each of these policies the first thing to recognize is that Vanunu has been in jail for ten years, so that to the extent that he has anything to say, his information is at least ten years old.

Declaratory policy

Declaratory policy is what a state publicly declares to be its policy--in this case, its policy related to the possession and use of nuclear weapons. Since a state's declaratory policy is by definition public knowledge, there are no additional secrets to be revealed other than whether the policy should be believed. Israel's declaratory policy has been to refrain from commenting on whether Israel has nuclear weapons, and since the early 1960s to declare that Israel will not be the first to introduce nuclear weapons into the Middle East.¹⁴ With respect to the first, Vanunu punched a big hole in Israel's declaratory policy, but there is nothing he could say now, ten years later, to make matters worse. With respect to not being the first to introduce nuclear weapons into the Middle East, this is a completely ambiguous, and therefore meaningless, statement because the United States was the first to introduce nuclear weapons into the Middle East, with the deployment of SAC B-47 bombs at Incirlik, Turkey in 1955.

Employment policy

¹⁴ Avnar Cohen and Benjamin Frankel, "Israel's nuclear ambiguity," *Science*, March 1987, pp. 15-19.

Employment policy governs how the weapons will actually be used. In the United States the nuclear weapons targeting options are set forth in the Single Integrated Operational Plan (SIOP). It is clear that Vanunu had no access to Israeli targeting plans. It would be impossible for Vanunu to betray any secrets here.

Deployment policy

Deployment policy governs where the forces are deployed. The locations of some Israeli nuclear forces has been published in the press, for example in *Aviation Week*. No doubt the United States and Russia have acquired better information through satellite reconnaissance and other intelligence methods. Vanunu had no access to Israeli deployment policy. He had no access to the facility where final assembly of Israeli nuclear weapons took place, which was not at Dimona. Consequently, Vanunu could not have had access to shipping record or anything that could have divulged the locations of deployed Israeli nuclear forces. And again, since he has been in jail in solitary confinement for ten years, even if he knew something ten years ago the information would be virtually worthless today.

Acquisition policy

Acquisition policy relates to the research, design, testing and acquiring of weapons. Vanunu had access to information bearing directly upon Israeli acquisition policy since he was in the business of manufacturing nuclear weapons. But to analyze whether Vanunu's release from prison would constitute a threat to Israel's national security, it is useful to break this category of information down further into nuclear weapon: design, testing, intelligence sources and methods, and materials production.

Nuclear weapon design information. As noted earlier, Vanunu was a technician, not a nuclear weapon designer. It is apparent from his educational background and his revelations ten years ago that he did not have a good working knowledge of weapon design. There is no evidence that Vanunu has another stash of photographs, and therefore there is nothing that he could reveal today in the way of warhead design that would affect Israel's national security, or the security of any other state. It is highly unlikely that he could reveal any further information about design details of Israeli weapons, beyond what has already been revealed. Even if he knew, for example, that Israel had been manufacturing enhanced radiation ("neutron bomb") warheads, which is unlikely given Israel's limited plutonium/tritium production capability, it is hard to see how that revelation today would affect Israel's national security.

Nuclear weapon testing information. There is no basis for believing Vanunu had access to any information related to the possible testing of any of Israel's nuclear warhead designs. If the South Atlantic event recorded by the U.S. VELA satellite was a test of an Israeli nuclear device, there is no basis for believing that Vanunu would have had access to unpublished information related to this event. Even if Vanunu somehow could shed additional light on whether this event was real, and whether it was an Israeli test, so what! It would not damage Israel's national security. As an alternative to testing, Israel may have had access to U.S. or French nuclear weapon design and/or test data. Any adversary must entertain this possibility.

Therefore, the deterrent value of Israel's weapons would not be diminished by additional revelations about whether Israel has conducted secret nuclear weapon tests. To the contrary, if it could be confirmed that Israel has conducted a clandestine nuclear test, if anything, this would increase a potential adversaries confidence that Israel's weapons will work as intended, and therefore increase the deterrent value of Israel's nuclear weapons.

Intelligence sources and methods. In the course of his work Vanunu may have seen one or more documents related to nuclear material production that had markings on the documents identifying the authors, and country of origin. It is doubtful that Israeli intelligence would be so careless as not to protect the sources of such documents if they were sensitive—even to the extent of shielding this information from technicians at Dimona. The fact that there are foreign documents—U.S., French or Russian—related to material production processes would not be a surprise. Just the opposite would be the case, since so much of this information is already in the public domain. Thus, it is highly unlikely that Vanunu could divulge anything at this late date about intelligence sources and methods that would be harmful to Israel.

Vanunu could name people who worked at Dimona, or who visited restricted working areas, when he was there from 1977 to 1986. This could conceivably embarrass someone or a few. But this hardly would be a threat to Israel's national security, and it does not justify his continued imprisonment.

Nuclear materials production. Of course, it is here that Vanunu had the greatest expertise. At Dimona's Machon 2, Vanunu was exposed to various technologies used in weapon material manufacture, including for example, chemical separation of plutonium from spent fuel, laser isotopic separation of uranium-235, enrichment of lithium, recovery of tritium from targets, and deuterium separation. The fact that these technologies were exploited at Dimona ten years ago has already been revealed.

It is difficult to believe that Vanunu could still remember important classified design details after ten years; but assuming he could, these details are now ten years old. He would have no obvious incentive to reveal information that could assist other countries in acquiring nuclear weapons, except as retribution for the way he was kidnapped and inhumanely imprisoned in Israel. But let us assume for purposes of argument that Vanunu, if released from prison, is crazy enough to emigrate to another nascent nuclear weapon state, e.g., Iran, Iraq, or Libya, in order to assist them in the production of nuclear weapon materials. Even under these circumstances Vanunu's assistance would be of very limited value. There are numerous nuclear scientists and engineers in these other countries, better educated than Vanunu, and an extensive public literature on the processes needed for nuclear material production. It is not credible to think that Vanunu is going to provide these scientists with critical insights that will significantly accelerate the programs in these countries. Moreover, in the case of Libya, Iraq or Iran, it is difficult to believe that Vanunu would assist a country in the development of nuclear weapons that would be aimed at his own family's home town or state.

Conclusion

Israel's nuclear weapons are viewed by the government as necessary to Israel's security—weapons of last resort to deter its destruction. But if Israel ever used these weapons, upwards to tens of millions of innocent men, women and children could be killed. Thus, nuclear weapons are meant to insure peace by threatening a holocaust many times greater than that experienced by the Jews during World War II.

While the Israeli government has chosen to threaten another holocaust to prevent one, it surely must respect a conclusion by some of its own citizens that this policy is unjust and abhorrent to the tradition of the Jewish State—a conclusion shared by a majority of world opinion. Israel, more than any nation on earth, should be tolerant of its citizens' efforts to avoid a holocaust by means that do not threaten the lives of others, even if such efforts challenge government policy.

Mordechai Vanunu's initial revelations 10 years ago about Israel's nuclear weapons program provided new, significant information on the status of nuclear weapon developments in Israel. These revelations, however, were not damaging to Israel's national security. If anything they strengthened the deterrent value of Israel's nuclear arsenal. Certainly, no evidence has been forthcoming in the past ten years to indicate otherwise.

If he were released from prison today, there is no basis to believe that Vanunu could further harm Israel's national security by revealing additional sensitive information. The greatest harm he could inflict would be to emigrate to Iran, Iraq, or Libya to assist in the production of nuclear weapon materials. Even in this unlikely case, his usefulness would be very marginal.

Vanunu revealed classified information, for what he believed was a higher cause. He was illegally kidnapped, returned to Israel, tried, convicted, and in violation of his human rights he has been held in solitary confinement for ten years. He has paid amply for his crime of revealing classified information. There is no plausible argument for extending his imprisonment. Vanunu never presented a threat, and he certainly no longer represents a credible threat, to Israel's national security.