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The NUMEC Affair: Did Highly Enriched Uranium from the U.S. Aid Israel's Nuclear Weapons Program?



NUMEC's uranium plant in Apollo, Pennsylvania was a two-story, 50,000 square foot industrial facility that stretched for nearly two blocks along a main street in town.

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Zalman Shapiro (1920-2016) held a PhD in metallurgy and assisted in the design of the first nuclear submarine and the first commercial nuclear power plant. One of the founders of NUMEC in 1957, he served as its Chairman and President until he resigned in 1970. Since the 1960s, controversy has abounded over whether he oversaw the diversion of weapons grade uranium produced by NUMEC to the Israeli nuclear program.



Rafi Eitan (1926-) served as an Israeli intelligence operative for most of his professional life. During 1968, he had meetings at NUMEC that caught the attention of the FBI. Eitan had led the Mossad team that captured Adolph Eichmann in 1960 and served as head of European operations for Mossad's human intelligence gathering unit, TZOMET, during 1963 to 1972. Besides advising several prime ministers on terrorism matters, during 1981-1985, he served as head of LAKAM (the Bureau of Scientific Relations), the scientific intelligence collecting unit, until he resigned as a result of the Jonathan Pollard affair.



John Hadden (1923-2013), an engineer and former Army officer, joined the CIA in 1951. After assignments in Berlin, Hamburg and Salzburg, Hadden served as CIA station chief in the U.S. embassy in Tel Aviv from 1963 to 1967, where he closely followed Israeli nuclear activities. Beginning in 1969, he worked for James Angleton, CIA's chief of counterterrorism. Hadden retired from the CIA in 1973.



Carl Duckett (1923-1992), a U.S. Army expert on Soviet missile systems, joined the CIA in 1963 and served as CIA Deputy Director and head of the Directorate of Science and Technology from 1966 to 1977. He briefed the NRC in 1976 on CIA's conclusion in the late 1960s that Israel's first atom weapons owed in some measure to uranium from the NUMEC plant in Pennsylvania.

The NUMEC Affair: Did Highly Enriched Uranium from the U.S. Aid Israel's Nuclear Weapons Program?

Document collection and introduction by Roger J. Mattson, PhD

Beginning more than 50 years ago, and extending over the period from 1957 to 1978, according to official U.S. government records and studies, more than 300 kilograms of uranium 235 (U-235) in the form of highly enriched uranium (HEU) went missing from a nuclear fuel manufacturing plant in the small town of Apollo, Pennsylvania. The Atomic Energy Commission (AEC) concluded in 1966 that there was about a 200-kilogram deficit between the U-235 in the form of HEU supplied to the plant and the amount returned in products to customers. After the AEC and its Oak Ridge office calculated the processing losses based on NUMEC's records, they determined that the fate of about 100 kilograms of U-235 in the form of HEU remained unexplained. NUMEC paid for the missing material, but later disputed the AEC calculations, maintaining that the unexplained 100 kgs could be attributed to other processing losses. After decommissioning of the Apollo plant, more than 330 kgs of U-235 in the form of HEU were unaccounted for, with most of that deficit occurring while NUMEC ran the plant.

For decades there have been allegations and suspicions that foreign agents, perhaps aided by American citizens, diverted a significant fraction of NUMEC's unexplained uranium deficits to Israel for its nuclear-weapons program. Because of the high stakes involved, the affair has been clouded in denial and concealment for nearly a half century. Several recent books and articles, including a book by this Briefing Book's primary author, *Stealing the Atom Bomb: How Denial and Deception Armed Israel*, have attempted to account for what is known and what is still a mystery.^[1] Using recently declassified documents published today for the first time by the National Security Archive and the **Nuclear Proliferation International History Project**, this Electronic Briefing Book aims to make more widely available to the public the fascinating information that has been declassified so far.

The Nuclear Materials and Equipment Corporation, commonly known as NUMEC, owned the Apollo uranium plant. A company named Apollo Industries, headed by Morton Chatkin, Ivan J. Novick and David Lowenthal, invested in NUMEC when it was formed in 1957. Novick later headed the Zionist Organization of America. Lowenthal was an American Zionist who played a significant role in the resettlement of Holocaust survivors in Israel.[2]

One of Lowenthal's partners in Apollo Industries and the president of NUMEC was Dr. Zalman Mordecai Shapiro, a chemist who played a key role in the development, at Bettis Laboratory, of the reactor that powered the world's first nuclear powered submarine, the USS *Nautilus*. Shapiro's work at Bettis Laboratory also involved development of the fuel for the first commercial nuclear power plant at the Shippingport Atomic Power Station in western Pennsylvania. Shapiro left Bettis to become the technological force behind the creation of NUMEC, which he founded to invent new and improved methods of processing nuclear fuel. Shapiro, along with a group of his principal managers, conceived, designed, built and oversaw operation of the Apollo plant until the early 1970s. The plant began manufacturing fuel for nuclear reactors in 1959. It processed many tons of uranium in its lifetime, reaching a peak annual throughput of more than 700 metric tons in 1973.

In early 1965, the AEC's Oak Ridge Operations Office in Tennessee conducted a routine inventory of government-owned HEU that the AEC had leased to NUMEC. As the AEC's Oak Ridge people suspected, based on past concerns, the inventory disclosed a significant shortage. In early 1966, after extensive investigations, with a concerted effort by NUMEC and AEC to account for all conceivable operating losses, the AEC confirmed that 178 kilograms of U-235 in the form of HEU, the main ingredient for uranium-fueled atom bombs, were missing from the Apollo plant. Within three years, the amount had grown to 269 kilograms.

The AEC, and subsequently its successor agency, the Nuclear Regulatory Commission (NRC), as well as the Federal Bureau of Investigation (FBI), the Justice Department, the Central Intelligence Agency (CIA), the Congressional Joint Committee on Atomic Energy (JCAE), the General Accounting Office (GAO), the National Security Council (NSC), the Defense Intelligence Agency (DIA), two committees of the U.S. House of Representatives, spanning four presidential administrations, investigated what became of the missing uranium. Despite their efforts, they never fully accounted for it. Those investigations extended over the period from 1965 to the early 1980s. The investigators all acknowledged that the material might have made its way to Israel,

and some in high position firmly believed it had gone there, but, until recently, hard evidence of a diversion was veiled in secrecy and hard to find.

Today, more is publicly known about the NUMEC affair than ever before. In 2009 The FBI released a detailed statement that was made in 1980 by a former NUMEC employee who said he started work at Apollo in February 1965 and was fired in October 1978 by the present owner, Babcock and Wilcox, Inc., for job abandonment following an alleged job-related illness. The former employee said he encountered armed strangers on the uranium plant's loading dock one night in early 1965. He said they were loading what appeared to be canisters of HEU onto a truck in racks that he had not seen before. He also saw a shipping manifest that said the material was heading to a ship bound for Israel on the Zim-Israel shipping line. He said that a NUMEC manager later threatened him to keep his mouth shut about what he had seen. From the mid 1980s through 2009, the FBI also declassified some of its other reports from the 1960s and into the early 1970s. Those reports indicated that Zalman Shapiro, throughout the time he headed NUMEC, collaborated with a number of Israeli officials. They included people from the "Science Attaché" office at the Israeli embassy in Washington, D.C., and others from the Israeli intelligence agencies Shin Bet and Mossad, all believed to be part of Israel's scientific intelligence organization (LAKAM), which collected nuclear technology in the United States to aid Israel's nuclear weapons program.

In 2014, the Interagency Security Classification Panel (ISCAP) declassified several documents about NUMEC, including voluminous 1978 reports by the NRC and the GAO. Those documents contained both FBI and CIA information regarding NUMEC. In 2015 CIA released another set of documents that appeared to add credence to the claim that in 1968 it found HEU traceable to the United States near the Israeli nuclear complex at Dimona, a fact that former AEC Chairman Glenn Seaborg recorded in his diary in June 1978. **[3]** Furthermore, documents found in 2014 among the personal papers of the late John Hadden, the former CIA Station Chief in Tel Aviv, provide additional insights into what CIA knew about the NUMEC case, Israeli nuclear espionage in the United States, and the Israeli nuclear program generally in the mid to late 1960s. The Hadden documents and the recently declassified CIA documents suggest that some of CIA's intelligence information was not made available to the FBI and the NRC.

In the end, however, after several FBI investigations, including the use of warrantless wiretaps on Shapiro's phones, the Department of Justice chose not to prosecute him. It is easy to speculate that the Department made this decision because it was unable

to use the wiretap information at trial and CIA did not want FBI or Justice to disclose its sources and methods. However, another possibility is that political and foreign policy considerations drove the decision. In 1971, to settle a dispute among the FBI, the Justice Department and the AEC over Shapiro's security clearance, the AEC commissioners found him a new job at Westinghouse that did not require a security clearance.^[4]

The documents described below provide the first in-depth CIA and FBI accounts of NUMEC to reach public view. They contain greater detail about the NUMEC affair than was previously known, leaving strong but not incontrovertible evidence that a diversion did occur. However, the available materials are still highly redacted. In some cases, entire multi-page documents or entire attachments to documents are blanked out. Most of these are CIA records, which the agency claims contain classified information revealing its sources and methods.^[5]

There are several new findings contained in the documents recently released. This new information is both material and relevant to understanding what happened at Apollo in the 1960s and what was not publicized during the investigations of the 1970s. Some of the recently declassified documents shed new light on the following issues.

1. In April 1968, Director of Central Intelligence (DCI) Richard Helms asked Attorney General Ramsey Clark to undertake a discrete, all-source investigation of Zalman Shapiro in light of new evidence gained by CIA (presumably through environmental samples taken in Israel that detected uniquely enriched uranium in the environment near Dimona). (Documents 8 and 9)
2. Some FBI and AEC documents describe a September 1968 visit to the NUMEC plant at Apollo by four Israeli citizens known to be affiliated with Israeli intelligence. These documents took on new importance when one of those agents, Rafi Eitan, later was exposed as the head of LAKAM in the Jonathan Pollard espionage affair in 1987. (Documents 10 to 12)
3. Despite AEC claims in the 1960s that there was no evidence of a diversion at Apollo, the FBI received a tip in 1968 from a NUMEC employee of how HEU could have been shipped out of the plant in food irradiators bound for Israel without detection. In addition, in the early 1980s, the FBI found a former NUMEC employee who claimed to have seen a diversion in process in 1965. (Documents 13 and 40)
4. Some FBI documents suggest that disclosure of its NUMEC investigation would be viewed poorly by Israeli and American Jewish organizations. (Documents 14 and 15)
5. In 1969, J. Edgar Hoover halted the FBI investigation of NUMEC that Helms had requested in 1968. Hoover asked the AEC what action it planned to take with respect

- to Shapiro's security clearance and classified contracts. (Documents 15, 17 and 24)
6. In internal CIA documents from the 1970s, which were released in 2015, CIA staffers Carl Duckett and John Hadden recorded the basis for their conclusion that NUMEC uranium had been diverted to Israel. Their information was included in a wide-ranging criminal investigation of NUMEC, initiated by Attorney General Edward Levi in 1976, in response to the concerns expressed by the NRC after it heard a briefing from Duckett. Dr. Glenn Seaborg, former AEC chairman, later confirmed that CIA included in some of these briefings the fact that it had discovered HEU with a Portsmouth signature in the vicinity of Dimona. (Documents 18 to 21, 34 to 38)
 7. In 1977, veteran CIA operative Theodore Shackley led interagency briefings about the agency's evidence of a diversion. He briefed representatives of ERDA, NSC, FBI, NRC and congressional committees as concerns arose in the Ford Administration over ERDA and NRC statements that there was no evidence of diversion from U.S. HEU inventories. In this period, the CIA attached unusually high significance to preventing public disclosure of NUMEC information. (Documents 22, 23, 25 to 33)
 8. Congressman Morris Udall's interview of Zalman Shapiro in 1978 served to record Shapiro's side of the NUMEC story. (Document 39)
 9. In 1980, when the FBI investigation was essentially complete, a number of additional interviews were conducted. (Document 41)
 10. The NRC, near the end of its oversight of the Apollo uranium plant, told the FBI that 337 kilograms of U-235 would remain unaccounted for when B&W completed decommissioning the plant. (Document 42)

With the availability of this batch of newly declassified documents, more is known about the NUMEC affair. However, important unknowns remain. They include the following:

1. The CIA is still redacting large portions of memoranda and letters written by NSC staffers and CIA employees (e.g., Shackley, Hadden and Duckett) and large swaths of information in FBI and GAO documents that contain CIA information. The CIA has released none of its internal operational documents that provided the basis for its summary pronouncements. These sources of information allegedly disclose CIA's intelligence methods and sources, but 50 years after the fact, one wonders if there is another purpose.
2. The FBI and CIA have suppressed information about the role of the late David Lowenthal and his relations with the other investors in Apollo Industries and NUMEC.
3. The CIA has not disclosed which U.S. science laboratory performed the spectrographic analysis of environmental samples taken near Dimona that disclosed

the presence of 97.7 percent enriched HEU from AEC's enrichment plant in Portsmouth, OH, which supplied such uranium to NUMEC for the manufacture of fuel for U.S. naval reactors.

4. In the absence of solid knowledge, one could speculate that CIA redactions of various documents now in the public domain concern the discovery of Portsmouth HEU near Dimona. The only document that attests to that fact in this EBB is Document 36 written by former AEC Chairman Glenn Seaborg. However, Carl Duckett discussed that discovery with Seymour Hersh who wrote in his book *The Samson Option* "that CIA operatives in Israel had found 'traces of enriched uranium' near Dimona that was similar to the enriched products that had been delivered for processing to Shapiro's plant." Hersh went on to say, "Duckett and other government investigators into NUMEC acknowledged that there was no meaningful correlation between the uranium processed in the NUMEC plant and the traces of enriched uranium picked up by American agents outside Dimona."^[6] Mattson's recent book debunks that assertion.
5. If the uranium that CIA found near Dimona was 97.7 percent enriched, it most assuredly came from AEC's enrichment plant in Portsmouth. This fact did not become public knowledge until 2006 when the Department of Energy (DOE) declassified a report that listed by year the amount of HEU the AEC and its successors produced at the Portsmouth. That report listed all of the 97.7 percent HEU used in naval reactor fuel.^[7] According to that reference, Portsmouth was the only source of this level of uranium enrichment, and this uniquely enriched uranium was used exclusively for U.S. naval reactor fuel, which NUMEC processed.
6. Other accounts of the discovery of HEU near Dimona said that the isotopic "signature" of the environmental samples showed that some of the HEU was enriched at the AEC plant in Portsmouth.^[8] Several of these accounts attribute the source of the Portsmouth signature information to retired Air Force General Alfred Starbird of the Energy Research and Development Administration, a predecessor of the Department of Energy, who was briefed by CIA's Theodore Shackley in the summer of 1977 (see Document 26).

Zalman Shapiro died on July 16, 2016, at the age of 96. Published accounts of his life pointed to the contributions he made to U.S. national security through his work for the naval nuclear program. They noted that he was investigated but never charged with providing Israel with weapons-grade uranium. They said that Shapiro was an ardent supporter of Israel where he contributed intellectually on matters of science and technology. Zionist Organization of America (ZOA) National President Morton A. Klein, agreed, saying, "Zalman was one of the strongest and committed activists for Israel

I've ever known. And when he set his mind to a pro-Israel or pro-ZOA project, he fought like a tiger to see it through — and see it through he did." [9]

READ THE DOCUMENTS

Some documents in this list were obtained by private researchers who requested them of federal agencies and presidential libraries pursuant to the Freedom of Information Act, Mandatory Declassification Reviews and appeals to the Interagency Security Classification Appeals Panel. Others came from a lawsuit by Grant Smith, director of the Institute for Research: Middle Eastern Policy, against the CIA to release its NUMEC documents and operational reports. Some documents were reviewed, redacted and released more than once. In each case, this posting provides the least redacted (most declassified) version of the document now available.

Document 1 "Summary Notes of Meeting with Representatives of the Nuclear Materials Equipment Corporation," F. T. Hobbs, Acting Secretary, Atomic Energy Commission, August 10, 1965, labeled CONFIDENTIAL and OFFICIAL USE ONLY before redaction and release.

Source: U.S. DOE Archives, 326 U.S. Atomic Energy Commission, Secretariat Collection, Box 1381, Meetings and Conferences.

In this meeting, AEC commissioners Seaborg, Ramey and Tape and AEC staff members sought explanations from Zalman Shapiro and others from NUMEC for the inventory differences in highly enriched uranium (HEU) that the AEC's Oak Ridge Office had detected at the Apollo uranium plant earlier that year. At the meeting, Shapiro "admitted that some waste was generated by work on Navy fuels [and] ... noted that in earlier years NUMEC had paid AEC up to \$1 million for material losses." In November 1965, because of Oak Ridge's findings, AEC sent its own material accounting experts to Apollo. The AEC survey team supervised another plant-wide inventory supported by independent laboratory studies to try to account for the lost uranium.

Document 2 "Summary Notes of Briefing [of AEC commissioners] on Safeguards and Domestic Material Accountability," W. B. McCool, Secretary, AEC, February 14, 1966, illegible classification obscured by DOE before release.

Source: U.S. DOE Archives, 326 U.S. Atomic Energy Commission, Secretariat Collection, O&M-6, Briefings Vol. 7.

These minutes record a briefing provided by the AEC senior staff, led by Assistant General Manager Howard Brown, for the AEC commissioners on the outcome of the

staff's investigation of NUMEC. The staffers told the commissioners how the losses on a recent NUMEC contract with Westinghouse, the so-called Astronuclear contract, compared to the cumulative eight-year loss of HEU from Apollo. The minutes reflect that "if collusion between a shipper and a foreign government were assumed it would be theoretically possible to ship material abroad in excess of the amounts indicated in the company's records. Because it was based upon a presumption of honesty and financial responsibility, the AEC materials accountability system might not reveal a deliberate and systematic attempt to divert materials in this manner The basic Commission position [with the Joint Committee on Atomic Energy] should be that AEC had no evidence or suspicion that diversion had occurred; neither could the Commission say unequivocally that the material had not been diverted."

Document 3 Letter from AEC Chairman Glenn Seaborg to JCAE Chairman Chet Holifield, February 14, 1966, unclassified.

Source: U.S. DOE Archives, 326 U.S. Atomic Energy Commission, Secretariat Collection, Box 1359, Materials-9.

Chairman Seaborg wrote to Chairman Holifield to answer questions raised earlier by the Joint Committee. One question asked whether an investigation of NUMEC by AEC's division of inspection or by the FBI was warranted. Seaborg responded, "In the absence of evidence or suspicion of violation of law, we have determined that an inquiry by the FBI is not now warranted. Our Division of Inspection is presently reviewing the survey report and a determination has not been made as to the need for further inquiry by that Division."

Document 4 Letter from R. L. Hollingsworth (AEC General Manager) to John T. Conway (JCAE Executive Director), February 14, 1966, labeled CONFIDENTIAL before release by ERDA.

Source: DOE Archives, labeled NNNNC-12.

Hollingsworth responded to questions raised by the Joint Committee. His letter included AEC's computation of the value of the 61 kilograms of HEU that were missing on the Astronuclear contract (6 percent of the HEU in the contract), i.e., \$736,600. He said that the AEC audit of November 1965 concluded that 178 kilograms of U-235 in the form of HEU was unaccounted for since the start of operations at the Apollo plant. Hollingsworth explained that 93.8 kilograms of the total of 178 kilograms could not be ascribed to any known loss mechanisms. Normally, such an unexplained loss would be examined for the possibility of theft. Instead, AEC said it found no evidence of theft.

However, there is no indication that either the Commission or the FBI looked for such evidence at the time the material was discovered to be missing.[\[10\]](#)

Document 5 “Report of Survey: Control Over Enriched Uranium, Nuclear Materials & Equipment Corp., Apollo, Pennsylvania, Division of Nuclear Materials Management, Nuclear Materials Management Survey Number DNMM-53,” S. C. T. McDowell, Assistant Director for Control, AEC Division of Nuclear Materials Management, April 6, 1966, labeled OFFICIAL USE ONLY before release.

Source: FBI FOIA File No. 117-2564, document 586.

In April 1966 Dr. Samuel McDowell of the AEC authored this 23-page report, with 40 pages of attachments, describing AEC’s late 1965 and early 1966 investigation and independent inventory of the uranium processing plant at Apollo and subsequent interactions with NUMEC. The report describes the cumulative inventory difference for HEU from the start of operations as 178 kilograms, of which 93.8 kilograms could not be explained.

Document 6 FBI investigation report, Pittsburgh Office of FBI, author's name redacted, June 21, 1966, labeled CONFIDENTIAL before redaction and release.

Source: FBI FOIA File No. 117-2564, document 23.

This report summarized an interview of Zalman Shapiro by FBI’s Pittsburgh Office on June 15, 1966. The AEC asked the FBI to determine if Shapiro should have registered as an agent of a foreign government pursuant to the Foreign Agents Registration Act. Shapiro described how NUMEC and the Israeli Atomic Energy Commission formed a joint venture company called ISORAD. He described meetings with the U.S. ambassador to Israel and with Joseph Eyal, science attaché of the Israeli embassy, in connection with the formation of ISORAD. Although the interview occurred after the AEC realized NUMEC was missing 93.8 kilograms of HEU, the FBI did not question Shapiro about the missing material.

Document 7 “Review of Accountability Controls Over Special Nuclear Materials, Nuclear Materials and Equipment Corporation,” Report to Joint Committee on Atomic Energy by the Comptroller General of the United States, June 20, 1967, unclassified, National Archives, University of Arizona, Special Collections Library, Papers of Morris Udall, Call No. MS 325, Box 364, Folder 7.

This 78-page report by the General Accounting Office reviewed the various audits that had been performed on NUMEC operations at Apollo and concluded, “During the period of our review, we found that additional losses had been disclosed and NUMEC’s

records showed that cumulative losses of U-235 through December 31, 1966 totaled about 260 kilograms or about 1.2% of receipts.”

Document 8 Letter from CIA Director Richard Helms to The Honorable Ramsey Clark, Attorney General, April 2, 1968.

Source: ISCAP Appeal No. 2013-062, Document #1, March 18, 2014.

On April 2, 1968, DCI Helms wrote to Attorney General Clark to ask the FBI to reopen its investigation of Shapiro. In the cover note for the letter, Helms said, “Since the subject matter of this letter is so sensitive for obvious reasons, I would appreciate if you would return it to me when you have taken whatever action you feel appropriate.” In the declassified letter, immediately following a twelve-line redaction, Helms asked Clark to “initiate a discreet intelligence investigation of an all source nature of Dr. Shapiro in order to establish the nature and extent of his relationship with the Government of Israel.”

Document 9 FBI memorandum from C. D. DeLoach to Mr. Tolson, “Dr. Zalman Mordecai Shapiro, Possible Atomic Energy Act Violation,” May 6, 1968, labeled CONFIDENTIAL before redaction and release.

Source: FBI FOIA File No. 117-2564, document 38, released in less redacted form on September 28, 2009 per FOIPA No. 1091168-000.

FBI Deputy Director Deke DeLoach wrote to FBI Associate Director Clyde Tolson concerning the new investigation of Shapiro requested by CIA. DeLoach expressed misgivings about the investigation. Director FBI Director Hoover penned his approval of the new investigation. “OK, but I doubt advisability of getting into this (redacted).”

Document 10 Memorandum from SAC, WFO, to Director, FBI, Subject: [Redacted] Atomic Energy Act, September 11, 1968, labeled SECRET before redaction and release.

Source: FBI FOIA File No. 117-2564, document 131.

In this memorandum, the Special Agent in Charge (SAC) of the FBI’s Washington Field Office (WFO) told FBI Director Hoover that, according to the AEC’s Headquarters Security Office, the AEC’s New York Security Office had reported on September 6, 1968, that NUMEC had requested a visit by four Israelis to its office in Apollo, Pennsylvania, on September 10. The four were identified as:

- Avraham Hermoni, Scientific Counselor, Israeli Embassy, Washington, DC;
- Ephraim Beigon [Biegun], Department of Electronics, Israel;
- Abraham Bendor, Department of Electronics, Israel;

- Raphael Eitan, Ministry of Defense, Israel.

Although the FBI redacted much of this memorandum before its release, more is known from other sources about these four Israelis. At the time of the visit, Hermoni (1926-2006) was a chemist serving as Scientific Counselor and LAKAM Station Chief (spymaster) in the Israeli embassy in Washington, a post he held from late 1968 to 1972.^[11] The FBI and the CIA knew of Hermoni's activities in the U.S., including his establishment of a network for gathering technical intelligence. From 1959 to late 1968, Hermoni served as technical director (vice president) at RAFAEL, Israel's weapons development authority. Biegun (1932-2007) headed the technical department in Israel's secret service (Shin Bet) at the time of the visit to NUMEC. Bendor (1928-2014), who later changed his name to Shalom, worked for Shin Bet for 35 years and headed that agency from 1981 to 1986. In 1968, when visiting NUMEC, he was deputy director of the covert operations unit that served Shin Bet, Mossad and Aman and was on special assignment to LAKAM. Raphael (Rafi) Eitan (b. 1926) was deputy chief of operations of Mossad (1963 to 1972). In 1968 he was director of the covert operations unit that served Shin Bet, Mossad and Aman and was on special assignment to LAKAM. He had been the chief organizer of Israel's capture of Adolph Eichmann in Argentina in 1960. He also organized the Mossad/LAKAM team in the Plumbat affair that diverted 200 tons of natural uranium oxide (yellowcake) from Europe to Israel in 1968, shortly after his visit to NUMEC. Eitan later served as a security advisor to Israeli prime ministers, a member of Israel's Knesset and the head of LAKAM. While serving as LAKAM's head, he was discovered in 1985 to be running the U.S. Navy spy for Israel, Jonathan Pollard. Eitan was also involved in the nuclear espionage activities in the United States of the Hollywood producer and Israeli citizen Arnon Milchan. The memo closed with the note that the AEC Security Office "would contact the Bureau for complete background on the visitors."^[12]

Document 11 Letter from Harry R. Walsh, Director of Security Division in AEC's New York Operations Office, to Bruce D. Rice, Manager of NUMEC Security Division, September 20, 1968, unclassified.

Source: FBI FOIA File No. 117-2564, document 134.

Ten days after the NUMEC visit by the four Israeli intelligence officers, Walsh confirmed "the telephonic approval furnished by [redacted] of my staff, regarding the unclassified visit of four (4) Israeli citizens to your facility on September 10, 1968. These visitors are identified in your two letters to me, dated September 12, 1968." The FBI provided only one of the two letters of September 12 pursuant to the FOIA.

Document 12 NUMEC letter to Harry R. Walsh, AEC Director of Security and Property Management Division, New York Operations Office, from Bruce D. Rice, NUMEC Manager of Security, September 27, 1968, unclassified.

Source: FBI FOIA File No. 117-2564, document 149.

This letter responded to a telephone call from Walsh requesting more information about who met with the four Israeli visitors and what they discussed. Walsh responded that Hermoni, Biegun, Bendor and Eitan met with Shapiro and four members of the NUMEC energy conversion department to discuss the possibility of developing plutonium-fueled thermo-electric generators. Walsh said NUMEC was developing a proposal for this work using only unclassified information and the Israelis also were seeking proposals from other nuclear organizations in the United States. The FBI has released no documents describing meetings of this sort with other nuclear organizations.

Document 13 Memorandum from SAC Pittsburgh to FBI Director, attaching 17-page report, "Dr. Zalman Mordecai Shapiro," January 20, 1969, labeled SECRET and CONFIDENTIAL before redaction and release.

Source: FBI FOIA File No. 117-2564, document 268, released in less redacted form on September 28, 2009 per FOIPA No. 1091168-000.

In this memorandum and report, the Pittsburgh office of the FBI told Director Hoover that Zalman Shapiro had written to AEC Chairman Seaborg to ask questions about licensing criteria for plutonium-powered generators of the type allegedly discussed with the LAKAM representatives in September 1968. Seaborg's November 20 reply to "Dear Zal" described the conditions that AEC would impose on such exports. The FBI also learned that while Shapiro was in Washington, D.C., on September 30, 1968, he talked with Hermoni and Biegun and, "although there were problems, both were anxious to move ahead," presumably with plutonium-238 generators.

The report noted that Shapiro departed for Israel on November 28, 1968. Upon his return, a wiretap revealed that Shapiro spoke about business opportunities while in Israel, the most promising of which was to create a research laboratory modeled after Battelle's Pacific Northwest Laboratory (PNL) in Washington State. Shapiro also discussed another business venture concerning a chemical facility being built in Israel by Allied Chemical Company. The Nuclear Services Division of Allied Chemical built a plant in Metropolis, Illinois, to convert yellowcake to uranium hexafluoride, the feedstock for making natural uranium dioxide reactor fuel at the Apollo plant of NUMEC. "It appears that if subject [Shapiro] can raise a million dollars or so within the

next few years, he would not hesitate to move to Israel and establish some business in that country.”

The report ended with the fact that in November a confidential source provided his FBI contact with a four-page document describing the packaging of food irradiators manufactured by NUMEC. The source advised that “it would have been a simple matter of placing large quantities of [HEU] in these food irradiator units and shipping them to Israel with no questions asked.”

Document 14 FBI Airtel, Pittsburgh SAC to FBI Director, “Dr. Zalman Mordecai Shapiro: IS—Israel, Atomic Energy Act,” January 24, 1969, labeled SECRET before redaction and release.

Source: FBI File No. 117-2564, document 270, released in less redacted form on September 28, 2009 per FOIPA No. 1091168-000.

The FBI’s Pittsburgh office wrote to FBI Director Hoover about interviewing Zalman Shapiro. The SAC described Shapiro’s connections with Israeli intelligence officers and others. The SAC went on to say, “Concerning the question of subject having diverted U-235 to Israel, that has not been resolved. The relatively few individuals interviewed in this matter, including former employees, revealed their suspicions of subject’s activities, but produced no concrete information of value in this regard.” The SAC noted the Israeli technical intelligence network being run in the U.S. by Avraham Hermoni and opined there were probably others. He noted that Shapiro and others involved in the NUMEC case are very active and highly regarded in various Jewish organizations, “which exert some influence in this country.” He also noted Shapiro, “has expressed no allegiance to the United States but has stated he would fight for Israel and is believed to be seriously contemplating migrating to Israel within the next several years.... An interview would alert subject’s associates to this Bureau’s interest in their activities and could cause them to be more clandestine in their actions.”

Document 15 Letter from John Edgar Hoover (FBI Director), to William T. Riley (Director of AEC Security Division), “[Redacted] Atomic Energy Act,” February 18, 1969, labeled CONFIDENTIAL and SECRET before redaction and release.

Source: FBI FOIA File No. 117-2564, documents 304 and 305, the former released in less redacted form on September 28, 2009 per FOIPA No. 1091168-000.

Hoover transmitted a summary report to AEC’s director of security by letter, stating, “This report summarizes the results of our investigation concerning Shapiro. Our investigation is substantially completed You are requested to advise as

expeditiously as possible what action will be taken by the AEC with respect to the current security clearances of Shapiro and the classified contracts held by the Nuclear Materials and Equipment Corporation." The 56-page report recounted Shapiro's education and employment through 1968. It included summaries of FBI interviews with NUMEC employees, several of whom said they could not explain the missing uranium. The report contained the names, expertise and affiliations of ten men who met on November 3, 1968, with Avraham Hermoni in Shapiro's home. All but three of the names remained redacted in FBI's response to the 2009 FOIA request. The report reviewed other salient information from the wiretaps on Shapiro's home phone, including Shapiro's potential opportunity to take over Allied Chemical Company's stalled construction project in Israel. The wiretaps also disclosed Shapiro's interest in speaking to Moshe Dayan to discuss image intensifier tubes, used in night vision devices whose technology was in a state of change at that time. The wiretaps captured Shapiro's November 8, 1968, statement "that he is of more value to Israel if he continues to reside in the United States where Israel's problems can be more readily resolved."

Document 16 AEC Letter from William T. Riley, Director, Division of Security, to the Honorable J. Edgar Hoover, Director, FBI, August 28, 1969, labeled CONFIDENTIAL and SECRET before redaction and release.

Sources: FBI FOIA File No. 117-2564, document 446, released in less redacted form by FBI on September 28, 2009 per FOIPA No. 1091168-000. An even less redacted form of the interview summary was provided by a December 15, 1989 FOIA response from CIA to the Natural Resources Defense Council (CIA Reference No. F87-1446). It contained an August 28, 1969 letter from AEC Assistant General Manager Howard Brown to DCI Richard Helms, transmitting the Shapiro interview summary.

The two transmittal letters are provided here, along with the CIA's copy of the interview summary. The AEC conducted the "Informal Interview" of Zalman Shapiro on August 14, 1969. The nine-page summary had a two-page attachment describing a follow-up interview by telephone on August 26. The follow-up interview was "in specific reference to the information he had provided ... concerning the circumstances of his meeting at the Pittsburgh airport on June 20, 1969, with Jeruham Kafkafi." The summaries provide an accounting by Shapiro of his interaction with Avraham Hermoni, scientific counselor of the Israeli embassy, and "a number of U.S. technical and scientific personnel" in the November 3, 1968, meeting arranged by "a scientist from the University of Cornell." Shapiro said the "general tone of the meeting

concerned ways and means the group could be of assistance to Israel in solving some of its technical problems." Shapiro said he met Jeruham Kafkafi, a subordinate of Hermoni, "about a half dozen times." The interviewers reported that Shapiro was "calm throughout the entire interview except when pressed for the details of his meeting with Kafkafi on June 20 at the Pittsburgh airport."

Document 17 Letter from J. Edgar Hoover, Director, FBI, to Honorable Richard Helms, Director, CIA, September 3, 1969, labeled SECRET before redaction and release.

Source: ISCAP Appeal No. 2013-062, Document No. 2, March 18, 2014.

Hoover wrote to Helms to summarize the Bureau's efforts to investigate Shapiro's activities. Hoover said, "We have developed information clearly pointing to Shapiro's pronounced Israeli sympathies [one and a half lines redacted]. It is believed most unlikely that further investigation will develop any stronger facts in connection with the subject's association [half line redacted]. The basis of the security risk posed by the subject lies in his continuing access to sensitive information and material and it is believed that the only effective way to counter this risk would be to preclude Shapiro from such access, specifically by terminating his classified contracts and lifting his security clearances. However, after careful consideration, including an interview with Shapiro, AEC has advised that it plans no further action at this time. Under these circumstances, we are discontinuing our active investigation of the subject."

Document 18 "Possible Diversion of Weapons Grade Nuclear Materials to Israel by Officials of the Nuclear Materials and Equipment Corporation (NUMEC)." CIA Memorandum for the Record, author not identified but probably John Hadden, former CIA Station Chief in Tel Aviv, March 9, 1972, classified SECRET/SENSITIVE before redaction and release.

Source: CIA FOIA Response, Reference No. F-2010-01210 | 1:15-cv-00224, August 31, 2015.

Carl Duckett told DCI George H. W. Bush on March 11, 1976, that this 1972 memorandum "was written by [redacted] who originated CIA action on this case [John Hadden] and who is available to answer any further questions you may have." By 1976, Hadden had retired from CIA and was living in Maine. He had strong convictions on the NUMEC matter as evidenced by documents described below, including subsequent presentations he made to DOE and congressional committees. This memorandum began with a summary of how Congress and the AEC allowed special nuclear material first to be leased and then owned by companies in the private sector.

It then summarized the formation and financing of NUMEC, including the role of David Lowenthal. The memorandum summarized the inventory difference that AEC discovered at NUMEC in 1965. It then listed "[eleven] facts developed to date pertinent to such a possible diversion." The document's author opined that NUMEC might have been conceived as an alternative method for producing Israel's atom bomb from its inception or it might have become a necessity later, "when the existence of the reactor at Dimona was discovered." The memorandum concluded, "On the basis of the foregoing it must be assumed for the purpose of U.S. national security that diversion of special nuclear materials to Israel by Dr. Shapiro and his associates is a distinct possibility." In its eleventh fact, the memorandum noted that in 1971 Shapiro took an uncleared position with Westinghouse in its breeder reactor program.

Document 19 "Nuclear Materials and Equipment Corporation (NUMEC)," Memorandum for Director of Central Intelligence, from Carl E. Duckett, Deputy Director for Science and Technology, March 11, 1976, classified SECRET SENSITIVE before redaction and. Release

Source: CIA FOIA Response, Reference No. F-2010-01210 | 1:15-cv-00224, August 31, 2015.

Carl Duckett, perhaps sensing his days at the Agency were limited, wrote this memorandum to DCI George H. W. Bush to summarize the NUMEC case. He attached a Memorandum for the Record dated March 9, 1972, entitled "Possible Diversion of Weapons Grade Nuclear Materials to Israel by Officials of the Nuclear Materials and Equipment Corporation (NUMEC)." (See above.) Duckett recalled that former DCI Helms brought the intelligence aspects of the case to the attention of presidents Johnson and Nixon, Attorney General Clark, secretaries of state Rusk and Rogers, the Joint Committee on Atomic Energy, and Henry Kissinger, among others. Duckett went on to provide Bush a chronology of CIA's efforts "to persuade the FBI to undertake an investigation of Shapiro and NUMEC and to keep track of its activities in this regard." The list began with the April 2, 1968, letter from Helms to Clark described above. There were six entries in the list showing that Helms and Hoover did not agree on the course of the FBI investigation. The last item that CIA had received from FBI at that time (1976) was a report that Zalman Shapiro requested to be brought up to date on a sensitive project two weeks after joining Kawecky Berylco in July 1971 before he went to work for Westinghouse later that year.

Document 20 "Possible Violation of Criminal Statutes," memorandum from Attorney General Edward H. Levi to President Gerald Ford, April 22, 1976, attachment labeled SECRET before redaction and release

Source: Gerald R. Ford Library.

Document 21 "Dr. Zalman Mordecai Shapiro, Atomic Energy Act," memorandum from Director, FBI, to The Attorney General, April 22, 1976, labeled SECRET before redaction and release.

Source: FBI FOIA File No. 117-2564, document 520, released in less redacted form on September 28, 2009 per FOIPA No. 1091168-000.

The memorandum from Levi to Ford had a four-page attachment bearing the same date. The last two pages of the attachment were almost entirely redacted when released by the Ford library. However, FBI Director Clarence Kelley provided that same attachment to Levi by separate memorandum on the same day. Kelley's memorandum and attachment are provided here because they contain fewer redactions than the version attached to the memorandum from Levi to Ford. In his memorandum, Levi told Ford, "The FBI did not conduct an investigation ... [so] the Department of Justice cannot state that there is no evidence which would support a criminal charge. The facts available with respect to this matter indicate that the following criminal statutes may be involved" Levi then listed ten possible violations of the Atomic Energy Act and criminal statutes. Two of them suggest the Justice Department's concern that enriched uranium was unlawfully removed from the NUMEC facility. The last three crimes listed were accessory after the fact, misprision of felony (concealing knowledge, usually by a government official, of a felony committed by another person) and conspiracy. When read in context, these possible crimes appear to refer to someone in the federal government.

Levi's April 22 letter to Ford attached Kelley's four-page summary of FBI's two previous investigations of Shapiro and NUMEC. It said that between the first and second investigations the Bureau learned of the missing uranium at NUMEC and decided not to intervene "under the circumstances presented by AEC." The information surrounding the advent of the second FBI investigation in 1968 was completely redacted from Kelley's summary. The substantial investment in NUMEC by David Lowenthal's company is mentioned at the end of the summary, as is Shapiro's being "active in fund raising and bond drives and ... a heavy contributor on behalf of Israel in the United States."

Document 22 "The NUMEC Case and ERDA's Paper," Memorandum for Deputy Director for Central Intelligence [Enno Knoche] from Theodore G. Shackley, CIA Associate Deputy Director for Operations, April 14, 1977, with attached routing

slip from CIA General Counsel Anthony A. Lapham, April 15, 1977, labeled SECRET/SENSITIVE before redaction and release.

Source: CIA FOIA Release, Reference No. F-2010-01210 | 1:15-cv-00224, August 31, 2015.

Shackley advised Knoche not to attend a meeting on NUMEC that was scheduled for the next day with the National Security Council staff because "a good possibility exists that sources and methods, as well as contradictory intelligence assessments, could become an issue The ERDA meeting with Dr. Brzezinski may be concerned with an issue of domestic law enforcement in which CIA has no authority or responsibility." Shackley recommended that CIA brief the NSC staff in private at a later date. He went on to summarize CIA's evidence on the matter, all of which was redacted by CIA when the document was released. Shackley attached to his memo a "talking points paper and a chronology [line redacted] for use by the DDCI should this option [briefing NSC separately] be selected." The talking points paper and chronology were six pages long and were mostly redacted when released by CIA. An unredacted statement read, "To provide all of our information to ERDA would release information that has been considered extremely sensitive up till now." Contrary to Shackley's advice, Knoche went to the meeting.

On April 15, Anthony A. Lapham, CIA's General Counsel, on a routing slip to Shackley, questioned "the decision not to discuss our intelligence information with the FBI or ERDA. As I understand it, the investigations of NUMEC are related to the possibility that nuclear material may have been diverted, and apparently at least ERDA has concluded there is no evidence of diversion. However, that conclusion is difficult to square with our intelligence information, and while one can argue about the probative value of that information from an investigative or legal standpoint, I doubt we are in a position to say that it has no value"

Document 23 "Briefing of the FBI on NUMEC Related Nuclear Diversion Information," Memorandum for Deputy Director of Central Intelligence from Theodore G. Shackley, Associate Deputy Director for Operations, May 11, 1977, labeled SECRET SENSITIVE before redaction and release.

Source: CIA FOIA Reference No. F-2010-01210 | 1:15-cv-00224, August 31, 2015.

On May 9, 1977, two FBI agents visited Shackley in his Langley office. One supervised the FBI's Criminal Investigation Division in charge of the ongoing NUMEC investigation. Shackley briefed them with a talking paper based on "a recent review of our files." He did not give them a copy of the paper. The agents said they had come up

with no hard evidence of a diversion and the material Shackley provided was not new to them. The talking paper was attached to the memorandum describing the meeting. The CIA redacted about two-thirds of the talking paper before its release, but left in the paragraph in which Shackley said CIA had not provided all the details of its knowledge of NUMEC to the FBI.

Document 24 FBI Memorandum, Washington Field Office, "Zalman Mordecai Shapiro, Atomic Energy Act: Obstruction of Justice" [redacted], July 21, 1977, labeled SECRET and CONFIDENTIAL before redaction and release.

Source: FBI FOIA File No. 117-2564, document 624, released in less redacted form on September 28, 2009 per FOIPA No. 1091168-000.

On June 27, 1977, two special agents of the FBI interviewed Zalman Shapiro in Pittsburgh. They spent the first hour of the interview discussing a "Waiver of Rights" that the agents asked him to sign. Shapiro said, to his knowledge "there was never any diversion of enriched uranium from the NUMEC facility and he termed the chances of any individual or group of individuals successfully diverting such material as miniscule. He denied emphatically that he was in any way connected with or responsible for any diversion." Shapiro also said, "At no time was [he] aware of being in contact with foreign intelligence officers or organizations." The special agents did not challenge his assertion, apparently unaware of the background or even the names of Hillel Aldag, Avraham Bendor, Ephraim Biegun, Binyamin Blumberg, Rafi Eitan, Joseph Eyal, Avraham Eylonie, Avraham Hermoni, and Jeruham Kafkafi, all prior contacts of Shapiro and all Israeli officials with intelligence credentials.[13]

Document 25 "Israel and MUF," National Security Council Memorandum from John Marcum to Jessica Tuchman, July 28, 1977, labeled TOP SECRET SENSITIVE before redaction and release.

Source: ISCAP Appeal No. 2012-167, document #3, March 18, 2014.

NSC staffer Marcum told fellow NSC staffer Tuchman that Ted Shackley had called on a secure line and "provided responses to our inquiries of yesterday [about NUMEC]." The next page and a half of the memorandum documenting what Shackley told Marcum were redacted by ISCAP when the document was released. In the last half page of the letter, Marcum went on to say, "At this point, despite the FBI clean bill of health, I do not think the President [Carter] has plausible deniability. The CIA case is persuasive, though not conclusive."

Document 26 CIA briefing of ERDA officials on July 29, 1977, as recorded in DOE internal memorandum of April 27, 1979, from DOE Deputy Inspector General to

Under Secretary with attachments entitled "August 8, 1977 NUMEC-Related Congressional Hearing," labeled SECRET before redaction and release.

Sources: Cover letter released per DOE FOIA File No. 2007-000554 and attachments available at University of Arizona, Special Collections Library, Papers of Morris Udall, MS 325, Box 365 Folder 1.

This April 27, 1979, document contains summaries of interviews conducted by the Inspector General's office of DOE. The interviews concerned a briefing that Theodore Shackley provided on July 29, 1977, to ERDA's acting administrator, Robert Fri, who was accompanied by generals Edward Giller and Alfred Starbird. The inspector general was investigating whether these men had lied to Congressman John Dingell's committee when they testified on August 8, 1977. Although DOE, ERDA's successor agency, redacted much of Giller, Starbird and Fri's recollections of the briefing, Giller's comments do mention some things not addressed in redacted summaries of other briefings Shackley conducted in summer 1977. For example, Giller "emphasized his belief that, even with careful analysis, the possibility of poor information, stemming from HUMINT [human intelligence] sources, still remains." He went on to say, apparently in reference to something Shackley had said about the discovery of HEU in Israel, "the U.S. government has made authorized shipments of high-enriched SNM to Israel in the past, which were intended for the Israeli reactor program." Such shipments involved the Nahal Soreq research reactor which used 93 percent HEU fuel, not the 97.7 percent HEU found by CIA in the environment near Dimona, 100 kilometers away from Nahal Soreq.

A January 28, 1979 article in the *Washington Star* newspaper reported what Shackley told the three ERDA representatives on July 29, 1977. [14] The article predates the DOE report of April 27, 1979, suggesting that the sources for the article were internal to the DOE. "According to government sources, a retired Air Force General, Alfred Starbird, recently told investigators that a CIA official told him that the CIA had obtained a sample of highly enriched uranium from Israel and that it bore the chemical 'signature' of material that had originated at the U.S. uranium enrichment plant at Portsmouth, Ohio. If the information is true, this would amount to scientific proof of the first known diversion of the nation's most heavily guarded nuclear material by persons acting as foreign agents."

Document 27 "Nuclear MUF," Memorandum for the President from Zbigniew Brzezinski, August 2, 1977.

Source: ISCAP Appeal No. 2012-167, document number 4, March 18, 2014.

National Security Advisor Brzezinski wrote this memorandum to President Carter saying he had been briefed by ERDA, FBI and CIA and summarizing the "essential conclusions" about NUMEC.

Brzezinski took at face value ERDA's claim that the AEC had investigated the NUMEC affair. He also passed off the FBI's findings as amounting to no more than confirmation that Zalman Shapiro had frequent contacts with Israeli officials, including a science attaché "thought to be an intelligence officer." Brzezinski told Carter the FBI had just concluded its latest investigation and "was unable to uncover any evidence of theft, although the interviews included many current and former NUMEC employees." In fact, the FBI investigation continued for two more years, and interviews of former NUMEC employees revealed suspicious circumstances concerning NUMEC's shipments to Israel in the mid-1960s. Brzezinski opined, "While a diversion might have occurred, there is no evidence—despite an intensive search for some—to prove that one did. For every piece of evidence that implies one conclusion, there is another piece that argues the opposite. One is pretty much left with making a personal judgment—based on instinct—as to whether the diversion did or did not occur."

Brzezinski went on to say, "So far as we know however, (and we have made serious efforts to discover it) there is nothing to indicate CIA participation in the alleged theft." There were rumors in Congress of possible involvement by government officials in the act itself or its coverup as evidenced by the questions asked during Shackley's briefings of various congressmen in 1977. At the end of the memorandum, Brzezinski wrote, "We face tough sledding in the next few weeks (particularly in view of Cy's [Secretary of State Cyrus Vance's] Mid-East trip) in trying to keep attention focused on ERDA's technical arguments and, if necessary, on the FBI investigations, and away from the CIA's information."

Document 28 "The NUMEC Case - Discussion with Staff Members of the House Energy Committee and Mr. Carl Duckett, Retired CIA Employee," CIA Memorandum for the Record, Theodore G. Shackley, August 3, 1977, labeled SECRET SENSITIVE before redaction and release.

Source: CIA FOIA Reference No. F-2010-01210 | 1:15-cv-00224.

On August 2, 1977, Theodore Shackley, Carl Duckett (by then retired from CIA) and a representative of CIA's Office of Legislative Counsel briefed staffers of the Subcommittee on Energy and Power of the House Committee on Interstate and Foreign Commerce, at the request of Congressman Dingell. Shackley pointed out that he was neither a scientist nor a first-hand participant in the events that unfolded from

1968 to 1977 relative to the NUMEC case. He merely provided "supervision to the people who were conducting research on the Agency's involvement in the NUMEC case."

The discussion centered on Duckett's recollections. Duckett said "CIA had been concerned about the nuclear weapons proliferation issue for a number of years (six lines redacted). As a result, CIA began to look at information which was available to it concerning possible diversion of uranium materials from NUMEC." Reading between the lines, it seems likely the Agency gathered some intelligence in Israel that there was enriched uranium in the Israeli weapons program that could not have been produced there. Hence, the Agency went looking for other sources and focused on NUMEC.

Shackley confirmed that Helms wrote to the attorney general in 1968 requesting an investigation because of the possibility that a diversion from NUMEC had taken place. Duckett told the staffers "he could say with certainty that CIA, as an institution, had not been involved in any kind of nuclear materials diversion operation."

Shackley said he did not know if an FBI investigation of the NUMEC case was currently underway. Why he would not know is a mystery. In response to questions about who would have first-hand knowledge of past investigations of the NUMEC case, Duckett referred the Congressional staffers to George Murphy of the Joint Committee staff and Richard Kennedy, who was then an NRC commissioner and had been a member of the National Security Council staff. Shackley stressed throughout the briefing that the CIA "did not have any facts which would stand up in court which could be used to conclusively prove that there was linkage between the alleged NUMEC diversion (six lines redacted)."

Document 29 "Briefing of Senator John Glenn Democrat, Ohio, on the NUMEC Case," CIA Memorandum for the Record, Theodore G. Shackley, Associate Deputy Director for Operations, August 6, 1977, labeled **SECRET SENSITIVE** before redaction and release.

Document 30 "Briefing of Congressman Mike McCormack, Democrat, Washington, on the NUMEC Case," CIA Memorandum for the Record, Theodore G. Shackley, Associate Deputy Director for Operations, August 6, 1977, labeled **SECRET SENSITIVE** before redaction and release.

Source: Both documents come from CIA FOIA Reference No. F-2010-01210|1:15-cv-00224.

Shackley provided briefings for Senator John Glenn (D-OH) and Representative C. G. Mike McCormack (D-WA). Leonard Weiss of Senator Glenn's staff attended the Glenn

briefing. The cover memoranda did not get into the details of Shackley's two briefings. There were lengthy question-and-answer exchanges with Glenn and fewer exchanges with McCormack. Some of the exchanges were redacted completely when CIA released the memoranda. However, it is clear that Glenn and McCormack were interested in the involvement of the presidents who had knowledge of the case, i.e., Johnson, Nixon, Ford and Carter. Shackley and his colleague told Glenn they had not seen any single document "which would lead to a flat conclusion that a diversion had occurred" Glenn asked if there were "bad connections between FBI and CIA on NUMEC." Shackley stressed that the two agencies took different approaches to the basic question. "CIA was trying to obtain information which would clarify an intelligence estimate. On the other hand, the FBI was looking for material that could be used in a criminal case." In response to another question, Shackley denied there was any U.S. government involvement in the diversion.

Shackley's summary of the McCormack briefing was much shorter. McCormack asked what he stressed was a hypothetical question, "If President Johnson had directed that a diversion of nuclear materials occur, would the CIA have known it?" Shackley responded, "This is a question that should be put to those who were direct participants in the events of the time. In short, this would be the type of question that Mr. Helms or Mr. Duckett could best comment on." Shackley gave a similar answer to another question by McCormack, "Suppose CIA Director Helms and FBI Director Hoover had stumbled on information suggesting a possible diversion authorized at the highest level of the U.S. Government? What then?"

Document 31 "Briefing of Representative Morris K. Udall, Democrat, Arizona, on the NUMEC Case," CIA Memorandum for the Record, Theodore G. Shackley, Associate Deputy Director for Operations, August 26, 1977, labeled SECRET SENSITIVE before redaction and release.

Source: CIA FOIA Reference No. F-2010-01210 | 1:15-cv-00224.

Shackley and two other CIA staffers briefed Congressman Udall and his committee staffer, Dr. Henry Myers. The briefing apparently followed the same outline as the August 5 briefings of Senator Glenn and Congressman McCormack. There were interesting similarities and some differences in Udall and Myers' questions compared to earlier briefings. When asked whether FBI had interviewed Zalman Shapiro, Shackley said the "Agency has no knowledge of any direct debriefing of Mr. Shapiro by the FBI." Asked if President Johnson, "who was known to be a friend of Israel, could have encouraged the flow of nuclear materials to the Israelis," Shackley responded: "There is no information in the CIA files which are currently available to us which

would indicate that President Johnson had ever undertaken any action which would have resulted in a diversion of nuclear materials to Israel." The CIA redacted nearly two pages of the answer to the question of how one would go about diverting material from NUMEC to Israel. In another answer, Shackley "stressed that CIA had never obtained any hard intelligence (half line redacted) which clearly linked NUMEC to the subsequent production of uranium-based nuclear weapons by Israel." Perhaps that redaction concerns the HEU that CIA found in the environment near Dimona, which Shackley described to the ERDA officials on July 29.

Document 32 "Amendments to the Freedom of Information Act," CIA Internal Memorandum for George Cary OLC, from Herbert E. Hetu, Assistant for Public Affairs, January 16, 1978, labeled before redaction and release.

Source: CIA CREST Database, March 24, 2005, CIA-RDP81M00980R0002002-0038-7

This document was among a group of internal memoranda that gathered CIA staff support for the Agency's request for relief from the Freedom of Information Act. It was written at the time that NUMEC was a priority concern for two committees of the U.S. House of Representatives. It read in part, "In addition to the concerns raised by the Director in the referenced memorandum, I believe the Agency's image has suffered unnecessary damage and the public has been misled because of the FOIA requirement to release bits and pieces of information. Three good examples are: MKULTRA ... Glomar ... [and] Israeli firing on the Liberty ... The Berlin Tunnel operation, NUMEC and the Kennedy assassination are just three FOIA requests and appeals that have potential for similar damage."

Document 33 "Meeting with the NRC," CIA Memorandum for the Record, February 3, 1978, probably written by ADDO Shackley, with attachments, labeled SECRET before redaction and release.

Source: CIA FOIA Reference No. F-2010-01210 | 1:15-cv-00224.

Shackley briefed officials of the NRC on CIA's "role and position relating to the NUMEC case." The briefing occurred in two settings, so there were never more than two commissioners in attendance to avoid a requirement for a recording of the meeting pursuant to the Government in Sunshine Act. The NRC attendees were given the opportunity to read a Talking Paper that summarized the CIA information. The four-page Talking Paper was completely redacted when released by the CIA. The summary of the meeting included the CIA statement, "We agreed with [NRC Commissioner Kennedy's] assessment, confirmed that there was no legal evidence of diversion from NUMEC. (One and a half lines redacted) which prompted CIA interest in the nuclear

material missing from NUMEC ... Mr. Hendrie concluded, as a result of this discussion, that the time frame of the MUF [inventory difference]—mid '60's—was compatible with the time phasing expressed in the Talking Paper.” In response to an NRC question about evidence of a diversion, the CIA said, "... there is no hard evidence, but a series of events and facts led to our intelligence conclusion that a diversion was a likely possibility."

In addition to the Talking Paper, the CIA also released an outline of the February 2 NRC briefing. One entry in the outline read: "Process of deductive reasoning to find out how uranium obtained." This entry was followed by the subheadings: "Results of Deductive Analysis, NUMEC, Shapiro, Centrifuge, (redacted)." The outline summarized the "Key Issues" with the following subheadings: "No Investigation of NUMEC by CIA, No Diversion by CIA, and No Hard Evidence."

Document 34 "Inquiry into the Testimony of the Executive Director for Operations," Volume I Summary Report, NRC Offices of General Counsel and Inspector and Auditor, February 1978, labeled SECRET before redaction and release.

Document 35 "Inquiry into the Testimony of the Executive Director for Operations," Volume III Interviews, NRC Offices of General Counsel and Inspector and Auditor, February 1978, labeled SECRET before redaction and release.

Source: ISCAP APPEAL NO. 2012-004, documents 1 & 2, March 18, 2014.

These two volumes of the report describe a series of interviews by NRC's Office of General Council (OGC) and Office of Inspector and Auditor (OIA) of people connected to the testimony of NRC's executive director for operations, General Lee Gossick, before the Udall and Dingell committees of the House of Representatives in summer 1977. The second volume of the report contained documents referenced by the interviewees and answers to congressional staff questions. It is not provided here. The issue that prompted the inquiry was whether Gossick lied to Congress in saying there was no evidence of a diversion from Apollo. Central to this question was what Carl Duckett, CIA deputy director for science and technology, had told the NRC representatives in February 1976 about evidence CIA had garnered about such a diversion. The OGC/OIA people interviewed Duckett and recorded what he said he had told the NRC people. His recollections are found at pages 176 to 179 of Volume III of this report. ISCAP redacted some of the material in the section of the report where Duckett recounted CIA's evidence surrounding the NUMEC affair.

Document 36 “Record of Interview with Bill Knauf and Jim Anderson, Department of Energy, Division of Inspection,” Glenn T. Seaborg, June 21, 1978.

Source: Glenn T. Seaborg Papers, Library of Congress.

Dr. Seaborg kept daily records of his business activities. He created this memo the same day that he met with the two inspectors from DOE. He said their purpose was "to interview me on the allegation that Zalman Shapiro ... diverted large amounts of highly enriched Uranium-235 to Israel in the 1960's." They questioned him on the degree of surveillance by the AEC of NUMEC and the dispute the commissioners had with Attorney General John Mitchell over denying Shapiro an upgraded clearance without "granting him due process." The inspectors had already met with former AEC Commissioner James Ramey to discuss how he found a job at Westinghouse for Shapiro "rendering the question of clearance upgrade as moot." They asked Seaborg about his discussions with DCI Helms concerning NUMEC. Seaborg "asked them if any responsible persons feel that Shapiro actually diverted material to Israel. They replied that nobody with a scientific background believes this but that it is difficult to convince some members of congress. They said that some enriched Uranium-235 which can be identified as coming from the Portsmouth, Ohio plant has been picked up in Israel which, of course, has excited some members of Congress. However, such enriched material has been sold on an official basis to Israel and this could be the source of the clandestine sample." It is unclear from context whether the inspectors or Seaborg uttered the last sentence in the foregoing quote. However, it is certain from AEC/DOE records[15] that Portsmouth was the only source of 97.7 percent enriched uranium, that such uranium went entirely to U.S. naval reactor fuel, that NUMEC processed such uranium for naval reactor fuel, and that the only authorized HEU in Israel was for fuel for the research reactor at Nahal Soreq, which was 93 percent enriched.[16]

Document 37 “Notes of Washington Trips,” Papers of John L. Hadden, Briefings of DOE Inspector General and staff of Dingell and Udall committees, beginning in September 1978.

Source: Personal papers of John Hadden, Jr.

An envelope with the lettering “Washington Trip” in John Hadden's hand was included in his personal papers after his death. The envelope contained a September 1, 1978, invitation from the DOE inspector general asking him to come to the Germantown, Maryland, office of DOE. He wanted Hadden “to meet with representatives of my office to discuss freely and in complete detail your knowledge of matters relating to ... Israel’s nuclear power capability” The envelope also included a September 1, 1978,

letter from DCI Stansfield Turner stating, "The scope of the Inspector General's inquiry may encompass information which you have pledged not to reveal pursuant to the terms of the secrecy agreement which you executed when you entered on duty with the Central Intelligence Agency. You are hereby released from the terms of that secrecy agreement, for the purpose of the Inspector General's inquiry, within the limitations set out below" The envelope included handwritten notes on five sheets of yellow legal paper. The notes apparently were an outline of what Hadden told congressional investigators and the DOE inspector general. Hadden's notes outline the basis for his conclusion that NUMEC was part of a broader Israeli-American conspiracy to support the Israeli nuclear weapons program.

Document 38 "Nuclear Diversion in the U.S.? 13 Years of Contradiction and Confusion," Report by the Comptroller General of the United States, December 18, 1978, labeled SECRET before redaction and release.

Source: ISCAP Appeal No. 2013-078, document #1, March 18, 2014.

In 2010 the government released the December 18, 1978, GAO report and related correspondence in response to a FOIA request. There were multi-page redactions in the report encompassing almost every paragraph that referred to the CIA, even though the report was then 32 years old. On March 18, 2014, ISCAP released a less redacted version of the GAO report in response to an appeal by Grant Smith of IRmep. The report shows that in 1978 GAO joined a growing chorus saying a diversion could not be ruled out and added that there were differing professional opinions on the matter within the CIA. A letter from Stansfield Turner that was attached to the report addressed the allegations of possible involvement by the CIA and the president.

Document 39 "Transcript of Proceedings: Hearing Held before Executive Session of Committee on Interior and Insular Affairs, Informal Meeting between Interior Committee Representatives and Dr. Zalman M. Shapiro," December 21, 1978.

Source: University of Arizona, Special Collections Library, Papers of Morris Udall.

On December 21, 1978, Zalman Shapiro finally had his chance to answer the charges made against him and set the record straight when Congressman Morris Udall (D-AZ) interviewed him at the Longworth House Office Building in Washington, DC. Three lawyers appeared on behalf of Shapiro from the Washington office of the Arnold & Porter law firm, a registered agent for the State of Israel.^[17] Hadrian Katz from Arnold & Porter told Senator Arlen Specter (D-PA) in 2009 that Shapiro was "our long-time pro bono client and friend." Udall dubbed the interview "an informal meeting." Shapiro was not under oath. However, he and his lawyers filed a thick brief before the

interview, a 116-page verbatim transcript was taken, written opening statements by Shapiro and Udall were appended, and Shapiro's attorneys submitted supplemental remarks and corrections of the transcript on January 16, 1979. Inconsistencies and errors in Shapiro's testimony were described by Mattson.[18]

Document 40 Interview of Charles A. Keller, Assistant Manager for Manufacturing and Support, Oak Ridge Operations Office, U.S. Department of Energy, "Atomic Energy Act; Obstruction of Justice," FBI report of [redacted], November 9, 1979, labeled TOP SECRET before redaction and release.

Source: FBI FOIA File No. 117-2564, no document number, p. 65-130.

Charles Keller of AEC's Oak Ridge Operations Office (OROO) led external oversight of uranium accounting at Apollo that led to the discovery that HEU was missing in unusual quantities. He then participated in AEC's independent inventory in late 1965 that established how much HEU was missing. Years later, Keller recounted his assessment of the situation in 1965 in an interview with the FBI. "His [Keller's] gut feeling is that NUMEC probably lost a major part of the material through mishandling and sloppy operations Mr. Keller felt that a great deal of collusion would have been required to remove 50 kilograms of enriched uranium. It would also be difficult to ship this amount of material to another company with forged documents because this would require collusion with someone in another plant, which would be even more difficult." The NRC staff later concluded it would have been relatively easy to remove the material from the Apollo plant.[19] After opining on peripheral matters, Keller summarized for the FBI his assessment of the NUMEC situation. "He said essentially the problem in a nutshell is that the material was not there that the books said should have been there but there is absolutely no way to say how or where it went. His opinion is that sloppy plant operations, lack of records, and improper sampling probably [were] the reason for the loss. He indicated, however, that if he [were] planning to steal nuclear material he would use exactly this kind of operation, i.e., sloppy handling and accounting procedures."

Document 41 FBI Internal Report of Interviews, "DIVERT," from SAC Pittsburgh to Director FBI and Criminal Investigative Division, Terrorism Section, March 25, 1980, labeled CONFIDENTIAL before redaction and release.

Source: FBI FOIA File No. 117-2564, document 728, released by FBI in less redacted form on September 28, 2009 per FOIPA No. 1091168-000.

The FBI interviewed an unnamed former B&W and NUMEC employee on March 21, 1980. The former employee had employment concerns with B&W at the time of the FBI

interview. It is not known why the FBI closed its consideration of his allegations. The essence of the observations the former employee reported to the FBI were as follows: "In late March or early April 1965 (exact date unknown) while working [at Apollo] on a swing shift ... he walked out to the loading dock for a breath of air He noticed a flatbed truck backed up to the loading dock with some strange equipment on it He advised he then noticed the NUMEC owner, Dr. Zalman Shapiro, pacing around the loading dock while (Shipping and Receiving Foreman) and (NUMEC truck driver) were loading "stove pipes" into the steel cabinet type equipment that he observed on the truck He stated that the "stove pipes" contained three or four canisters ... that normally are used to store high enriched uranium products, which he defined as 95 percent uranium citing his natural curiosity ... he proceeded to read the information contained on the shipping order. He said he noticed that the destination for the equipment on the truck was Israel, and that it was to be transported by ship After he had quickly read the information contained on the shipping order, (redacted) grabbed the clipboard away from him, telling him in words to the effect that the material contained in the shipping order was confidential and not for his eyes Shortly thereafter, an armed guard ordered him off the loading dock He advised he had not come forward before because he had a large family to support and the day following the incident, the plant Personnel Manager (name unrecalled) of NUMEC threatened to fire him if he "did not keep his mouth shut" concerning what he had seen on the loading dock the night before. He further advised he mentioned the threat he received from the Personnel Manager to his union steward, whereupon he claims he was visited by 'some union goons' from Kittanning, Pa., and again told to keep his mouth shut."

Document 42 NRC Letter, from Robert F. Burnett, Director Division of Safeguards, NRC, to (Redacted), Federal Bureau of Investigation, May 19, 1982, unclassified.

Source: FBI FOIA File No. 117-2564, document 759.

One of the last documents in the FBI files on NUMEC is a May 19, 1982, letter from the NRC to the FBI transmitting a summation of the uranium found during the decommissioning of Apollo. The attachment says that processing of highly enriched uranium by NUMEC at Apollo began in 1957 and ceased in 1978 and that the cumulative inventory difference for the operating period from 1957 to 1978 was 463 kilograms of U-235. It concludes, "The total amount of material accounted for [recovered] to date as a result of the decommissioning effort is 95 kilograms U-235 Additionally, licensee measurements indicate that approximately 31 kilograms of U-235 are held up in the walls and floors. The resulting total cumulative ID [inventory

difference] for the period from 1957 to present is 368 kilograms U-235.” That is, NRC told FBI to expect that 337 kilograms (368 minus 31) of U-235 would remain missing from the uranium plant at Apollo when B&W completed the decommissioning. The estimate that the NRC provided to the FBI was in close agreement with the aforementioned 2001 DOE report (declassified in 2006), which reported the cumulative HEU inventory difference at Apollo as 269 kilograms of U-235 through 1968 and 76 kilograms thereafter, for a total cumulative inventory difference over the life of the plant of 345 kilograms.

NOTES

[1] *Stealing the Atom Bomb: How Denial and Deception Armed Israel*, Roger J. Mattson, 2016. *Divert: NUMEC, Zalman Shapiro and the Diversion of U.S. Weapons Grade Uranium into the Israeli Nuclear Weapons Program*, Grant F. Smith, Institute for Research: Middle Eastern Policy, Inc., 2012. “Revisiting the NUMEC Affair,” Victor Gilinsky and Roger J. Mattson, *Bulletin of the Atomic Scientists*, March/April 2010. “Did Israel steal bomb-grade uranium from the United States?” Victor Gilinsky and Roger J. Mattson, *Bulletin of the Atomic Scientists*, April 17, 2014.

[2] <http://www.post-gazette.com/news/obituaries/2006/03/10/Obituary-David-Lowenthal-Innovative-industrialist-who-helped-Jews-settle-in-Israel/stories/200603100223>

[3] Former AEC Chairman Glenn T. Seaborg described the NUMEC affair in three of his books. He generally defended Shapiro and said there were alternative explanations for the HEU that went missing from Apollo. See Seaborg, Glenn T. with Loeb, Benjamin S., *Stemming the Tide: Arms Control in the Johnson Years*, Lexington Books, 1987; Seaborg, Glenn T. with Loeb, Benjamin S., *The Atomic Energy Commission under Nixon: Adjusting to Troubled Times*, St. Martin's Press, New York, 1993; and Seaborg, Glenn T. and Seaborg, Eric, *Adventures in the Atomic Age: From Watts to Washington*, Farrar, Straus and Giroux, New York, 2001.

[4] *Stealing the Atom Bomb: How Denial and Deception Armed Israel*, Roger J. Mattson, p. 155, 167.

[5] Those claims are being put to the test by ongoing appeals of FOIA denials, Mandatory Declassification Reviews and at least one lawsuit against the CIA that seeks

operational files underlying its summary reports on NUMEC.

[6] *The Sampson Option: Israel's Nuclear Arsenal and American Foreign Policy*, Seymour M. Hersh, Random House, NY, 1991, p. 255.

[7] "Highly Enriched Uranium: Striking a Balance, A Historical Report on the United States Highly Enriched Uranium Production, Acquisition and Utilization Activities from 1945 through September 30, 1996," U.S. Department of Energy, National Nuclear Security Administration, Revision 1, January 2001 (declassified and released in January 2006).

[8] *Dangerous Liaison: The Inside Story of the U.S.-Israeli Covert Relationship*, Andrew and Leslie Cockburn, HarperCollins, NY, 1991, p. 79. "CIA Tales of 'Lost' Uranium Seem to Conflict," John J. Fialka, *Washington Star*, January 28, 1979.

[9] "Scientist developed nuclear fuel for USS Nautilus." *TRIB LIVE*, Mary Ann Thomas, July 18, 2016. "Zalman Shapiro, scientist and supporter of Israel, passes away at 96," *The Jewish Chronicle*, Adam Reinherz, July 28, 2016.

[10] *Stealing the Atom Bomb: How Denial and Deception Armed Israel*, Roger J. Mattson, p. 55-56.

[11] LAKAM was an Israeli intelligence unit established in 1957 by Shimon Peres, then the director general of the Ministry of Defense. LAKAM is the Hebrew acronym for the Science Liaison Bureau. Its first director, who lasted in the job for 20 years, was a former Shin Bet operative named Binyamin Blumberg. The rationale for the creation of LAKAM was to provide technological intelligence to serve the nuclear project. Israeli intelligence officials have said that LAKAM's original reason for being was to collect scientific intelligence behind friendly lines in the West.

[12] *Stealing the Atom Bomb: How Denial and Deception Armed Israel*, Roger J. Mattson, 2016, p. 109-116.

[13] *Stealing the Atom Bomb: How Denial and Deception Armed Israel*, Roger J. Mattson, 2016, p. 188.

[14] "CIA Tales of 'Lost' Uranium Seem to Conflict," John J. Fialka, *Washington Star*, January 28, 1979.

[15] "Highly Enriched Uranium: Striking a Balance; A Historical Report of the United States Highly Enriched Uranium Production, Acquisition and Utilization Activities from 1945 through September 30, 1996," U.S. Department of Energy, Revision 1, January 2001 (declassified January 2006).

[16] *Stealing the Atom Bomb: How Denial and Deception Armed Israel*, Roger J. Mattson, 2016, p. 27, 40, 214.

[17] *Divert: NUMEC, Zalman Shapiro and the Diversion of U.S. Weapons Grade Uranium into the Israeli Nuclear Weapons Program*, Grant F. Smith, Institute for Research: Middle Eastern Policy, Inc., 2012. p. 204. "Supplemental Statement Pursuant to the Foreign Agents Registration Act of 1938, as amended," U.S. Department of Justice, Registrant: Arnold and Porter LLP, Foreign Principal: State of Israel, December 31, 2014.

[18] *Stealing the Atom Bomb: How Denial and Deception Armed Israel*, Roger J. Mattson, 2016 p. 217 ff.

[19] "A Safeguards Case Study of the Nuclear Materials and Equipment Corporation Uranium Processing Plant, Apollo, Pennsylvania," W. Altman, J. Hockert, and E. Quinn, U.S. Nuclear Regulatory Commission, NUREG-0627, January 1980.

March/April 2010, and a sequel in April 2014. Mattson is the author of a recent book, *Stealing the Atom Bomb: How Denial and Deception Armed Israel*.



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