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9 March 1972

MEMORANDUM FOR THE RECORD

SUBJECT: Possible Diversion of Weapons Grade Nuclear Materials to Israel by Officials of the Nuclear Materials and Equipment Corporation (NUMEC)

1. From 1947 until the Atomic Energy Act of 1954 all special nuclear material was owned by the United States Government and with certain exceptions was held by the AEC and its cost type contractors operating Government owned and/or controlled facilities. The Act of 1954 was designed to widen participation in the use of atomic energy. While the material was still owned by the U.S., it was more widely held by Government contractors and by licensees who were not Government contractors. Legislation in 1964 made private ownership of special nuclear material permissible. The 1954 Act authorized the AEC to regulate the use of these materials and to guard against loss or diversion. In setting up regulations to enforce the control of material, the Commission concluded that the physical protection and accountability controls which licensees as prudent businessmen would maintain over special nuclear material because of its intrinsic value and their responsibility for its loss or damage and the severe criminal penalties provided by AEC's governing legislation would adequately protect the national interest from the standpoint of unlawful diversion. In 1955 a policy was adopted along these lines by the AEC. In May 1966, the AEC concluded that a change toward tighter controls was in order and the Commission amended their regulations on 25 January 1967.

2. In 1957 Dr. Zalman Mordechai Shapiro left Westinghouse and established a firm called Nuclear Materials and Equipment Corporation (NUMEC) in Apollo, Pennsylvania. Instrumental in the financing of the new firm was a Pittsburgh industrialist named David L. Lowenthal, a long-time, close, personal friend of Shapiro.

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3. NUMEC owned and operated a uranium processing facility at Apollo, Pennsylvania. It first received material under lease arrangement in December 1957 and received its first material as an AEC contractor in December 1957. From the start up through 31 December 1966 NUMEC received 21,750 kg of U 235 and shipped 19, 865 kg U 235 reporting losses of about 260 kg or about 1.2% of total receipts. Starting about 1960 the AEC began a continuing, but in the opinion of the Comptroller General of the United States ineffective, campaign to get NUMEC to implement adequate control of the material in its plant. This matter came to a head in November 1965 when the AEC made a detailed survey to determine total losses since start up and to attempt to explain the "unexpectedly" high U 235 loss on the WANL contract (Westinghouse). The survey established the loss from 1957 until 31 October 1965 as 178 kg U 235. Of this total, 84.2 kg was estimated by the survey team to have been lost through known loss mechanisms (NOL) and the remaining amount of 93.8 kg was categorized as MUF. MUF is defined as usually the result of uncertainties in measurements, unknown losses and undetected errors in records. In 1964, a fire occurred in the vault containing nuclear materials at NUMEC, which effectively destroyed records of the input and output of material. The fire occurred during a strike when the plant was shut down. The AEC report on the November 1965 survey presented the view that while it could not be stated with certainty that diversion did not take place, the survey team found no evidence to support the possibility of diversion. The Comptroller General found that because of the condition of NUMEC's records, they were unable to state an opinion on the disposition of the MUF but had no reason to question the AEC conclusion with regard to diversion. The Comptroller had been asked to investigate this situation by an alarmed Joint Committee of the Congress on Atomic Energy on 7 September 1966. The Comptroller General's report to the Congress stated: "Notwithstanding extensive reviews of NUMEC's operations neither the AEC nor NUMEC have been able to identify with a high degree of certainty the specific causes of WANL material loss."

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4. During the period August 1958 to October 1965, NUMEC shipped some 425 kg of U-235 overseas to various parts of the world under some 28 different contracts. The AEC report states the following: "Quantities in individual shipments, domestic as well as foreign, are not confirmed independently by the AEC. Such actions have been outside the scope of the present AEC system of control of nuclear material. Instead, reliance has been placed on a technical review of the shipper's internal controls and independently developed receivers data. The validity of this approach is of course largely dependent on the integrity of the shipper and the receiver."

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[redacted]

6. 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. Such a diversion might be evolutionary or revolutionary. NUMEC was formed by Dr. Shapiro and his associates in 1957 [redacted]

7. On the other hand, it is possible that the idea of diversion didn't occur until much later when the existence of the reactor at Dimona was discovered [redacted]

8. [redacted]

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[redacted] It is interesting in this connection to quote from the AEC investigation of 1966 when the AEC team requested NUMEC production control and process engineering records on the WANL and other contracts: "All efforts in this direction were negated when it was learned that many of the requested records had been inadvertently destroyed by supervisory personnel during a 'clean-up' campaign at the time of an employee strike, January 1 to February 25, 1964." (This was in addition to the fire mentioned in paragraph 3 above.)

9. To the best of our knowledge, the strike which gave supervisory personnel free run of the facility pinpoints the time at which the material could have been most easily diverted to Israel and the time at which evidence of such a diversion could best be covered up. Given the state of affairs at NUMEC from 1957 on, a diversion could have occurred at any time, but the period January - February 1964 is certainly the most suspect. With regard to the material itself, it could have been shipped in less than critical lots of say twenty pounds per lot. Lead coated or nickel plated, it would present no radiation hazard and could have easily gone by diplomatic pouch or Israeli merchant ship or even El Al Airlines. Transportation of diverted material to Israel would have been a simple matter.

10. In September 1969 CIA was informed by the FBI that Shapiro had been interviewed by AEC officials on 14 August 1969. On the basis of information developed during the interview, particularly Shapiro's statement that he had never furnished classified information to unauthorized persons, the AEC has advised that it does not contemplate further action on this matter. The FBI informed CIA that while they had developed information clearly pointing to Shapiro's pronounced pro-Israeli sympathies and close contacts with Israeli officials [redacted] the FBI believed that further investigation would be unlikely to produce any facts leading to conviction and therefore were terminating their active investigation. It should be noted that the AEC meeting with Shapiro was not coordinated with CIA although the AEC was well aware of CIA's interest in the affair. CIA attempts to persuade the FBI to continue the

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investigation proved fruitless.

11. In June 1970 Shapiro resigned from NUMEC and took a position as Vice President for Research and Development with Kawecki Berylco Company in Temple, Pa.

[redacted] In July 1971 Shapiro left Kawecki Berylco and took a position as executive assistant to Westinghouse breeder reactor divisions' general manager. To quote Nucleonics Week of 8 July 1971, "At Westinghouse he'll be giving guidance and advice on the Fast Flux Test Facility project and breeders, with special concentration on fuel."

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