Fortieth session
Item 64 of the provisional agenda*

ISRAELI NUCLEAR ARMAMENT

Note by the Secretary-General

1. By paragraph 7 of General Assembly resolution 39/147 of 17 December 1984, the Assembly requested the United Nations Institute for Disarmament Research, in co-operation with the Department for Disarmament Affairs of the Secretariat and in consultation with the League of Arab States and the Organization of African Unity, to prepare a report providing data and other relevant information relating to Israeli nuclear armament and further nuclear developments, taking into account, inter alia, the report of the Secretary-General on Israeli nuclear armament (A/37/434) and to submit it to the General Assembly at its fortieth session.

2. The report is submitted herewith.

* A/40/150.
ANNEX

Israeli nuclear armament

Report of the United Nations Institute for Disarmament Research

Contents

<table>
<thead>
<tr>
<th>I. INTRODUCTION</th>
<th>Paragraphs</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1 - 6</td>
<td>3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>II. UNITED NATIONS CONCERN WITH THE QUESTION OF ISRAELI NUCLEAR ARMAMENT</th>
<th>Paragraphs</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>7 - 21</td>
<td>6</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>III. ISRAEL'S NUCLEAR DEVELOPMENT</th>
<th>Paragraphs</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. General nuclear research activities</td>
<td>22 - 26</td>
<td>9</td>
</tr>
<tr>
<td>1. Nuclear infrastructure</td>
<td>22</td>
<td>9</td>
</tr>
<tr>
<td>2. Nuclear reactor facilities</td>
<td>23 - 24</td>
<td>10</td>
</tr>
<tr>
<td>3. Research activities</td>
<td>25 - 26</td>
<td>10</td>
</tr>
<tr>
<td>B. Nuclear power programme</td>
<td>27 - 38</td>
<td>10</td>
</tr>
<tr>
<td>1. Nuclear power planning</td>
<td>27 - 29</td>
<td>10</td>
</tr>
<tr>
<td>2. Research and development</td>
<td>30 - 34</td>
<td>11</td>
</tr>
<tr>
<td>3. Uranium resources and supply</td>
<td>35 - 37</td>
<td>11</td>
</tr>
<tr>
<td>4. Heavy water demand and supply</td>
<td>38</td>
<td>12</td>
</tr>
<tr>
<td>C. Nuclear weapon potential</td>
<td>39 - 55</td>
<td>12</td>
</tr>
<tr>
<td>1. Plutonium production capability</td>
<td>39 - 43</td>
<td>12</td>
</tr>
<tr>
<td>2. Uranium enrichment activities</td>
<td>44</td>
<td>13</td>
</tr>
<tr>
<td>3. Nuclear weapon capability</td>
<td>45 - 53</td>
<td>13</td>
</tr>
<tr>
<td>4. Means of delivery</td>
<td>54 - 55</td>
<td>14</td>
</tr>
</tbody>
</table>

| IV. SUMMARY                       | 56         | 15   |

/.../
I. INTRODUCTION

1. By resolution 39/147 of 17 December 1984, the General Assembly, inter alia, requested the United Nations Institute for Disarmament Research (UNIDIR) in co-operation with the Department for Disarmament Affairs of the Secretariat and in consultation with the League of Arab States and the Organization of African Unity, to prepare a report providing data and other relevant information relating to Israeli nuclear armament and further nuclear developments, taking into account, inter alia, the report of the Secretary-General on Israeli nuclear armament (A/37/434), and to submit it to the General Assembly at its fortieth session.

2. The report of the Secretary-General (A/37/434), submitted to the General Assembly at its thirty-seventh session in 1982, stated:

"By resolution 36/98 of 9 December 1981, the General Assembly, having taken note of the report of the Secretary-General on Israeli nuclear armament (A/36/431), inter alia, expressed its deep alarm that the report had established that Israel had the technical capability to manufacture nuclear weapons and possessed the means of delivery of such weapons; called upon all States and other parties and institutions to terminate forthwith all nuclear collaboration with Israel; requested the Secretary-General to give maximum publicity to the report on Israeli nuclear armament; also requested the Secretary-General to follow closely Israeli military activity and to report thereon as appropriate; and decided to include in the provisional agenda of its thirty-seventh session the item entitled 'Israeli nuclear armament'.

"Pursuant to the above request, the Secretary-General has given maximum publicity to the report on Israeli nuclear armament. Moreover, the Secretary-General has followed Israeli nuclear activities, taking into account information published by the International Atomic Energy Agency. The Secretary-General has received no new information in this regard and consequently has nothing to add to his earlier report to the General Assembly on the subject."

3. In pursuance of General Assembly resolution 34/89 of 11 December 1979, the Secretary-General, with the assistance of qualified experts, had previously prepared a study on Israeli nuclear armament which was submitted to the Assembly in 1981, at its thirty-sixth session (A/36/431). That study, which contains factual information, analyses and assessments covering the period up to June 1981, arrived at the following conclusions:

"In carrying out its mandate to study the question of Israeli nuclear armament, the Group of Experts has sought to make its evaluation as factual and concise as possible on the basis of available information. However, because of gaps in the availability of reliable information, some of the specific assessments may be subject to an element of uncertainty.

"Ever since its establishment, Israel has been actively engaged in various aspects of nuclear research. It has reportedly devoted its own sources of uranium and has acquired expertise of various processes that make up the nuclear fuel cycle. Especially in the decades of the 1950s and 1960s."

/*...*/
Israel has maintained close co-operation in the nuclear field with several countries which have helped it in acquiring its nuclear expertise and which have supplied nuclear equipment, materials and technology.

"All the known nuclear facilities in the territories of the Middle East States are subject to international safeguards. The exceptions are a small research reactor in Egypt and the Israeli research reactor at Dimona and its related facilities.*

"Israel's authorities have not supplied information the major part of its nuclear programme and activities; in particular critical details about Israel's unsafeguarded Dimona nuclear centre are kept secret. This makes it difficult to make an accurate assessment of the nature of Israel's actual nuclear development and capability.

"On the basis of what is known about the facilities at Dimona, (the existence of a natural uranium research reactor, with a capacity of about 25 MW (th) pilot reprocessing facility, hot laboratories), the physical possibility exists that Israel may already have enough weapons-grade materials for making several bombs comparable to the bomb dropped on Nagasaki.

"Israel is reported to be engaged in uranium-enrichment research, specifically on laser isotope separation techniques.

"Delivery systems would not constitute a major problem, given the short distances between Israel and the conceivable targets in the region. Its existing aircraft and missiles could deliver nuclear warheads.

"Thus, there is no doubt that Israel has the technical capability to manufacture nuclear weapons and possesses the means of delivery of such weapons to targets in the area. To recapitulate: Israel has an unsafeguarded reactor capable of producing considerable amounts of plutonium and has some means of separating plutonium from irradiated uranium fuel. It has the technological skills and expertise as well as the technical infrastructure required to manufacture nuclear weapons. Since the greater part of Israel's nuclear programme is not under safeguards, and since few technical details about that programme have been made publicly available, it is difficult to assess the full extent of Israel's actual nuclear activity. However, since 1964, when Dimona went into operation, Israel could have produced sufficient weapons-grade plutonium for a significant number of explosive devices.

"Israel's official statements on its plans and intentions with regard to the possession of nuclear weapons have often been equivocal and have provided little definitive information. It has repeatedly utilized the formula that 'Israel will not be the first to introduce nuclear weapons into the Middle East'. At the same time, however, Israel has refused to sign and ratify the

* It was announced on 30 June 1981 (IAEAPR/81/15) that negotiations between Egypt and the International Atomic Energy Agency (IAEA) on a safeguards agreement covering the Egyptian reactor had been successfully completed.
Treaty on the Non-Proliferation of Nuclear Weapons or otherwise to place all of its nuclear facilities under international safeguards. Israel has not only failed to submit all its own nuclear facilities to international inspection, but has also appeared to undermine the credibility of IAEA safeguards in the region, in particular by the bombing of an Iraqi nuclear reactor, which was under IAEA safeguards.

"Meanwhile, there have been official and unofficial statements and reports in a number of countries that Israel has already crossed the nuclear-weapon threshold. Discussion of these issues must take account of the political, military and geographic circumstances of the region. Whereas Israel could be moved by a number of cogent arguments to refrain from the acquisition of nuclear weapons, various considerations may be thought to prompt it to acquire nuclear weapons. In fact, Israel appears to have a posture of deliberate ambiguity on this subject, which has contributed considerably to the alarm in the region and to the concern of the world community.

"The Group of Experts believes that this deliberate ambiguity is or may be a factor contributing to instability in the region and could be an obstacle to the creation of the confidence necessary to achieve a political settlement there.

"On the basis of the available authoritative information, the Group of Experts is unable to conclude definitively whether or not Israel is at present in the possession of nuclear weapons. There are, however, significant indications that Israel reached the threshold of becoming a nuclear-weapon State at least a decade ago. Taking into account its nuclear facilities, the availability of nuclear material required for their operation, the existence of scientific and technical knowledge and the presence of an adequate number of trained and experienced staff, the Group of Experts wishes to emphasize that they do not doubt that Israel, if it has not already crossed that threshold, has the capability to manufacture nuclear weapons within a very short time.

"The Group of Experts considers that the possession of nuclear weapons by Israel would be a seriously destabilizing factor in the already tense situation prevailing in the Middle East, in addition to being a serious danger to the cause of non-proliferation in general. However, they wish to add the final observation that, it would, in their view, contribute to avoiding the danger of a nuclear arms race in the region of the Middle East if Israel should renounce, without delay, the possession of or any intention to possess nuclear weapons, submitting all its nuclear activities to international safeguards, through adherence to a nuclear-weapon-free zone in accordance with paragraphs 60 to 63 of the Final Document of the first special session of the General Assembly devoted to disarmament (resolution S-10/2) and with Assembly resolution 35/147,* through accession to the Treaty on the Non-Proliferation of Nuclear Weapons, or by unilaterally accepting such safeguards."

* In this connection, the Group of Experts noted with interest the suggestions made by Egypt in its letter of 20 April 1981 addressed to the Secretary-General (A/36/220). (See A/36/431, para. 9.)
4. The present report is submitted to the General Assembly in pursuance of Assembly resolution 39/147. In fulfilling its mandate, the Institute worked in close co-operation with the Department for Disarmament Affairs and held consultations with the League of Arab States and the Organization of African Unity. Consultations were also held with the International Atomic Energy Agency (IAEA).

5. In the preparation of the present report, UNIDIR has used publicly available information emanating mainly from governmental sources and international organizations, covering the period since the Secretary-General's study mentioned above.

6. The following section sets forth the political framework for the report as expressed in the resolutions of the General Assembly, the Security Council and the General Conference of the International Atomic Energy Agency. Section III deals with Israel's nuclear development and, as in the Secretary-General's study, Israel's nuclear weapon potential is presented in the context of availability of the necessary nuclear explosive materials, the capability to design and produce nuclear explosives, and the available means of delivery of these weapons. Section IV summarizes the findings of the report.

II. UNITED NATIONS CONCERN WITH THE QUESTION OF ISRAELI NUCLEAR ARMAMENT

7. States Members of the United Nations have over the years shown increasing concern regarding the danger of the introduction of nuclear weapons into the Middle East, particularly in view of reports that Israel may have developed a nuclear weapon capability.

8. In this connection, the General Assembly has since 1974 adopted a number of resolutions reflecting its uneasiness about the possible danger of the proliferation of nuclear weapons in the Middle East. a/

9. In 1981, at its thirty-sixth session, after considering the report of the Secretary-General on Israeli nuclear armament (A/36/431), the General Assembly adopted resolution 36/98 by which it expressed its deep alarm that the report had established that Israel had the technical capability to manufacture nuclear weapons and possessed the means of delivery of such weapons. The Assembly, also, inter alia, requested the Security Council to prohibit all forms of co-operation with Israel in the nuclear field, called upon all States and other parties and institutions to terminate forthwith all nuclear collaboration with Israel, requested the Security Council to institute effective enforcement action against Israel so as to prevent it from endangering international peace and security by its nuclear-weapon capability, and demanded that Israel should renounce, without delay, any possession of nuclear weapons and place all its nuclear activities under international safeguards. It further requested the Secretary-General to follow closely Israeli military nuclear activity and to report thereon as appropriate (see A/37/434).
10. At the same session, the General Assembly, by its resolution 36/87 B of 9 December 1981 on the establishment of a nuclear-weapon-free zone in the region of the Middle East, declared that it was imperative that Israel should place forthwith all its nuclear facilities under IAEA safeguards.

11. On 7 June 1981 Israel attacked the Iraqi Osirak research reactor at the nuclear research centre near Baghdad. The attack was immediately considered by the Board of Governors of IAEA and by the Security Council, which adopted resolution 487 (1981) on 19 June 1981. The resolution stated the following:

"The Security Council,"

"...

"1. Strongly condemn the military attack by Israel in clear violation of the Charter of the United Nations and the norms of international conduct;

"2. Calls upon Israel to refrain in the future from any such acts or threats thereof;

"3. Further considers that the said attack constitutes a serious threat to the entire safeguards régime of the International Atomic Energy Agency, which is the foundation of the Treaty on the Non-Proliferation of Nuclear Weapons;

"4. Fully recognizes the inalienable sovereign right of Iraq and all other States, especially the developing countries to establish programmes of technological and nuclear development to develop their economy and industry for peaceful purposes in accordance with their present and future needs and consistent with the internationally accepted objectives of preventing nuclear-weapons proliferation;

"5. Calls upon Israel urgently to place its nuclear facilities under the safeguards of the International Atomic Energy Agency;

"6. Considers that Iraq is entitled to appropriate redress for the destruction it has suffered, responsibility for which has been acknowledged by Israel;

"7. Requests the Secretary-General to keep the Security Council regularly informed of the implementation of the present resolution."

12. Subsequently, in September 1981, at its twenty-fifth session, the General Conference of the International Atomic Energy Agency decided, inter alia, to "suspend immediately the provision of any assistance to Israel under the Agency's technical assistance programme" (GC(XXV)/RES/381). The General Conference also called upon all member States of the Agency to end all transfer of fissionable material and technology to Israel which could be used for nuclear arms. It also reaffirmed the inalienable right of all Member States to develop nuclear energy for peaceful purposes under internationally accepted safeguards.

/...
13. In 1982, at its thirty-seventh session, the General Assembly, by its resolution 37/82 of 9 December 1982 entitled "Israeli nuclear armament", reaffirmed its demand that Israel renounce, without delay, any possession of nuclear weapons and place all its nuclear activities under IAEA safeguards and called again upon all States and other parties and institutions to terminate forthwith all nuclear collaboration with Israel. It also called upon all States to submit to the Secretary-General all information in their possession concerning the Israeli nuclear programme or any public or private assistance thereto, and requested the Secretary-General to keep Israeli nuclear activities under constant review and to report thereon as appropriate. It also requested the Secretary-General, in co-operation with the Organization of African Unity and the League of Arab States, to follow closely the nuclear and military collaboration between Israel and South Africa and the dangers it constituted to peace and security and to efforts aimed at the establishment of nuclear-weapon-free zones in Africa and the Middle East (see A/38/199).

14. In the same year, by its resolution 37/75 of 9 December 1982 entitled "Establishment of a nuclear-weapon-free zone in the region of the Middle East", the General Assembly urged all parties directly concerned to consider seriously taking the practical and urgent steps required for the implementation of the proposal to establish a nuclear-weapon-free zone in the Middle East in accordance with the relevant resolutions of the Assembly and, as a means of promoting that objective, invited the countries concerned to adhere to the Treaty on the Non-Proliferation of Nuclear Weapons (resolution 2373 (XXII), annex). It called upon all countries of the region that had not done so, pending the establishment of the zone, to agree to place all their nuclear activities under IAEA safeguards. It also, inter alia, invited those countries, pending the establishment of the zone, not to develop, produce, test or otherwise acquire nuclear weapons or permit the stationing on their territories, or territories under their control, of nuclear weapons or nuclear explosive devices.

15. In 1983, at its thirty-eighth session, the General Assembly, inter alia, considered a report by the Secretary-General entitled "Study on the consequences of the Israeli armed attack against Iraqi nuclear installations devoted to peaceful purposes" (A/38/337). Among the conclusions, it was stated that the more general consequences of the attack included its potential serious damage to international norms and institutions and that, if Israel became a party to the Non-Proliferation Treaty, accepted full scope safeguards and complied with the General Assembly's demand that it should refrain from its threat to repeat its armed attacks against nuclear facilities, the situation would substantially improve.

16. During the same session, in its resolution 38/69 of 15 December 1983 under the agenda item "Israeli nuclear armament", the General Assembly condemned Israel's refusal to renounce any possession of nuclear weapons and to place all its nuclear activities under international safeguards, requested IAEA to suspend any scientific co-operation with Israel which could contribute to Israel's nuclear capabilities and requested the Secretary-General to continue to follow closely Israel's nuclear activities and the nuclear and military collaboration between Israel and South Africa and to report to the Assembly at its thirty-ninth session thereon, as appropriate (see A/39/435).
17. In this connection, it is to be noted that the General Assembly has repeatedly expressed its alarm at the increasing collaboration between South Africa and Israel, especially in the military and nuclear fields, and has condemned this collaboration. b/

18. Also at its thirty-eighth session in 1983, the General Assembly adopted resolution 38/64 of 15 December 1983 on the establishment of a nuclear-weapon-free zone in the region of the Middle East, in which it reiterated the provisions of earlier resolutions on the subject and, inter alia, called upon all countries of the region that had not done so, pending the establishment of the zone, to agree to place all their nuclear activities under IAEA safeguards.

19. In 1984, at its thirty-ninth session, the General Assembly in its resolution 39/147 of 17 December 1984 noted with concern Israel's persistent refusal to commit itself not to manufacture or acquire nuclear weapons, despite repeated calls by the General Assembly, the Security Council and IAEA, and to place its nuclear facilities under Agency safeguards. The resolution condemned Israel's continued refusal to implement Security Council resolution 487 (1981), and requested the Security Council to investigate Israel's nuclear activities and the collaboration of other States, parties and institutions in those activities. It reiterated its request to IAEA to suspend any scientific co-operation with Israel which could contribute to Israel's nuclear capabilities, and reaffirmed its condemnation of the continuing nuclear collaboration between Israel and South Africa.

20. The General Assembly also adopted resolution 39/54 of 12 December 1984 on the establishment of a nuclear-weapon-free zone in the region of the Middle East, in which it once again called upon all parties directly concerned to consider seriously taking the practical and urgent steps required for the implementation of the proposal to establish a nuclear-weapon-free zone in the region of the Middle East.

21. For its part, Israel has reaffirmed its proposal submitted originally at the thirty-fifth session of the General Assembly (A/C.1/35/L.8) calling upon all States of the Middle East and non-nuclear-weapon States adjacent to the region to convene at the earliest possible date a conference with a view to negotiating a multilateral treaty establishing a nuclear-weapon-free zone in the Middle East on the pattern of the Treaty of Tlatelolco for Latin America.

III. ISRAEL'S NUCLEAR DEVELOPMENT

A. General nuclear research activities

1. Nuclear infrastructure

22. Israel has an extensive nuclear infrastructure (see A/36/431). The Israel Atomic Energy Commission (IAEC) and the National Council for Research and Development operate and supervise a number of nuclear research institutes and centres. Four major university institutions deal with fundamental nuclear research and education: the Weizmann Institute of Science at Rehovoth, the Racah Institute of Physics at the Hebrew University of Jerusalem, the Israel Institute of Technology—Technion at Haifa and the Ben-Gurion University of the Negev at
Beer-Sheba. The Israeli Government, through IAEC, controls the Nahal-Soreq Nuclear Research Center and the Negev Nuclear Research Center and their reactors.

2. Nuclear reactor facilities

23. Israel has two nuclear reactors: IRR-I and IRR-II located at Nahal-Soreq and at Dimona, respectively. The Nahal-Soreq reactor, IRR-I, is a 5-megawatt (MW) pool-type research reactor supplied by the United States of America under its Atoms for Peace Programme. The original enrichment was 20 per cent in U-235. The enrichment was later increased to 90 per cent. The IRR-I is safeguarded by IAEA.

24. The Dimona reactor, IRR-II, which was supplied by France, is a natural uranium heavy-water moderated research reactor located in the Negev Desert. Its initial thermal capacity was 25 MW. According to press reports in 1980 the power level of the Dimona reactor was later increased to 70 MW. This information has not been confirmed officially. A revision of the plant design of this magnitude would have required a close-down of the plant for a prolonged period (from one to two years). The Dimona reactor has never been submitted to international control or inspection. Visits were paid by delegations from the United States from 1963 to 1969; members of those delegations were reported in 1969 as describing their visits to be inadequate to guarantee that the reactor was being used solely for peaceful purposes (see A/36/431).

3. Research activities

25. The two research reactors are being extensively used for general research in nuclear physics and chemistry, solid state physics and in materials science. Results are regularly published in the IAEC's Research Laboratories annual reports and in international scientific journals.

26. The reactors cover the demand of the Israeli nuclear medicine community for radiopharmaceuticals and labelled compounds for medical and biological research.

B. Nuclear power programme

1. Nuclear power planning

27. A public committee, chaired by the President of Technion, Professor Amos Horev, made an evaluation in 1982 of the industrial and economic need for nuclear power plants in Israel. The committee urged a start to a nuclear construction programme and advocated development, if necessary, of an Israeli heavy-water moderated, natural uranium-fueled power reactor: ISDU, an indigenous version of the Canadian CANDU reactor.

28. Preparatory work related to the construction of nuclear power plants has been conducted by IAEC in co-ordination with the Ministry of Energy and Infrastructure and with the Nuclear Power Plant Programme Steering Committee appointed by the
Ministry. g/ A special study on the siting of nuclear power stations has been conducted. The Israel Electric Corporation (IEC) has reportedly expressed a preference for locating the nuclear plant at Shivta, in the Negev Desert, although two other sites will continue to be examined - Besor, in the western Negev, and Bet Gubin in the northern Negev. i/

29. Reports have indicated that Israeli authorities have been negotiating with the French industrial company, Framatome, about delivery terms for a 2 x 950 MW(e) nuclear power station. No agreement on this transaction has been reported up to now. j/

2. Research and development

30. Research and development related to nuclear power plants has been conducted for many years in Israel. Nuclear fuel cycles have been studied extensively, emphasizing reactor core analysis. The Dimona reactor is being used for the development and testing of fuel element. The performance of a variety of reactor concepts has been studied with simulator models. g/

31. A research project has been undertaken at the Department of Nuclear Engineering of the Ben-Gurion University of the Negev, aiming at developing a nuclear fuel consisting of a mixture of uranium and thorium. In such a fuel the fissile isotope uranium-233 will be produced instead of plutonium. k/

32. The ISDU reactor concept advocated by the Horev Committee is being studied. Development of the ISDU concept will imply high investment costs. The plant will probably have a capacity of no more than 250 MW.

33. A subcritical reactor facility has been installed at Beer-Sheba. l/ It is suited mainly for training purposes. It could, however, be useful in performing some measurements in new types of fuel elements.

34. The IAEA has emphasized work on safety and security measures related to operations of nuclear power plants. In particular, the vulnerability of nuclear power stations to external attacks by explosives and to internal sabotage acts has been studied. g/

3. Uranium resources and supply

35. The natural resources of Israel are relatively limited. There are no uranium ore deposits, but the phosphate reserves in the Negev Desert contain uranium at concentrations of 100-170 parts per million. The proven and estimated reserves of uranium in the phosphates of Israel are estimated, respectively, to be 40,000 and 200,000 tons. m/

36. Extensive research on methods for extracting uranium from the Negev phosphates has been conducted by the Israeli Nuclear Research Center at Dimona. Their scientists claim to have successfully tested a new technique involving the use of a
novel ion exchange resin, which is applied to the separation of uranium from phosphoric acid. A pilot plant has been in operation since the beginning of 1984 at the Rotem Fertilizer Ltd. plant at Arad. n/

37. Israel has reportedly p/ been importing natural uranium from a number of sources, mainly Western and African. In one case it has been alleged that Israel obtained a consignment of natural uranium by irregular methods. p/ Israel has denied this.

4. **Heavy water demand and supply**

38. Israeli scientists were pioneers in the development of heavy water production technology. A pilot heavy water production plant was in operation before the construction of the Dimona reactor. q/ In 1979, it was reported that a small-scale facility existed in Israel. r/ Heavy water is not consumed during the operation of a reactor. However, losses due to leakages and replacements of fuel elements have to be restored. Make-up heavy water has therefore to be imported or to be replenished from a domestic plant or heavy water upgrading facility. An independent Israeli nuclear power programme based on the ISDU reactor concept implies design and construction of an indigenous heavy water production plant. Otherwise reliance would have to be placed on imports.

C. **Nuclear weapon potential**

1. **Plutonium production capability**

39. The Dimona reactor is a dual purpose plant suited for scientific experimental research as well as for production of weapon-grade plutonium.

40. In the Secretary-General's report (A/36/431) it was assessed that on the basis of its original capacity (25 MW) the Dimona reactor was capable of producing annually 8-10 kilograms (kg) of plutonium containing 70 per cent of the fissile isotope Pu-239. s/ In the period from 1963 to 1980, around 100 kg could thus have been produced (assuming six to eight months of operation per year) (A/36/431).

41. Plutonium has to be extracted from the fuel rods to be of any military significance. This is done through a chemical extraction process in a reprocessing plant. The IAEA and SIPRI have indicated t/ that a pilot facility for reprocessing spent fuel exists in Israel.

42. Reprocessing technology, unlike uranium enrichment technology, has not been kept secret by the nuclear-weapon States. The basic principles are used in the chemical industry for other purposes. Sufficient basic knowledge has been available to the scientific community since the 1960s for the construction and operation of reprocessing plants.

/...
43. In 1980, Professor Francis Perrin, former High Commissioner of the Commissariat à l'énergie atomique, reportedly stated in an interview that France had participated in the building of a plutonium extraction plant in Israel. According to Professor Perrin, the Government of France had not itself participated in the construction of the plant, but it had permitted French industry to help Israel in this endeavour.

2. Uranium enrichment activities

44. Research in Israel on the use of laser methods for enriching uranium has been reported as early as 1974. Variants of the laser method are extensively studied in most larger industrial States. The method studied in Israel, the Atomic Vapour Laser Isotope Separation technique (AVLIS) is also being developed in the United States.

3. Nuclear weapon capability

45. Israeli nuclear weapon potential was assessed in the Secretary-General's report (A/36/431), on the basis of availability of necessary nuclear explosive materials, the capability to design and produce nuclear explosive devices, and on the available means of delivery of these weapons.

46. The cumulative production of plutonium in Dimona of about 100 kg, as assessed in the Secretary-General's report, would, on the same basis, today amount to 125 kg. If the power level of the Dimona reactor were increased to 70 MW, the annual plutonium production would be of the order of 25 to 30 kg. Cumulative figures of plutonium production are by necessity uncertain owing to lack of knowledge of the operational availabilities and capacities of the Dimona plant and reprocessing facilities, and also to inevitable loss factors during the manufacturing processes.

47. In the Secretary-General's report it was assessed that laboratory-scale laser enrichment facilities might be capable of producing small amounts of highly enriched uranium, perhaps 2 to 3 kg per year. Over a time span of seven years (1974-1980) it was considered physically possible that Israel might have had enriched uranium in the quantity necessary to make one bomb. Israel's nuclear weapons potential would increase more rapidly if this technology were to be developed further (A/36/431, para. 53).

48. In the same report it was assessed that Israel in 1980 possessed enough separated plutonium to manufacture 10 to 15 nuclear warheads. On the same basis the number in 1985 could be 15 to 20 nuclear warheads. Operation of the Dimona reactor at a higher power load and increased sophistication of the nuclear warhead design might permit the manufacture of a greater number of warheads.
49. The Secretary-General's report states that there was widespread agreement among technical experts that, given Israel's nuclear activities and level of expertise, it was capable of manufacturing nuclear explosive devices. Some of these experts considered that Israel was capable of assembling a number of nuclear explosive devices within weeks or perhaps even days.

50. Reports during May 1985 indicated that Israel had imported from the United States a number of krytons. Krytons are extremely high speed electronic switches that are used to provide the precise timing necessary for triggering nuclear explosions. They are also used in oil exploration and in medical equipment. Because of claims that these krytons were exported from the United States without a proper government licence, United States law enforcement authorities are investigating the case. x/

51. There has so far been no indication that Israel has ever carried out a nuclear test explosion. Some analysts regard as unfounded the assumption that such a test detonation would be required for a country like Israel to be sure that it has a workable nuclear weapon. These analysts point out that over the years the field of nuclear explosives design has undoubtedly developed ways, including the use of computer simulations, to be assured that a given type of bomb would work without a prior test-detonation (A/36/431).

52. The Secretary-General's study also mentioned that many accounts had appeared in the press, in other information media, in academic journals and in books to the effect that Israel had already acquired nuclear weapons. As early as 17 July 1970, for example, The New York Times published an article referring to United States national intelligence assessments and stating that it was assumed by the United States Government that Israel "either possessed an atomic bomb or has component parts available for quick assembly". As in the Secretary-General's report, it has not been possible to confirm or deny these reports.

4. Means of delivery

53. The Israeli Air Force has a nuclear weapon delivery capability (A/36/431). Distances between Israel and conceivable targets in the region are relatively short. Aircraft like the Kfir C7 have a range of 700 kilometres and may carry two 450-kg bombs. The Lavi is the next generation of attack aircraft after the Kfir. The first flight is expected in 1986, with service entry by 1989. The combat radius will be at least that of the Kfir, a typical weapons load could include two 900-kg bombs. y/

54. The Jericho MD-660 and MD-62 ballistic missiles are reported to be capable of carrying nuclear warheads. Long range (550 km) ballistic missiles are also reported to be under development. These reports are not confirmed, but Israel has considerable experience in the development and production of pilotless reconnaissance vehicles such as the IAI Scout, Tadeus Mastiff and the Gabriel group of missiles. z/
IV. SUMMARY

55. The present report provides data and other information relating to Israeli nuclear armament and further nuclear developments, taking into account reports of the Secretary-General on Israeli nuclear armament as well as information on the subject provided by IAEA. The main findings are as follows:

(1) The material contained in the present report confirms the assessment and conclusions of the Secretary-General's report on Israeli nuclear armament (A/36/431), which are reproduced in paragraph 3 above.

(2) Israel has not acceded to requests from the Security Council and the General Assembly of the United Nations to place all its nuclear activities under international safeguards. It is to be stressed that most of the information relating to Israel's nuclear activities is kept secret, and thus the quantity and quality of available reliable information on the subject is such that it is difficult to draw definitive conclusions.

Notes

a/ The General Assembly has adopted, since 1974, resolutions 3263 (XXIX) of 9 December 1974, 3474 (XXX) of 11 December 1975, 31/71 of 10 December 1976, 32/82 of 12 December 1977, 33/64 of 14 December 1978, 34/74 of 11 December 1979 and 35/147 of 12 December 1980 on the question of establishing a nuclear-weapon-free zone in the Middle East. In paragraphs 60 to 63 (d) of the Final Document of the Tenth Special Session of the General Assembly (S-10/2), the first special session devoted to disarmament, the Assembly called for serious consideration of the practical steps required for the implementation of the proposal to establish a nuclear-weapon-free zone in the Middle East. Since 1979, the General Assembly has adopted resolutions 34/89 of 11 December 1979 and 35/157 of 12 December 1980 under the agenda item "Israeli nuclear armament".


d/ International Atomic Energy Agency INFCIR/C/249 and Add.1.


Notes (continued)


i/ Nucleonics Week, 6 December 1984.


l/ Jerusalem domestic television service, 13 June 1981.


o/ Bertrand Goldschmidt, op. cit.


r/ SIPRI Yearbook, 1979, pp. 315-316.

s/ As a rule of thumb, a Dimona-type reactor will produce about one gram of plutonium per megawatt-day of energy released.


u/ Interview with S. Weissman and H. Krossney, authors of The Islamic Bomb (Times Books, 1981).


y/ Paul Rogers, Guide to Nuclear Weapons 1984-1985 (University of Bradford, School of Peace Studies); New Scientist, 23 May 1985.

z/ Ibid.