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LETTER DATED 24 MARCH 1980 FROM THE SECRETARY-GENERAL OF
THE UNITED NATIONS TO THE CHAIRMAN OF THE COMMITTEE ON
DISARMAMENT TRANSMITTING THE REPORT ON A COMPREHENSIVE
NUCLEAR TEST BAN, PREPARED PURSUANT TO GENERAL ASSEMBLY
DECISION 32/422 of 11 DECEMBER 1979

In accordance with General Assembly decision 34/422 of 11 December 1979,
I have the honour to transmit to you the report on a comprehensive nuclear test
ban, which was prepared in the Secretariat with the assistance of four consultant
experts.

(Signed) Kurt WALDHEIM
Secretary-General

*/ Reissued for technical reasons.

COMPREHENSIVE ~~NUCLEAR~~ TEST BAN

Report of the Secretary-General

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FOREWORD

The subject of this report is a question of the highest priority on the disarmament agenda. Over the years, I have stressed repeatedly the vital importance of a general and complete test ban as an indispensable first step towards halting the nuclear-arms race.

The present report was prepared pursuant to General Assembly decision 34/422, adopted on 11 December 1979, which reads as follows:

"The General Assembly requested the Secretary-General to prepare a study on the question of a comprehensive nuclear test ban recommended by the Advisory Board on Disarmament Studies and by the Secretary-General himself and that the study should include the chapters or sections described in paragraph 14 of the report of the Secretary-General,^{*/} should be completed in time to be transmitted to the Committee on Disarmament in the spring of 1980, as indicated in the same paragraph, and should be carried out in accordance with the procedure described in paragraph 16 of the Secretary-General's report."

In accordance with that decision, I appointed Mr. Alessandro Corradini, former Director and Deputy to the Assistant Secretary-General, Centre for Disarmament, United Nations; Mr. William Epstein, Professor, Carlton University, Ottawa; Mr. Jozef Goldblat, The Senior Member of the Research Staff, Stockholm International Peace Research Institute, and Mr. Kashi Prasad Jain, Director, Disarmament, Ministry of External Relations, New Delhi, to carry out the study.

In proposing that a study should be made on the subject of a nuclear test ban, the Advisory Board on Disarmament Studies recommended that it should consist of an introduction, a brief background summary, an analytical summary of the negotiations which led to the Treaty Banning Nuclear Weapon Tests in the Atmosphere, in Outer Space and Under Water (partial test-ban Treaty); the partial-test ban Treaty and the Treaty on the Non-Proliferation of Nuclear Weapons; proceedings in the Conference of the Committee on Disarmament and the Committee on Disarmament; three-Power negotiations; major unresolved issues; and conclusions. There should be appendices on present nuclear arsenals, nuclear-weapon tests from 1945 to 1963 and nuclear-weapon tests from 1965 to 1979.

In my report to the General Assembly, I pointed out that although the matter had been the subject of much study in the past, I felt that any measures which might contribute to the conclusion of an agreement were welcome.

^{*/} A/34/588

I wish to express my appreciation to the experts for their valuable contributions and I hope that the report will be useful to the Committee in its work. At the same time I am aware that the subject of a comprehensive nuclear test ban has a variety of interrelated aspects on which there are many different views.

The successful conclusion of the negotiations now in progress is of crucial importance to the solution of the problem. I, therefore, urge the three nuclear-weapon States involved in those negotiations to use their best endeavours to achieve positive results soon.

In my first statement to the Conference of the Committee on Disarmament, in 1972, I stated the belief that all the technical and scientific aspects of the problem had been so fully explored that only a political decision was necessary in order to achieve agreement. I still hold that belief. The problem can and should be solved now. I share the conviction expressed in the Final Document adopted by the General Assembly at its tenth special session, that the cessation of nuclear-weapon testing by all States within the framework of an effective nuclear disarmament process would be in the interest of mankind.

Kurt Waldheim
Secretary-General

INTRODUCTION

1. No other question in the field of disarmament has been the subject of so much international concern, discussion, study and negotiation as that of stopping nuclear-weapon tests.
2. The complete cessation of nuclear-weapon tests is a prime objective of the United Nations in the field of disarmament. It has been considered ever since 1954, when Prime Minister Jawaharlal Nehru appealed for a "standstill agreement" in respect of nuclear explosions. It has been a separate agenda item of the General Assembly each year since 1957. The General Assembly has adopted some three dozen resolutions calling for an end to nuclear-weapon testing, far more than on any other issue of disarmament.
3. The question has been the subject of deliberations and negotiations in the Disarmament Commission and in its five-Power Sub-Committee, in the three-Power Conference on the Discontinuance of Nuclear Weapon Tests, in the Eighteen-Nation Committee on Disarmament, in the Conference of the Committee on Disarmament (CCD) and, since 1979, in the Committee on Disarmament. Trilateral negotiations among the Union of Soviet Socialist Republics, the United Kingdom of Great Britain and Northern Ireland and the United States of America have also been proceeding since 1977, in private.
4. After the conclusion of the Treaty Banning Nuclear Weapon Tests in the Atmosphere, in Outer Space and Under Water (the partial test-ban Treaty) in 1963, efforts were again directed towards achieving a comprehensive test ban.
5. Despite persistent urging by non-nuclear-weapon States in every session of the General Assembly and in the negotiating bodies, and the determination expressed by the United Nations that the cessation of all nuclear-weapon testing was a matter of the "highest priority", all efforts have thus far been unsuccessful, and testing continues unabated.

I. BACKGROUND SUMMARY

6. Many avenues have been explored and great ingenuity displayed in efforts to achieve a comprehensive test ban. The proposals put forward at one time or another included various forms of suspension of testing; unilateral and agreed moratoria on testing; a "threshold" above which all underground tests would be banned with or without a moratorium; a progressive lowering of the threshold as verification techniques improved; and interim measures to reduce the number and magnitude of tests and to phase them out. A number of proposals were also considered as regards verification. They included the use of automatic seismic stations ("black boxes"); a limited and variable number of on-site inspections; verification by challenge; a commission of scientists possibly from non-aligned countries to consider ambiguous events; and a "detection club" for the international exchange of seismic information. These efforts have produced no solution.
7. Irrespective of efforts to achieve agreement on a comprehensive test ban or pending such agreement, the General Assembly repeatedly called for an immediate suspension of nuclear testing.
8. Some countries maintained that existing techniques of verification were adequate and that no international inspection was required.
9. Some other countries questioned the adequacy of existing verification techniques for small underground explosions. They also doubted whether those techniques could detect and identify underground explosions conducted in "big holes" or caverns or in soft alluvium, that is, in conditions that would have a muffling or "decoupling" effect on seismic signals. They maintained that on-site inspections were necessary. It was even suggested that a series of underground tests could be so programmed as to stimulate an earthquake and its aftershocks or that tests could be so timed as to be hidden by actual earthquakes.
10. Most other countries believed those possibilities to be so remote as to be of minor significance. While a few such small-scale underground tests might escape identification, they would be of little or no importance for weapons development. In order to achieve an important advance or advantage in that respect, a series of tests would be required and the possibilities of such a series escaping detection were very small.

11. In addition to other arguments for ending nuclear-weapon tests, it was also argued that continued testing increased the danger of the spread of nuclear weapons to other countries.

12. Over the years non-nuclear-weapon States have increasingly questioned whether there was sufficient determination to bring about a cessation of nuclear-weapon testing. The USSR, the United Kingdom and the United States, for their part, repeatedly reaffirmed their intention to achieve a comprehensive test ban, but their positions as to when testing should stop and as to the extent of verification required never coincided.

13. A number of national and international scientific studies and meetings of experts established that modern technology could ensure that all underground tests could be detected and identified, except for those having a very low yield of a few kilotons. It was doubtful, however, whether the threshold of detection could ever be lowered to zero so that all small underground tests without exception could be monitored without any possibility of error.

14. It was in the light of these circumstances that the Secretary-General has, over the years, emphasized the importance he attaches to a comprehensive test ban and to its role in the efforts to halt the nuclear-arms race. In his message to the 1972 session of the Conference of the Committee on Disarmament, the first statement he made on the subject, he surveyed the problems and the significance of a comprehensive test ban. The text of his remarks is contained in appendix A.

15. As a result of the failure to stop nuclear weapon testing, many States became disillusioned and increasingly discontented. Non-nuclear weapon States in general came to regard the achievement of a comprehensive test ban as a litmus test of the determination of the nuclear-weapon States to halt the arms race.

II. NEGOTIATIONS LEADING TO THE PARTIAL TEST-BAN TREATY

1. Negotiations from 1955 to 1962

16. The development of thermonuclear weapons in the early 1950s spurred demands for the cessation of all nuclear-weapon tests. There was also growing concern, indeed alarm, throughout the world about the dangerous effects of radioactive fall-out from nuclear-test explosions. On the initiative of India, the General Assembly, in 1955, established a Scientific Committee on the Effects of Atomic Radiation to study and report on the short-term and long-term effects of radiation upon man and his environment.^{1/} The Committee continues its work and submits periodic reports to the General Assembly.

17. The question of a test ban was actively discussed in the Disarmament Commission, in its London Sub-Committee meetings, from 1955 to 1957, and in the General Assembly. The Western Powers insisted that a test ban must be part of a comprehensive programme of disarmament with adequate supervision. The Soviet Union, in 1955, called for an early and separate agreement suspending or banning all tests, with essentially only national supervision or monitoring.

18. In June 1957, the USSR formally proposed agreement on the immediate cessation of all atomic and hydrogen tests, if only for a period of two or three years, as well as the establishment of an international commission to supervise the agreement and the establishment, on a basis of reciprocity, of control posts.^{2/} The Western Powers maintained, however, that any temporary suspension of tests must be linked to the cessation of production of fissionable material for weapons purposes.

19. The increasing world-wide concern about the effects of radioactive fall-out was evidenced by a deputation of scientists led by Linus Pauling which, in January 1957, presented to the Secretary-General a petition signed by 9,000 scientists, including many Nobel laureates, from 43 countries, urging that an international agreement to stop the testing of nuclear bombs "be made now!".

20. In April 1958, Chairman Khrushchev wrote to President Eisenhower drawing attention to a decision of the Soviet Government to end nuclear testing and calling on the Western Powers to do the same, but reserving the right to resume testing if the Western Powers tested. Failure to achieve a mutual suspension led to the resumption of testing by both sides.

21. Following a United States proposal and an exchange of letters by President Eisenhower and Chairman Khrushchev, it was agreed that a conference of experts from eight countries (Canada, Czechoslovakia, France, Poland, Romania, the USSR, the United Kingdom and the United States) be convened to study the possibility of detecting violations of a possible agreement on the suspension of nuclear tests.
22. The Conference of Experts met in Geneva from 1 July to 21 August 1958 and submitted a unanimous report, in which the experts concluded that it was technically feasible to establish an effective control system that could detect and identify nuclear explosions, including low-yield explosions of from 1 to 5 kilotons. Some 20 to 100 earthquakes each year would be indistinguishable from underground tests of 5 kilotons and would require on-site inspection. Larger tests could be monitored by technical means set up in a world-wide network of some 160 to 170 land-based control posts and about 10 ships.
23. The USSR, the United Kingdom and the United States agreed to begin negotiations in Geneva on 31 October 1958 in an effort to reach agreement on a treaty for the discontinuance of nuclear-weapon tests on the basis of the experts' report. France stated that it would not sign a test-ban treaty unless the treaty were accompanied by other measures of disarmament.
24. The three Powers agreed unilaterally to suspend nuclear tests about the time of the beginning of the Conference on the Discontinuance of Nuclear Weapon Tests and continued such suspensions on a voluntary basis. In the meantime, France conducted its first nuclear explosion in 1960.^{3/}
25. Early in the Conference on the Discontinuance of Nuclear Weapon Tests (January 1959), the United Kingdom and the United States dropped their insistence that a test ban should be linked to other disarmament measures and agreed that the ban would depend solely on effective control. That was regarded as an important step forward. Thereafter, the question of verification became the main issue of the negotiations.
26. In the spring of 1959, the United States raised technical questions about the adequacy of the 1958 experts' report. It maintained that new seismic data indicated that the number of earthquakes each year, indistinguishable from 5-kiloton nuclear explosions, would be some 1,500 instead of the 20 to 100 mentioned by the experts. Moreover, deep underground explosions in large cavities would be less easily detected.

27. The Conference on the Discontinuance of Nuclear Weapon Tests made considerable progress on many issues of substance and on the broad outlines of a control organization, although differences remained concerning the composition of the control commission and its operation. Because of disagreement concerning the identification of underground tests, the parties agreed that a treaty should ban all tests in the atmosphere, in outer space and under water; underground tests above a seismic threshold of 4.75 would also be banned and there would be a moratorium on all testing below that threshold for three years, subject to the institution of a programme to improve detection procedures. The USSR proposed a quota of three on-site inspections each year, but the United Kingdom and the United States proposed a sliding scale of from 12 to 20 annual on-site inspections.

28. During 1961, political relations between the two sides deteriorated, and the conference became deadlocked. The Soviet Union stated that it could not ignore that France, as a NATO member, could improve the nuclear capabilities of the alliance by continued testing. It proposed that either a test-ban treaty be concluded on the basis of the USSR proposals, which were again based on the previous position that national means of verification were sufficient, or the question be considered within the context of general and complete disarmament. The United Kingdom and the United States maintained that the Soviet proposals for a treaty were unacceptable as they amounted to self inspection, and that to merge the test-ban issue with general and complete disarmament would "drown it".

29. On 30 August 1961, the Soviet Union announced that it would resume testing and did so on the following day; all but one of its tests were conducted in the atmosphere.^{4/} The United States and the United Kingdom proposed on 3 September that all atmospheric tests be ended without any requirement for international control. On 15 September, the United States resumed testing underground and, later, in the atmosphere.

30. The Conference on the Discontinuance of Nuclear Weapon Tests met briefly towards the end of 1961 but made no progress and finally adjourned in January 1962. At the last session, the USSR restated its opposition to any international control while the arms race continued, on the grounds that such

control could serve as a means of espionage. It proposed a draft treaty providing for a ban on all tests in the atmosphere, outer space and under water, to be supervised by national means of detection, with a moratorium on underground tests until a control system had been developed as part of the system for control over general and complete disarmament. The United Kingdom and the United States rejected the Soviet arguments and draft treaty, and declared that an uncontrolled moratorium on underground tests was unacceptable. Thus ended what had appeared to be a hopeful and encouraging effort to achieve a comprehensive test-ban treaty.

2. Negotiations from 1962-1963

31. When the Eighteen-Nation Committee on Disarmament (ENDC) convened in Geneva in March 1962 to consider the question of general and complete disarmament and also collateral measures, it created a Sub-Committee composed of the same three nuclear Powers to consider the nuclear-test ban. Their initial positions were substantially the same as they had been at the end of the Conference on the Discontinuance of Nuclear Weapon Tests. An important new development, however, had taken place. Eight non-aligned States -- Brazil, Burma, Egypt, Ethiopia, India, Mexico, Nigeria and Sweden -- had become members of the new multilateral negotiating body, the ENDC. These States stressed that a test ban was also their concern, and they played an active and moderating role.

32. In order to break the continuing deadlock, the eight non-aligned members presented a joint memorandum on 10 April 1962.^{5/} The memorandum suggested the establishment of a purely scientific and non-political system for observation and control of a test ban, based on existing networks of observation posts and institutions, together with new posts as agreed. An international commission of highly qualified scientists, possibly from non-aligned countries, would receive and process all data received from the observation posts and report on any nuclear explosion or "suspicious event" after examination of all available data. Parties to the treaty would be obligated to furnish the commission with the facts necessary to establish the nature of any suspicious and significant event, and "could invite" the commission to visit their territories and/or the site of the doubtful event. The commission would report its conclusions to the parties.

33. The joint memorandum led to considerable discussion. The USSR interpreted the memorandum as suggesting on-site inspection only on a voluntary basis. The United Kingdom and the United States, on the other hand, interpreted it as laying down a mandatory obligation for on-site inspection.

34. In August 1962, the United States and the United Kingdom submitted two alternative draft treaties. One was for a comprehensive test ban based on the principle of compulsory on-site inspections but involving an unspecified smaller number than the 12 to 20 previously proposed. The other draft treaty was for a partial test ban limited to the three "non controversial" environments -- the atmosphere, outer space and under water -- without international verification. The two Powers stated, however, that they would not accept in any form an uncontrolled moratorium on underground tests. They proposed 1 January 1963 as the cut-off date for tests under either the comprehensive or the partial draft treaty.

35. The USSR rejected both draft treaties -- the comprehensive one because it provided for compulsory on-site inspection, and the partial one because it excluded underground tests.

36. Some non-aligned members of the ENDC urged that the scientific commission envisaged in their joint memorandum should be set up immediately on an interim basis, accompanied by a suspension of underground tests for a limited period of time. If any party were to refuse a request from the commission for on-site inspection to identify a suspicious seismic event, the commission would automatically release other parties from the interim arrangement.

37. In December 1962, the USSR proposed that two or three automatic seismic stations (black boxes), in addition to existing national means of seismic detection, be established in the territories of each of the three nuclear Powers and some also in neighbouring countries. These black boxes could periodically be carried to the international commission by national personnel, but with the participation of staff of the Commission.

38. The United States considered that black boxes could be a useful adjunct to manned detection stations but that internationally manned stations and on-site inspections would still be required.

39. The General Assembly in November 1962 adopted two resolutions on a test ban. The first was a 37 Power draft which condemned all nuclear-weapon tests and asked that they cease by 1 January 1963, and endorsed the eight-nation joint memorandum of 16 April 1962 as a basis for negotiation; if no agreement was reached by 1 January 1963, it recommended an immediate agreement prohibiting tests in the atmosphere, in outer space and under water, accompanied by an interim arrangement

suspending all underground tests, taking as a basis the eight-nation joint memorandum, with a view to providing adequate assurances of detection and identification. The second resolution was a United Kingdom and United States draft calling simply for the conclusion of a comprehensive test-ban treaty at an early date with effective international verification.

40. During 1963, in the aftermath of the Cuban "missile crisis", private talks took place between the USSR and the United States on a test ban.

41. At the reconvened 1963 session of the ENDC, the discussions concentrated on a comprehensive test ban. Agreement emerged on the following principles:

(a) utilization of nationally manned and controlled seismic stations for detecting and identifying seismic events; (b) installation of automatic (unmanned) seismic stations on the territories of nuclear Powers and adjacent countries, on the understanding that delivery and removal of equipment and records would be carried out with the participation of some foreign personnel; and (c) an annual quota of on-site inspections to determine the nature of suspicious events.

42. There was disagreement, however, on the number of automatic seismic stations -- the USSR proposed three and the United States seven. There was also disagreement on the number of annual on-site inspections -- the USSR proposed from two to three, and the United States proposed from eight to ten but later reduced the figure to seven.

43. On 10 June 1963, three non-aligned members of the ENDC -- Egypt, Ethiopia and Nigeria -- submitted a joint memorandum suggesting that for the time being "three, four or so truly effective inspections a year, or an adequately proportioned figure spread over more years", might dispel mutual suspicions and facilitate agreement.^{6/}

They also considered that direct talks between the Foreign Ministers or heads of Government of the nuclear Powers could prove of great value in reaching a solution.

44. Also on 10 June, it was announced that the USSR, the United Kingdom and the United States had agreed to hold talks in mid-July on the cessation of nuclear tests.

On 2 July, the Soviet Union stated that insistence of the United States and the United Kingdom on on-site inspections made an underground test ban impossible; the USSR was therefore prepared to sign a limited treaty banning tests in the three non-controversial environments in the atmosphere, in outer space and under water. It also withdrew its previous demand that a partial test ban be accompanied by a moratorium on underground testing.

45. The trilateral negotiations began in Moscow on 15 July 1963 and ended on 25 July, when the text of the treaty was initialed. The Treaty was signed on 5 August by the Foreign Ministers of the three parties and was opened for signature in the capitals of each of the three "original parties" as they are called in the

Treaty. (For the text of the Treaty, see appendix B). The Treaty entered into force on 10 October 1963. Up to the present, 110 States have become parties to the Treaty; two nuclear-weapon States, China and France, are among those that have not adhered to the Treaty. (For the list of signatories and parties, see appendix C).

46. The commitment of the three original parties to pursue a comprehensive test ban is contained in the preamble and in article I of the Treaty. The relevant portion of the preamble reads as follows:

"Seeking to achieve the discontinuance of all test explosions of nuclear weapons for all time, determined to continue negotiations to this end, and desiring to put an end to the contamination of man's environment by radioactive substances ..."

Article I reads as follows:

"1. Each of the Parties to this Treaty undertakes to prohibit, to prevent, and not to carry out any nuclear weapon test explosion, or any other nuclear explosion, at any place under its jurisdiction or control;

"(a) in the atmosphere; beyond its limits; including outer space; or under water, including territorial waters or high seas; or

"(b) in any other environment if such explosion causes radioactive debris to be present outside the territorial limits of the State under whose jurisdiction or control such explosion is conducted. It is understood in this connexion that the provisions of this subparagraph are without prejudice to the conclusion of a treaty resulting in the permanent banning of all nuclear test explosions, including all such explosions underground, the conclusion of which, as the Parties have stated in the Preamble to this Treaty, they seek to achieve.

"2. Each of the Parties to this Treaty undertakes furthermore to refrain from causing, encouraging, or in any way participating in, the carrying out of any nuclear weapon test explosion, or any other nuclear explosion, anywhere which would take place in any of the environments described, or have the effect referred to in paragraph 1 of this Article."

47. The partial test-ban Treaty was the first international agreement of world wide scope reached in the field of nuclear-arms limitation. It was hailed as an event of historic significance that would begin to curb the nuclear arms race. It greatly contributed to reducing radioactive pollution. It brought about some relaxation of international tension. It also helped to create a climate that facilitated negotiations for other treaties in the field of nuclear arms limitation, including the non-proliferation Treaty.

48. By 1963, the USSR and the United States had already carried out extensive series of tests in the atmosphere and knew that testing underground, which would be continued, could provide most of the information required for further nuclear-weapon development. That facilitated, to a large extent, the conclusion of the partial test-ban Treaty.

49. In practice, the partial test-ban Treaty did not slow down the nuclear-arms race among the major nuclear Powers, except to the extent that it placed technical constraints on the underground testing of large thermonuclear weapons.

50. After the signing of the Treaty, the rate of testing, in fact, increased. Of 1,221 nuclear explosions reported to have been conducted between 1945 and 1979, 488 were carried out in the 18 years preceding the conclusion of the Treaty, and 733 in the 16 years after the signing of the Treaty. Thus, the rate of testing was, on average, 45 per year after the Treaty as compared to 27 per year before it. The three nuclear Powers party to the partial test-ban Treaty, namely, the USSR, the United Kingdom and the United States, account for more than 90 per cent of all nuclear explosions (see Appendix D).

51. Despite the commitment to pursue a comprehensive test ban, no actual negotiations took place for a decade.

III. TREATY ON THE NON-PROLIFERATION OF NUCLEAR WEAPONS

52. The question of a comprehensive test ban was one of the issues raised in connexion with the negotiations for the non-proliferation Treaty. The question arose because of the demands of the non-nuclear-weapon States that the nuclear Powers must provide some binding undertakings to make rapid substantial progress towards nuclear disarmament. A resolution of that question was regarded as one of the necessary elements of an acceptable balance of the mutual responsibilities and obligations of the nuclear-weapon and non-nuclear-weapon States.

53. The text of the non-proliferation Treaty contains the following preambular paragraph:

"Recalling the determination expressed by the Parties to the 1963 Treaty banning nuclear weapon tests in the atmosphere, in outer space and under water in its Preamble to seek to achieve the discontinuance of all test explosions for all time and to continue negotiations to this end".

and article VI, which reads:

"Each of the Parties to the Treaty undertakes to pursue negotiations in good faith on effective measures relating to cessation of the nuclear ~~arms~~ race at an early date and to nuclear disarmament and on a treaty on general and complete disarmament under strict and effective international control".

The commitment to negotiate a cessation of the nuclear-arms race obviously includes the achievement of a comprehensive test ban.

IV. DELIBERATIONS AND NEGOTIATIONS (1963-1979)

1. General Assembly resolutions

54. The cessation of nuclear-weapon tests, as a separate agenda item, has been debated by the General Assembly since 1957--longer than any other disarmament question.

55. From 1958 to 1979, the General Assembly adopted 56 resolutions dealing with exclusively with the cessation of nuclear-weapon test;^{7/} of these, 26 were adopted after the conclusion of the partial test-ban Treaty in August 1963.

56. The General Assembly resolutions deal with various aspects of the question of the cessation of nuclear-weapon tests. In particular, the Assembly

(a) Urged that all nuclear weapon tests be suspended in all environments;^{8/}

(b) Repeatedly condemned all nuclear-weapon tests;^{9/}

(c) Called for the 'highest priority' to be given to the achievement of a comprehensive test ban;^{10/}

(d) Called on all States to become parties to the partial test-ban Treaty^{11/} and, later, repeatedly called upon all States not yet parties to the Treaty to adhere to it without delay;^{12/} it also stressed the urgency of bringing to a halt all atmospheric testing of nuclear weapons;^{13/}

(e) Called on the ENDC (later the CCD) to continue with a sense of urgency negotiations to achieve a comprehensive test ban;^{14/}

(f) Set a deadline (5 August 1973, i.e., the tenth anniversary of the signing of the partial test ban treaty) for the halting of all nuclear-weapon tests; subsequently, after the date in question had passed, it urged the Governments of the nuclear-weapon States to bring to a halt without delay all nuclear-weapon tests, either through a permanent agreement or through unilateral or agreed moratoria;^{15/}

(g) Requested the CCD to submit "special reports" on its deliberations on the question of a nuclear-test ban;^{16/}

(h) Underlined the responsibility of the nuclear-weapon States to achieve a nuclear-test ban and on occasion, stressed, in particular, the responsibility in this regard of the three nuclear Powers which were parties to the partial test-ban Treaty and the non-proliferation Treaty;^{17/}

(i) Called for immediate unilateral or negotiated measures of restraint that would suspend nuclear-weapon testing or limit or reduce the size and number of nuclear-weapon tests, pending the entry into force of a comprehensive test ban;^{18/}

(j) Called for international co-operation in the field of seismic detection,^{19/} including the provision of specific information in the context of a world-wide exchange of seismological data;^{20/}

(k) Expressed the conviction that, whatever might be the differences on the question of verification, there was no valid reason for delaying the conclusion of a comprehensive test ban.^{21/}

57. In 1977, following the initiation of negotiations on a comprehensive text ban among the USSR, the United Kingdom and the United States, the General Assembly noted that fact with satisfaction and requested the CCD to take up the agreed text resulting from the tripartite negotiations, with a view to the submission of a draft treaty to the General Assembly at its special session devoted to disarmament (tenth special session).^{22/}

58. Subsequently, in 1978, the General Assembly expressed its regret that a draft treaty had not yet been concluded; urged the three negotiating Powers to expedite their negotiations, with a view to bringing them to a positive conclusion; and requested the Committee on Disarmament to take up immediately the text that would result from the negotiations, with a view to the submission as soon as possible of a draft treaty to a resumed thirty-third session of the General Assembly.^{23/}

59. Then, in 1979, the General Assembly reiterated its grave concern that nuclear-weapon testing continued unabated against the wishes of the overwhelming majority of Member States; reaffirmed its conviction that a treaty to achieve the prohibition of all nuclear-test explosions by all States for all time was a matter of the highest priority; expressed its conviction that progress in the negotiations by the Committee on Disarmament on such a treaty was a vital element for the prevention of both vertical and horizontal proliferation of nuclear weapons and would contribute to the halting of the arms race and the achievement of nuclear disarmament; requested the Committee on Disarmament to initiate negotiations

on such a treaty as a matter of the highest priority; and called on the three negotiating Powers to bring their negotiations to a positive conclusion in time for consideration during the 1980 session of the Committee on Disarmament.^{24/}

60. In spite of all these actions by the General Assembly, including the adoption of seven resolutions condemning nuclear-weapon tests and just as **many** requesting that the highest priority be given to a comprehensive test ban, the international community is still waiting for the comprehensive test-ban Treaty. Testing is continuing notwithstanding 24 resolutions urging that all nuclear-weapon tests be suspended in all environments.

2. Main developments in the negotiating bodies

61. After the tripartite Conference on the Discontinuance of Nuclear Weapon Tests came to an end early in 1962, the task of seeking agreement on a comprehensive test ban fell mainly on the LNDC. Every year from 1962 to 1978 the Committee considered the question of a comprehensive test ban and regularly reported to the General Assembly. In addition, special reports on the subject were submitted by the Committee in 1970, 1971, 1973 and 1974, in response to requests of the Assembly.

62. In its report dated 5 September 1963, the Committee expressed satisfaction with the conclusion of the partial test-ban Treaty and "with the aims proclaimed by the negotiating parties in the preamble of the treaty".^{25/}

63. During the five years between the signing of the partial test-ban Treaty in 1963 and the signing of the non-proliferation Treaty in 1968, there was no significant movement by the nuclear-weapon States to modify their long-held positions on an underground test ban. The United States and the United Kingdom acknowledged that some progress had been made in the technique of detection and identification of seismic events, but not enough to eliminate the need for on-site inspections. They were prepared to discuss the possibility of accepting a smaller number of on-site inspections than the seven per year previously proposed but did not suggest any new **number**. The USSR continued to insist that no on-site inspections were necessary and that national detection systems were adequate and, in effect, withdrew its previous offer of from two or three on-site inspections per year.

64. The USSR continued to urge a ban on underground tests above a threshold of seismic magnitude 4.75, with a voluntary moratorium on tests below that threshold. The United States continued to reject an unverified moratorium in any form.

65. China conducted its first nuclear-weapon test in October 1964, thus becoming the fifth nuclear-weapon State. The event provided the occasion for many United Nations Members to criticize not only the testing in the atmosphere by China and France but the continued underground testing by the USSR, the United Kingdom and the United States. It was also observed that underground explosions had not been legalized by their exclusion from the partial test-ban Treaty.

66. At the ENDC session in 1964, the eight non-aligned members submitted a joint memorandum^{26/} in which they recalled that in resolution 1762 A (XVII) the General Assembly had condemned all nuclear-weapon tests. They appreciated the fact that there were differences among the nuclear-weapon Powers on the question of verification of underground tests, but they did not consider such obstacles to be insurmountable and suggested that an exchange of scientific or other information among the nuclear-weapon Powers leading to an improvement of detection and identification techniques would facilitate the achievement of a comprehensive test ban.

67. At the ENDC session in 1965, Sweden formally proposed international co-operation in the detection of underground explosions by the exchange of seismic data (the "detection club"). The eight non-aligned members of the ENDC submitted a joint memorandum^{27/} in which they called for the immediate suspension of all nuclear-weapon tests in all environments and stressed the advantages that would accrue from international co-operation in the field of seismic detection.

68. The following year, Sweden proposed a system of "verification by challenge" or "inspection by invitation", whereby a party to a comprehensive test ban suspected of a violation could provide information and invite inspection either on its own initiative or on request; failure to do so would entitle other parties to withdraw from the treaty.

69. The eight non-aligned members again submitted a joint memorandum^{28/} stressing that a comprehensive test ban would be an effective non-proliferation measure making the development of nuclear weapons by non-nuclear-weapon States practically

impossible and would inhibit the development of new nuclear weapons. On verification, the memorandum set forth the ~~suggestions~~ already presented individually by various non-aligned members, for instance the idea of a threshold treaty and the proposal of verification by challenge, and once again called on the nuclear-weapon States to discontinue tests pending the conclusion of a comprehensive test ban.

70. During the period beginning in 1965, the question of non-proliferation of nuclear weapons emerged as the dominant issue in the field of disarmament, and both the General Assembly and the ENDC devoted most of their time and attention to it. Nevertheless, as has already been noted, the question of a comprehensive test ban became one of the issues raised in that connexion.

71. In 1968, the ENDC adopted for the first time a provisional agenda. Cessation of nuclear tests was mentioned first among the measures to be discussed under the first agenda item, i.e., measures relating to the cessation of the nuclear-arms race and nuclear disarmament.

72. In a new joint memorandum,^{29/} the eight non-aligned members of the ENDC deplored the high frequency and increasing yields of underground testing, which they felt were giving impetus to the arms race. On the question of verification, they stressed that there had been considerable progress in regard to the techniques of verification of an underground test ban and suggested that efforts should be made to promote an "organized international exchange of seismic data", which would provide a better technical basis for national evaluation of underground events. They also underlined the need for a universal and comprehensive solution of the problem of nuclear explosions for peaceful purposes in the context of a comprehensive test ban.

73. At the Conference of Non-Nuclear-Weapon States, held in 1968, a resolution was adopted requesting the General Assembly to recommend that the ENDC begin, not later than March 1969, negotiations for the conclusion of a comprehensive test ban as a matter of high priority.

74. At the 1969 session of the ENDC, Sweden submitted a working paper suggesting possible provisions for a treaty of unlimited duration banning underground nuclear-weapon tests.^{30/} Each party would undertake to co-operate in good faith in an effective international exchange of seismological data in order to facilitate the ~~detection~~, identification and location of underground events, as well as to co-operate in the clarification of any unidentified seismic event. In that

connexion, any party could invite inspection on its territory, in the manner prescribed by the inviting party. Any party could bring to the attention of the Security Council or the other parties to the treaty the fact that a party had failed to co-operate in the clarification of a particular event. A separate international agreement would be negotiated to regulate the question of nuclear explosions for peaceful purposes.

75. The Swedish working paper was welcomed by the majority of the Committee members, including all of the non-aligned members, but both the USSR and the United States had reservations on the proposals for verification.

76. The working paper was revised by Sweden in 1971.^{31/} In the revised version it was envisaged that the treaty would become fully operative after a transitional period to be negotiated, during which nuclear-weapon test explosions would be phased out in accordance with the provisions laid down in a protocol annexed to the treaty. Nuclear explosions for peaceful purposes would be carried out in conformity with the provisions of another protocol.

77. Those proposals met with no immediate response on the part of the nuclear-weapon members of the CCD, who continued to maintain their respective positions on verification.

78. Again in 1971, a joint memorandum was submitted by nine members (Burma, Egypt, Ethiopia, Mexico, Morocco, Nigeria, Pakistan, Sweden and Yugoslavia) of the Group of 12 of the CCD.^{32/} The memorandum^{33/} maintained that sufficient progress had been made in the field of seismology to permit resolution of the verification problem on the basis of national means of detection, supplemented by international co-operation and procedures. Such a system, coupled with a withdrawal clause and provisions for periodic review conferences, should ensure the required level of deterrence against clandestine testing. The memorandum also called on the nuclear-weapon States to submit their own proposals with regard to a comprehensive test ban, so that purposeful negotiations could be immediately undertaken.

79. In 1971 and subsequent years, the CCD gave increased attention to the question of international co-operation in the exchange of seismic data. The question was debated in plenary meetings, as well as in informal meetings with the participation of experts, a practice to which the CCD resorted repeatedly throughout its existence.

80. At a special meeting of the CCD held on the occasion of the tenth anniversary of the partial test-ban Treaty, nearly all speakers underlined the importance of the Treaty and the need to complete it with an underground test ban. The three nuclear-weapon Powers, in particular, stressed the role that the Treaty had played in reducing world tensions, curbing nuclear-arms proliferation and promoting arms limitation measures. At the same time, members of the Group of 12 of the CCD, supported by a number of Western countries, expressed strong dissatisfaction that the commitment of the Treaty to seek to achieve the discontinuance of all nuclear-weapon tests had not been fulfilled, and several of them specifically expressed concern that such failure could undermine the viability of the Non-Proliferation Treaty.

81. Over the years, both the USSR and the United States had repeatedly stated that a comprehensive solution should be found to the problem of underground testing. Then, on 3 July 1974, the USSR and the United States signed the Treaty on the Limitation of Underground Nuclear Weapon Tests, commonly referred to as the threshold test-ban Treaty.^{3/} In the Preamble to the Treaty, the two parties recalled the determination expressed in the partial test-ban Treaty to seek to achieve the discontinuance of all test explosions of nuclear weapons for all time and reaffirmed their adherence to the objectives and principles of that Treaty. They also noted that the adoption of measures for the further limitation of underground nuclear weapon tests would contribute to the achievement of those objectives and would meet the interests of strengthening peace and the further relaxation of international tension.

82. Under the threshold test-ban Treaty, the USSR and the United States undertook not to carry out, beginning 31 March 1976, any underground nuclear-weapon test having a yield in excess of 150 kilotons and to conduct all permitted tests solely within specified testing areas. Each party would use the national technical means of verification at its disposal and was under the obligation not to interfere with the means of verification of the other party. The parties also agreed to exchange information necessary to improve the assessments of the yields of explosions.

83. The Treaty was not in force by 31 March 1976, the agreed cut-off date, and has not entered into force subsequently, but the parties stated that they would observe the limitation during the pre-ratification period.

84. In addition to the limit placed on the size of underground tests, each party committed itself to restrict the number of tests to a "minimum". However, the rate of testing activities has not diminished (see appendix D).

85. Although data necessary to design weapons with a yield much higher than the 150-kiloton threshold can be obtained from tests below that threshold,^{35/} the significance of the threshold test-ban Treaty consists mainly in that it may make more complicated the development of new high-yield warheads.

86. In the CCD several members welcomed the threshold test-ban Treaty as a step towards a comprehensive test ban. On the other hand, many members pointed out that the 150-kiloton yield threshold was so high (approximately 10 times the yield of the Hiroshima bomb) that the limitation would not contribute to the cessation of the nuclear-arms race. Moreover, the threshold exceeded by many times the level of verification capability. It was generally admitted that detection and identification of nuclear explosions of much lower size was possible. Furthermore, it was pointed out that the very concept of a threshold test-ban, which presumes the continuation of testing, was not in consonance with the objective of a comprehensive test ban.

87. The provisions of the Treaty did not extend to underground nuclear explosions for peaceful purposes. Since the parties considered that such explosions could not be distinguished from a distance from tests serving military purposes, and since the information to be provided under the Treaty was not meant for monitoring the size of explosions conducted outside the designated weapon-test sites, the USSR and the United States decided to work out a separate agreement for underground explosions for peaceful purposes.

88. On 28 May 1976, the two Powers signed the Treaty on Underground Nuclear Explosions for Peaceful Purposes, commonly referred to as the peaceful nuclear explosions Treaty.^{36/} The Treaty regulates the explosions which may be carried out by the USSR and the United States outside their nuclear-weapon test sites and which may, therefore, be presumed to be for peaceful purposes. To ensure that explosions announced as peaceful should not provide weapon-related benefits that were not obtainable from weapon testing limited by the threshold test-ban Treaty, the new Treaty established the same yield threshold for explosions for peaceful applications as had been imposed on weapon tests, namely, 150 kilotons. The restriction applies to individual explosions, but a group explosion might exceed the 150-kiloton limit and reach an aggregate yield as high as 1500 kilotons, or one-and-one-half megatons, if it was carried out in such a way that individual explosions in the group could be identified and their yields determined to be no more than 150 kilotons.

89. In checking compliance with the peaceful nuclear explosions Treaty, the parties would use national technical means of verification. They were also obliged to supply each other with relevant information. But, in addition, in certain specified circumstances, observers of the verifying party would be given access to the site of the explosion.

90. The parties agreed that the peaceful nuclear explosions Treaty could not be terminated so long as the threshold test-ban Treaty was in force, since it is an essential complement to the latter.

91. In the meantime, in May 1975, the first Review Conference of the Parties to the Treaty on the Non-Proliferation of Nuclear Weapons, in its Final Declaration, affirmed the determination, expressed in the partial test-ban Treaty and reiterated in the non-proliferation Treaty, to achieve the discontinuance of all test explosions of nuclear weapons for all time. The Conference also expressed the hope that the nuclear-weapon States parties to the non-proliferation Treaty would take the lead and make every effort to reach an early solution of the technical and political difficulties relating to the conclusion of an effective comprehensive test ban.

92. In 1975, for the first time since 1962, one of the nuclear-weapon States, the USSR, proposed a draft treaty on the "complete and general prohibition of nuclear-weapon tests". The draft treaty, which was submitted to the General Assembly, provided for prohibition of unlimited duration of all nuclear-weapon tests in all environments. It further provided that all nuclear-weapon States must ratify the treaty before its entry into force. As regards verification, the relevant provisions of the treaty were to be based on "national technical means of control", i.e., there would be no on-site inspection. They contained, however, undertakings of the parties to co-operate in an international exchange of seismic data and to consult and make inquiries, as well as a procedure for lodging complaints with the Security Council in the case of a suspected violation.

93. In 1977, the USSR submitted to the CCD its 1975 draft treaty, together with an amendment (submitted to the Assembly in 1976) providing for on-site inspections by invitation under certain conditions.^{37/}

94. Subsequently, Sweden also introduced a draft treaty^{38/} with possible transitional arrangements permitting the two major nuclear-weapon Powers to phase out their testing over a limited period of time. On verification, the draft envisaged the establishment of a consultative committee of parties to the treaty to clarify ambiguous events. The draft also provided for the withdrawal of any party if all nuclear weapon Powers had not adhered to it within a specific period. Sweden urged that a working group be set up at an early date to negotiate a concrete agreement on the matter.

95. In 1976, the CCD adopted a proposal to establish the Ad Hoc Group of Scientific Experts to Consider International Co-operative Measures to Detect and Identify Seismic Events. The Group held its first meeting in 1976 and is continuing its work. In 1978, the Group submitted a comprehensive report to the CCD,^{39/} recommending the establishment of a global network of seismological stations and the carrying out of practical exercise to test the proposed network. The CCD, after considering the report, decided that the Ad Hoc Group should continue its work and study the scientific and methodological principles of the possible experimental test of a global network of seismological stations of the kind which might be established in future for the international exchange of seismological data under a treaty prohibiting nuclear-weapon tests, as well as under a protocol dealing with tests for peaceful purposes which would be an integral part of the treaty. In 1979, the Ad Hoc Group submitted a second report on the subject.^{40/}

96. In 1977, the USSR and the United States, after preliminary bilateral talks, informed the CCD that the United Kingdom would join with them in negotiations on a comprehensive test-ban agreement. The United States stressed that, if such agreement was reached, the Committee could then begin to play an important role in the elaboration of an appropriate international treaty. The United States added the view that, while it would be easier to reach a broad agreement after the nuclear-weapon Powers had first succeeded in bridging their differences on the subject, informal discussions in the Committee could be useful in the meantime.

97. On the occasion of the special session of the General Assembly devoted to disarmament, in 1978, the CCD, at the request of the General Assembly, submitted a special report on the state of the various questions under consideration by the Committee, including the question of a comprehensive nuclear-test ban.^{41/} In the report, the CCD stated that "the Committee's highest priority remains the conclusion of a comprehensive nuclear-test ban".

98. At the special session, the Members of the United Nations, in the Final Document of the session, recognized that the cessation of nuclear-weapon testing would make an important contribution to the goal of ending the qualitative improvement of nuclear weapons and the development of new types of such weapons, and of preventing the proliferation of nuclear weapons. In that context, the General Assembly stated that the tripartite negotiations in progress on a comprehensive nuclear-test ban should be concluded urgently and that all efforts should be made by the negotiating parties to achieve an agreement which, following General Assembly endorsement, could attract the widest possible adherence. In that context, various views were expressed by non-nuclear-weapon States that, pending the conclusion of such a treaty,

the world community would be encouraged if all the nuclear-weapon States refrained from testing nuclear weapons. A few countries expressed reservations on some aspects of that part of the Final Document.

99. China stated that it found those parts of the Final Document dealing with the "so-called total prohibition of nuclear tests" totally unacceptable. Likewise, France dissociated itself from the idea that the cessation of nuclear tests would make a significant contribution to the prevention of the production of new types of weapons and the proliferation of nuclear weapons. In its view, the two most heavily armed Powers had, as a result of numerous tests, accumulated sufficient data to make any qualitative improvements they might desire, without carrying out new tests.

100. The Disarmament Commission, as established by the special session of the General Assembly devoted to disarmament, at its first substantive session in 1979, elaborated the elements of a comprehensive programme of disarmament and mentioned a nuclear-test ban first in the list of measures of the programme.

101. The Committee on Disarmament, the disarmament negotiating body, also held its first session in 1979. Its agenda for the session also listed first the question of a nuclear-test ban.

102. The latest resolution of the General Assembly on the subject^{42/} contains the following two provisions:

"The General Assembly,

" ...

"4. Requests the Committee on Disarmament to initiate negotiations on such a treaty, as a matter of the highest priority;

"5. Calls upon the three negotiating nuclear-weapon States to use their best endeavours to bring their negotiations to a positive conclusion in time for consideration during the next session of the Committee on Disarmament.

V. TRILATERAL NEGOTIATIONS ON A COMPREHENSIVE TEST BAN

103. Following bilateral consultations between the Soviet Union and the United States in June 1977 on the subject of a test ban, trilateral negotiations, in which the United Kingdom joined, began in July of that year for the achievement of a comprehensive test ban.^{43/} Several rounds of these talks have since taken place, the latest of which opened in Geneva on 4 February 1980.

104. The trilateral negotiations are private, and official information in regard to them is based on the progress reports that have been provided from time to time to the multilateral negotiating body by the United Kingdom on behalf of the three negotiating parties. Three such reports have been presented so far: on 16 March 1978, 8 August 1978 and 31 July 1979.^{44/}

105. The following points have emerged from those reports concerning the substance of the negotiations:

(a) The trilateral negotiations were aimed at achieving a treaty prohibiting nuclear-weapon tests in all environments and a protocol covering nuclear explosions for peaceful purposes, which would be an integral part of the treaty.

(b) There was agreement that the treaty should provide for verification by national technical means and for the possibility of on-site inspection.

(c) The USSR, the United Kingdom and the United States shared the widely held view that an international exchange of seismic data would play a major role in verification of compliance with the treaty. They considered that all parties to the treaty should have the right to participate and to receive seismic data provided by the international exchange, whether or not they contributed seismic stations to the global network. They agreed that the guidelines for setting up and running the international seismic exchange should be laid down in an annex to the treaty, and that the detailed organizational and procedural arrangements for implementing the international exchange should be worked out after the entry into force of the treaty. The recommendations of the Ad Hoc Group of Scientific Experts to Consider International Co-operative Measures to Detect and Identify Seismic Events would, in large measure, influence the way in which the exchange of seismic data was implemented in practice. The negotiating parties considered that a committee of experts drawn from the parties to the treaty should be established to assist in the implementation of the exchange.

(d) It was envisaged that after a certain period the parties to the treaty would wish to hold a conference to review its operation.

106. Concerning the progress of the negotiations, the United Kingdom stated, in the 1979 report, that a large measure of agreement had already been reached between the three negotiating parties. It also pointed out that although there was agreement on the main elements of verification, negotiations were still proceeding on the detailed arrangements. The United Kingdom stated that verification was a complex subject, involving many technical issues that required time to negotiate. The three negotiating partners recognized the legitimate interest of the Committee on Disarmament in the earliest completion of the negotiations -- and the calls to that effect in successive General Assembly resolutions, as well as in the Final Document of the tenth special session of the General Assembly. They were determined to achieve an agreement which would meet international expectations and attract the widest possible adherence.

107. In addition to presenting joint progress reports, the three negotiating parties have commented individually on the state of the trilateral negotiations in the Conference of the Committee on Disarmament, in the Committee on Disarmament and in the General Assembly.

108. The USSR stated that in the course of the negotiations it had suggested a number of constructive steps with respect to the issues that presented the greatest difficulty, in order to bring the matter to a speedy and successful conclusion. It had agreed to verification on a voluntary basis, to a moratorium on peaceful nuclear explosions and to the entry into force of the treaty -- even if initially not all the five nuclear Powers became parties to it. The Soviet Union considered that an early conclusion of a treaty and its entry into force would contribute to the cessation of the nuclear arms race and would create the conditions necessary for a transition to nuclear disarmament.^{45/}

109. The United Kingdom stated that its objective was to achieve a comprehensive test-ban treaty which would be non-discriminatory in that it would ban nuclear explosions by all parties, nuclear-weapon and non-nuclear-weapon States alike. It also noted that agreement in principle had been reached on many of the major issues in the negotiations, including the key point that the treaty should be genuinely comprehensive. Although much progress had been made, there were still difficult problems, particularly concerning verification. The United Kingdom believed that adequate verification measures were needed to provide the necessary confidence in regard to compliance with the treaty's obligations. It was determined to make every effort to bring to a successful and early conclusion a viable and fair treaty which would attract the adherence of as many States as possible, both nuclear and non-nuclear.^{46/}

110. The United States pointed out that the treaty that was being negotiated would be of fixed duration. It stated its determination to bring the ongoing negotiations to an early and successful conclusion but emphasized that if a comprehensive test-ban treaty was to serve its objectives effectively, it must provide for measures capable of promoting confidence that its provisions were being faithfully implemented. In that respect, a significant number of critical questions remained to be resolved. The United States pointed out that innovative co-operative measures would be required, as the negotiating parties had recognized. Work was continuing on that and other aspects but a number of problems had been less susceptible to prompt solution than the United States had hoped. It understood the strong interest of the entire world community in the success of the negotiations but was convinced that the only practical means of achieving the common objective of a comprehensive test ban was for the United Kingdom, the Soviet Union and the United States to continue their efforts to resolve the remaining differences in their negotiations.^{47/}

111. The initiation of the trilateral negotiations in 1977 was generally welcomed, and the USSR, the United Kingdom and the United States were urged to bring them to a speedy conclusion and submit a draft treaty to the CCD, with a view to the elaboration of a generally acceptable treaty. In the following years, there was increasing dissatisfaction at the fact that no draft treaty had emerged for consideration in the negotiating body and that, consequently, it had not been possible to initiate multilateral negotiations on the question that had for long been a matter of the highest priority. Many countries were also disappointed at the general nature of the information provided by the three Powers and called for more precise indication of the progress of the negotiations and of the areas where agreement had yet to be reached.

112. There have been a number of comments on some of the requirements a treaty would have to meet to be generally acceptable and effective. For instance, it has been held that the treaty should be truly comprehensive in scope, without any loopholes; that it should provide for the participation of all parties in the verification process; that all nuclear-weapon States should become parties to the treaty; and that provision should be made for its automatic prolongation, with the usual clause for withdrawal in the event the vital interests of a party were being threatened.

113. Following the 1979 joint progress report, many States argued that negotiations in the Committee on Disarmament should not await the submission of an agreed text by the USSR, the United Kingdom and the United States. The Group of 21 of the Committee on Disarmament,^{48/} in its statement on the conclusion

of the Committee's 1979 session, held that there was no justification to delay any further the initiation of concrete negotiations in the Committee on a comprehensive test ban and called for such negotiations to start at the beginning of the 1980 session as the item of highest priority.^{49/}

114. That sense of urgency in regard to a comprehensive test ban, underlay General Assembly resolution 34/83B, by which the Assembly urged the Committee on Disarmament to proceed without any further delay to substantive negotiations on the priority questions on its agenda and invited Committee members involved in separate negotiations on specific priority questions of disarmament to make every effort to achieve a positive conclusion of those negotiations without further delay for submission to the Committee and, failing that, to submit to the Committee a full report on the status of their separate negotiations and results achieved so far, in order to contribute most directly to the negotiations in the Committee as envisaged in the resolution.

VI. THE MAJOR UNRESOLVED ISSUES

115. The obstacles to effective negotiations among the USSR, the United Kingdom and the United States on a comprehensive test ban seemed to have been removed in 1977, when those States agreed that on-site inspection to verify compliance with the treaty might be carried out under certain circumstances, that explosions for peaceful purposes would be covered by a protocol which would be an integral part of the treaty, and that participation of all nuclear-weapon Powers would not be required for the treaty to enter into force. Nevertheless, the trilateral talks on a comprehensive test ban, which have now been going on for nearly three years, have not as yet succeeded in formulating a treaty text which could be submitted to the Committee on Disarmament for Multilateral consideration. The major unresolved issues, together with possible solutions, are reviewed below.

116. In considering those issues, it should be noted first that various reasons have been adduced to justify the continuation of nuclear-weapon testing. Among those most often propounded is that test explosions are necessary to maintain confidence in the reliability of the stockpiled weapons. In reply to this contention, highly qualified views have been advanced to the effect that the state of stockpiled nuclear weapons can be checked without nuclear testing.^{50/} Even assuming that the nuclear weapons were subject to deterioration, any such deterioration would affect the arsenals of all nuclear-weapon Powers. Moreover, experts who have studied the problem consider that the less confidence there is in nuclear weapons, the less would be the temptation to rely on them.^{51/}

1. Verification of the comprehensive test ban

117. The problems of verification of a comprehensive test ban necessarily differ in important respects from those of the partial test-ban Treaty. The partial test-ban Treaty which prohibits nuclear testing in three environments — in the atmosphere, in outer space and under water — did not set up any mechanism to check whether the commitments of the Parties were being complied with. The nuclear-weapon States parties were satisfied that each could monitor the terms of the Treaty unilaterally, using its own national means of verification, while other parties were also confident that a violation would not remain undetected.

118. Any presumed gains from clandestine atmospheric explosions may turn out to be relatively small when compared to the cost of concealment and the risk of detection. Actually, since the Parties are permitted to test underground, there appears to be no reason for violating the partial test-ban Treaty.

119. Because it is difficult to predict precisely the yield of nuclear explosions and because of the additional difficulties of verification of explosions near the threshold level, a threshold test ban poses many more problems for observance and verification than a comprehensive test ban.

120. Under a comprehensive test ban, secret underground testing may provide a military advantage to a violator, and it may not be possible to obtain, through the parties' own means alone, assurance that the prohibition is being observed. Provision for verification by both national and international means must, therefore, be made in a treaty banning all underground nuclear tests.

(a) Seismic monitoring

121. It is now generally recognized that seismological means are a most effective form of verification and that they can provide deterrence against clandestine underground nuclear tests. Therefore, whatever additional methods might be used by individual nations, seismological verification will constitute the principal component of a global control system for an underground test ban. In 1976, the Conference of the Committee on Disarmament (CCD) established the Ad Hoc Group of Scientific Experts to Consider International Co-operative Measures to Detect and Identify Seismic Events.

122. In its reports,^{52/} the Ad Hoc Group has suggested that these measures should include a systematic improvement of procedures at seismological stations around the globe, an international exchange of seismic data over the global telecommunications system of the World Meteorological Organization (WMO), and the processing of the data at special international data centres for use by participating States.

123. In particular, the Group of Experts considered that a seismological verification system should comprise about 50 globally distributed teleseismic stations, selected in accordance with seismological requirements, and that there should be routine reporting by these stations of basic parameters of detected seismic signals, as well as transmission of data in response to requests for

additional information regarding events of particular interest. International centres would receive the data mentioned above, analyse those data in accordance with agreed procedures in order to estimate location, magnitude and depth of seismic events; associate identification parameters with those events; distribute compilations of the complete results of those analyses, and act as a data bank.

124. Details remain to be worked out to render the proposed seismic network operative. These include the distribution of stations, particularly in the southern hemisphere, equipment for data acquisition and data communications facilities.

125. According to some sources, the envisaged network of stations would be capable of detecting and locating in the USSR and the United States seismic events of a magnitude corresponding to that of a fully contained nuclear explosion in hard rock with a yield of about one kiloton TNT. The capability for obtaining data for distinguishing explosions from earthquakes (and not merely detecting and locating them) would be somewhat less.^{53/}

126. As indicated earlier, the parties to the trilateral negotiations stated that the Ad Hoc Group's recommendations would, "in large measure", influence the way in which the exchange of data among all the parties to the comprehensive test ban was implemented in practice. They also expressed the view that a committee of experts drawn from the parties to the treaty should be established to assist in the implementation of the exchange.^{54/}

127. As a supplement to the global seismic network, the USSR, the United Kingdom and the United States are reported to be negotiating additional arrangements to meet their verification requirements. These arrangements would apparently consist mainly in the establishment of internal, so-called national seismic stations (NSS), which would have international aspects.^{55/}

128. The national seismic stations, which are still in the stage of development, would be advanced, tamper-proof stations, nationally manned, as opposed to the automatic black boxes proposed in previous years, and the data recorded by them would be transmitted outside the host country continuously and directly.

129. It is understood that the national seismic stations would help lower the detection threshold. If properly distributed, they would also provide supplementary identification data for monitoring earthquakes, thus contributing to a more confident identification of seismic events detected by a global network. Furthermore, the national seismic stations could serve to deter evasion if placed in areas whose geological structure might be considered suitable for conducting clandestine tests.^{56/} Such areas exist, for instance, in the USSR and the United States.^{57/}

130. Questions relating to the instrumentation of the national seismic stations, their number and location in each of the negotiating States^{58/}, procedures for their emplacement and maintenance, as well as the transmission of data, are to be solved.

(b) On-site inspection

131. The need for on-site inspection is being urged on the ground that although the global seismic network can provide a high degree of confidence that a comprehensive test ban is not being violated, there may still be a few events of uncertain origin. When the global seismic network is supplemented with national seismic stations, satellite observation, electronic and other means of information gathering (which can even detect preparations for tests), the need for on-site inspection would be further reduced. Ambiguous events could also be clarified by the provision of seismic data from stations not belonging to the global network, as well as other information.

132. The partners in the tripartite negotiations have agreed on the possibility of having on-site inspection.^{59/} It is understood that such inspection would be conducted on a voluntary or "challenge" basis and that a case would have to be made not only for a challenge but for a rejection.^{60/}

133. It is worth noting that "on-site observation" was agreed upon in the 1976 peaceful nuclear explosions Treaty between the USSR and the United States, which has not entered into force. A protocol to that Treaty contains detailed provisions regulating the number of observers, the geographical extent of their access, their equipment, records and immunities. These provisions might be useful in connexion with the modalities of on-site inspection for a comprehensive test ban.

(c) Participation in verification arrangements

134. Various States have expressed the view that it would be necessary to ensure that all parties to a comprehensive test ban have the possibility to participate in the verification process as envisaged in the Final Document of the special session of the General Assembly.

135. A problem which arises is whether the verification arrangements which are being negotiated by the USSR, the United Kingdom and the United States will be reserved solely for the three Powers, on the basis of reciprocity, or "multilateralized" to include other parties, both nuclear-weapon and non-nuclear-weapon States. All States have an interest in effective verification, but the nuclear-weapon States have a special interest in monitoring each other.

Consequently, problems concerning the application of the whole verification system will arise, particularly for the nuclear-weapon States, if China and France decide to participate in the comprehensive test ban.

136. Among the specific questions that might arise is whether any other States, in addition to the USSR, the United Kingdom and the United States, would be required to set up national seismic stations; whether the data from national seismic stations would be generally available; and whether on-site inspections on the territories of the three great Powers would be conducted with the participation of other States as well.

137. The three negotiating parties have stated that they consider that all parties to the Treaty should have the right to participate in and to receive seismic data provided by the international exchange, whether or not they contribute seismic stations to the global network.

138. The relation between the arrangements that are being negotiated trilaterally and those in which all parties to the treaty would participate, will have to be worked out. Some experts feel that if there are to be verification arrangements valid only for the USSR, the United Kingdom and the United States, and separate from the verification system valid for all, it would facilitate early agreement if negotiations for multilateral arrangements were initiated as soon as possible.

2. Scope of the comprehensive test ban

(a) Peaceful nuclear explosions

139. The participants in the tripartite negotiations have agreed that a treaty prohibiting weapon tests would be accompanied by a protocol, as an integral part of the treaty, covering peaceful nuclear explosions. The two documents would be of the same duration. Thus, in practice, the comprehensive test ban that is being negotiated would cover all nuclear explosions.

140. For several States, including the three negotiating parties, there is a problem of compatibility of such a comprehensive coverage with the non-proliferation Treaty, which contains an obligation to ensure that "potential" benefits from any peaceful application of nuclear explosions should be made available to non-nuclear-weapon States parties to the non-proliferation Treaty, as well as with the 1976 peaceful nuclear explosions Treaty, which regulates the Soviet and the United States peaceful explosions. However, there seems to be a consensus among the negotiating Powers that as long as peaceful programmes can be used to obtain weapon-related information, it will be impossible to separate nuclear-weapon testing from peaceful nuclear explosions. Different problems will arise in the case of non-nuclear-weapon States that are not parties to the non-proliferation Treaty.

(b) Laboratory tests

141. It may be argued that in order to be effective, a comprehensive test ban should cover all explosions without exception, including laboratory tests. On the other hand, it can be contended that a comprehensive test ban could not cover laboratory tests because they are contained and not verifiable, and also because some of them may be useful for various peaceful purposes, including the development of new sources of energy. Such tests could, for example, consist of extremely low-yield "nuclear experiments", or the so-called inertial confinement fusion.

142. Extremely low-yield nuclear experiments could involve an explosion of a device which may have characteristics of a nuclear explosive device but uses fissile material of an amount or kind that produces only a fraction of the yield of the chemical explosion that sets off the release of the nuclear energy. The question is whether such a test, which could be conducted in a containment facility at a laboratory, should be considered a nuclear-weapon test explosion.^{61/}

143. The inertial confinement concept is to use lasers or other high-power sources to heat and compress small pellets containing fusionable fuel (deuterium and tritium). If a properly shaped pulse of sufficient energy can be delivered to the pellet, the density and temperature may become high enough for fusion.^{62/} This would be a laboratory nuclear explosion of tiny proportions.

144. It will be recalled that in 1975, during the first non-proliferation Treaty Review Conference, the United States, responding to a question asked by Switzerland about the legality of contained thermonuclear micro explosions for peaceful purposes, made the following statement:

"A question has been raised with respect to energy sources, of a kind on which research has been reported, involving nuclear reactions initiated in millimeter-sized pellets of fissionable and/or fusionable material by lasers or by energetic beams of particles, in which the energy releases, while extremely rapid, are designed to be, and will be, nondestructively contained within a suitable vessel. On the basis of our present understanding of this type of energy source, which is still at an early stage of research, we have concluded that it does not constitute a nuclear explosive device within the meaning of the non-proliferation Treaty or undertakings in IAEA Safeguards Agreements against diversion to any nuclear explosive device."^{64/}

The above interpretation was supported at the Conference by the United Kingdom. The USSR did not comment.

145. Recently, the United States stated that it did not anticipate that inertial confinement fusion research would be constrained under the prospective limited duration comprehensive test ban.^{64/} The technology in question may have both civilian and military applications, but new weapons designs "cannot be based on laser fusion experimentation alone".^{65/}

3. Duration of the comprehensive test ban

146. It has always been assumed that a comprehensive test ban would be of indefinite duration. However, in recent years, a comprehensive test ban of fixed duration has been discussed,^{66/} and there are indications that the comprehensive test ban now being negotiated trilaterally may be limited to three years.^{67/} A review conference of the parties is envisaged to be held before the expiration of the treaty.^{68/} It has been suggested that such a conference could discuss the possible extension of the treaty.^{69/} It can be assumed that the protocol to the treaty, covering peaceful nuclear explosions, would be subject to the same treatment as the treaty itself.

147. As regards the duration of the comprehensive test ban, the treaty should fulfil the pledge included in the partial test ban Treaty, and reiterated in the non-proliferation Treaty, "to achieve the discontinuance of all test explosions of nuclear weapons for all time."

148. According to some views, a comprehensive test ban of short duration would create a problem with respect to the adherence of non-nuclear-weapon States, particularly for parties to the non-proliferation Treaty, which have renounced the possession of nuclear weapons and other nuclear explosive devices for a longer period.

149. Resumption of tests upon the expiration of a short-lived comprehensive test ban might be a serious setback to the cause of arms limitation and disarmament.

150. Finally, whatever the format of the comprehensive test ban, the existing commitments and the continued operation of the partial test-ban Treaty would need to be ensured so that the prohibitions contained in that Treaty will endure.

CONCLUSIONS

151. A main objective of all efforts of the United Nations in the field of disarmament has been to halt and reverse the nuclear-arms race, to stop the production of nuclear weapons and to achieve their eventual elimination.

152. In this connexion, a comprehensive test ban is regarded as the first and most urgent step towards a cessation of the nuclear-arms race, in particular, as regards its qualitative aspects.

153. Over the years, enormous efforts have been invested in achieving a cessation of all nuclear-weapon tests by all States for all time. These efforts have occupied the uninterrupted attention of the Members of the United Nations for a longer period of time than any other disarmament issue.

154. The trilateral negotiations have now been going on for nearly three years, while in the Committee on Disarmament negotiations have still not commenced. In order to bring the achievement of a comprehensive test ban nearer to realization, much more intensive negotiations are essential. Verification of compliance no longer seems to be an obstacle to reaching agreement.

155. A comprehensive test ban could serve as an important measure of non-proliferation of nuclear weapons, both vertical and horizontal.

156. A comprehensive test ban would have a major arms limitation impact in that it would make it difficult, if not impossible, for the nuclear-weapon States parties to the treaty to develop new designs of nuclear weapons and would also place constraints on the modification of existing weapon designs.

157. A comprehensive test ban would also place constraints on the further spread of nuclear weapons by preventing nuclear explosions, although a test explosion may not be absolutely essential for constructing a simple fission device.

158. In the view of the parties to the non-proliferation Treaty, a comprehensive test ban would reinforce the Treaty by demonstrating the awareness of the major nuclear Powers of the legal obligation under the Treaty "to pursue negotiations in good faith on effective measures relating to cessation of the nuclear arms race at an early date".

159. The arms limitation benefits of a comprehensive test ban could be enhanced, and the channels of arms competition among the great Powers further narrowed, if the comprehensive test ban were followed by restrictions on the qualitative improvement of nuclear delivery vehicles.

The widespread impatience and dissatisfaction of the non-nuclear-weapon States with the failure of the nuclear Powers to stop nuclear-weapon tests [has been] clearly demonstrated ...

A comprehensive test-ban treaty would strengthen the Treaty on the Non-Proliferation of Nuclear Weapons ... It would be a major step towards halting what has been called "vertical proliferation", that is the further sophistication and deployment of nuclear weapons, and would also strengthen the resolve of potential nuclear-weapon States not to acquire nuclear weapons and thereby help to prevent the "horizontal proliferation" of such weapons. On the other hand, if nuclear-weapon tests by the nuclear Powers continue, the future credibility and perhaps even the viability of the non-proliferation Treaty achieved after such painstaking effort may be jeopardized. I need not describe the greatly increased dangers that would confront the world in such event.

B. TREATY BANNING NUCLEAR WEAPONS TESTS IN THE
ATMOSPHERE, IN OUTER SPACE AND UNDER WATER

The Governments of the United States of America, the United Kingdom of Great Britain and Northern Ireland, and the Union of Soviet Socialist Republics, hereinafter referred to as the "Original Parties",

Proclaiming as their principal aim the speediest possible achievement of an agreement on general and complete disarmament under strict international control in accordance with the objectives of the United Nations which would put an end to the armaments race and eliminate the incentive to the production and testing of all kinds of weapons, including nuclear weapons,

Seeking to achieve the discontinuance of all test explosions of nuclear weapons for all time, determined to continue negotiations to this end, and desiring to put an end to the contamination of man's environment by radioactive substances,

Have agreed as follows:

Article I

1. Each of the Parties to this Treaty undertakes to prohibit, to prevent, and not to carry out any nuclear weapon test explosion, or any other nuclear explosion, at any place under its jurisdiction or control:

(a) in the atmosphere; beyond its limits, including outer space; or under water, including territorial waters or high seas; or

(b) in any other environment if such explosion causes radioactive debris to be present outside the territorial limits of the State under whose jurisdiction or control such explosion is conducted. It is understood in this connexion that the provisions of this subparagraph are without prejudice to the conclusion of a treaty resulting in the permanent banning of all nuclear test explosions, including all such explosions underground, the conclusion of which, as the Parties have stated in the Preamble to this Treaty, they seek to achieve.

2. Each of the Parties to this Treaty undertakes furthermore to refrain from causing, encouraging, or in any way participating in, the carrying out of any nuclear weapon test explosion, or any other nuclear explosion, anywhere which would take place in any of the environments described, or have the effect referred to, in paragraph 1 of this Article.

Article II

1. Any Party may propose amendments to this Treaty. The text of any proposed amendment shall be submitted to the Depositary Governments which shall circulate it to all Parties to this Treaty. Thereafter, if requested to do so

by one-third or more of the Parties, the Depositary Governments shall convene a conference, to which they shall invite all the Parties, to consider such amendment.

2. Any amendment to this Treaty must be approved by a majority of the votes of all the Parties to this Treaty, including the votes of all of the Original Parties. The amendment shall enter into force for all Parties upon the deposit of instruments of ratification by a majority of all the Parties, including the instruments of ratification of all of the Original Parties.

Article III

1. This Treaty shall be open to all States for signature. Any State which does not sign this Treaty before its entry into force in accordance with paragraph 3 of this Article may accede to it at any time.

2. This Treaty shall be subject to ratification by signatory States. Instruments of ratification and instruments of accession shall be deposited with the Governments of the Original Parties -- the United States of America, the United Kingdom of Great Britain and Northern Ireland, and the Union of Soviet Socialist Republics -- which are hereby designated the Depositary Governments.

3. This Treaty shall enter into force after its ratification by all the Original Parties and the deposit of their instruments of ratification.

4. For States whose instruments of ratification or accession are deposited subsequent to the entry into force of this Treaty, it shall enter into force on the date of the deposit of their instruments of ratification or accession.

5. The Depositary Governments shall promptly inform all signatory and acceding States of the date of each signature, the date of deposit of each instrument of ratification and accession to this Treaty, the date of its entry into force, and the date of receipt of any requests for conferences or other notices.

6. This Treaty shall be registered by the Depositary Governments pursuant to Article 102 of the Charter of the United Nations.

Article IV

This Treaty shall be of unlimited duration.

Each Party shall in exercising its national sovereignty have the right to withdraw from the Treaty if it decides that extraordinary events related to the subject matter of this Treaty, have jeopardized the supreme interests of its country. It shall give notice of such withdrawal to all other Parties to the Treaty three months in advance.

Article V

This Treaty, of which the English and Russian texts are equally authentic, shall be deposited in the archives of the Depositary Governments. Duly certified copies of this Treaty shall be transmitted by the Depositary Governments to the Governments of the signatory and acceding States.

IN WITNESS WHEREOF the undersigned, duly authorized, have signed this Treaty.

DONE in triplicate at the city of Moscow the fifth day of August, one thousand nine hundred and sixty-three.

C. LIST OF PARTIES AND SIGNATORIES TO THE TREATY BANNING NUCLEAR
WEAPON TESTS IN THE ATMOSPHERE, IN OUTER SPACE AND UNDER WATER

Signed by the Union of Soviet Socialist Republics, the United Kingdom of
Great Britain and Northern Ireland and the United States of America at Moscow:
5 August 1963

Opened for signature at London, Moscow and Washington: 8 August 1963

Entered into force: 10 October 1963

The Depositary Governments: Union of Soviet Socialist Republics, United Kingdom of
Great Britain and Northern Ireland and United States of America .

- (i) Signatures affixed on the original of the Treaty deposited with the
Governments of the: Union of Soviet Socialist Republics (M),
United Kingdom of Great Britain and Northern Ireland (L), and
United States of America (W).
- (ii) Instruments of ratification, accession (a) or succession (s) deposited
with the Governments of the: Union of Soviet Socialist Republics (M),
United Kingdom of Great Britain and Northern Ireland (L), and
United States of America (W).

<u>State</u>	(i) <u>Signature</u>	(ii) <u>Deposit</u>
Afghanistan	(M) 9 August 1963	23 March 1964
	(L) 8 August 1963	12 March 1964
	(W) 8 August 1963	13 March 1964
Algeria	(M) 19 August 1963	-
	(L) 14 August 1963	-
	(W) 14 August 1963	-
Argentina	(M) 9 August 1963	-
	(L) 9 August 1963	-
	(W) 8 August 1963	-
Australia	(M) 8 August 1963	12 November 1963
	(L) 8 August 1963	12 November 1963
	(W) 8 August 1963	12 November 1963
Austria	(M) 11 September 1963	17 July 1964
	(L) 12 September 1963	17 July 1964
	(W) 11 September 1963	17 July 1964
Bahamas	(M) -	16 July 1976 (s)
	(L) -	13 August 1976 (s)
	(W) -	13 August 1976 (s) <u>1/</u>
Belgium	(M) 8 August 1963	1 March 1966
	(L) 8 August 1963	1 March 1966
	(W) 8 August 1963	1 March 1966
Benin (Dahomey)	(M) 9 October 1963	23 December 1964
	(L) 3 September 1963	22 April 1965
	(W) 27 August 1963	15 December 1964

<u>State</u>	(i) <u>Signature</u>	(ii) <u>Deposit</u>
Bhutan	(M) - (L) - (W) -	* * 8 June 1978 (a)
Bolivia	(M) 20 September 1963 (L) 21 August 1963 (W) 8 August 1963	4 August 1965 25 January 1966 4 August 1965
Botswana	(M) - (L) - (W) -	5 January 1968 (s) 14 February 1968 (s) 4 March 1968 (s) <u>1/</u>
Brazil	(M) 9 August 1963 (L) 8 August 1963 (W) 8 August 1963	15 December 1964 4 March 1965 15 January 1965
Bulgaria	(M) 8 August 1963 (L) 8 August 1963 (W) 8 August 1963	21 November 1963 2 December 1963 13 November 1963
Burma	(M) 14 August 1963 (L) 14 August 1963 (W) 14 August 1963	15 November 1963 15 November 1963 15 November 1963
Burundi	(M) * (L) * (W) 4 October 1963	- - -
Byelorussian SSR	(M) 8 October 1963 (L) * (W) *	16 December 1963 * *
Cameroon, United Republic of	(M) * (L) 6 September 1963 (W) 27 August 1963	- - -
Canada	(M) 8 August 1963 (L) 8 August 1963 (W) 8 August 1963	28 January 1964 28 January 1964 28 January 1964
Cape Verde	(M) - (L) - (W) -	24 October 1979 (a)
Central African Republic	(M) - (L) - (W) -	25 September 1965 (a) 24 August 1965 (a) 22 December 1964 (a)
Chad	(M) * (L) * (W) 26 August 1963	* * 1 March 1965
Chile	(M) 9 August 1963 (L) 9 August 1963 (W) 8 August 1963	* 6 October 1965 *
Colombia	(M) 16 August 1963 (L) 20 August 1963 (W) 16 August 1963	- - -
Costa Rica	(M) 23 August 1963 (L) 9 August 1963 (W) 13 August 1963	* * 10 July 1967

<u>State</u>	<u>(i) Signature</u>	<u>(ii) Deposit</u>
Cyprus	(M) 8 August 1963 (L) 8 August 1963 (W) 8 August 1963	21 April 1965 15 April 1965 7 May 1965
Czechoslovakia	(M) 8 August 1963 (L) 8 August 1963 (W) 8 August 1963	14 October 1963 14 October 1963 17 October 1963
Denmark	(M) 9 August 1963 (L) 9 August 1963 (W) 9 August 1963	15 January 1964 15 January 1964 15 January 1964
Dominican Republic	(M) 19 September 1963 (L) 17 September 1963 (W) 16 September 1963	3 June 1964 18 June 1964 22 July 1964
Ecuador	(M) 1 October 1963 (L) 1 October 1963 (W) 27 September 1963	13 November 1964 8 May 1964 6 May 1964
Egypt (UAR)	(M) 8 August 1963 (L) 8 August 1963 (W) 8 August 1963	10 January 1964 <u>2/</u> 10 January 1964 10 January 1964 <u>2/</u>
El Salvador	(M) 23 August 1963 (L) 22 August 1963 (W) 21 August 1963	9 February 1965 7 December 1964 3 December 1964
Ethiopia	(M) 19 September 1963 (L) 9 August 1963 (W) 9 August 1963	- - -
Fiji	(M) - (L) - (W) -	14 July 1972 (s) 14 July 1972 (s) 18 July 1972 (s) <u>1/</u>
Finland	(M) 8 August 1963 (L) 8 August 1963 (W) 8 August 1963	9 January 1964 9 January 1964 9 January 1964
Gabon	(M) * (L) * (W) 10 September 1963	9 March 1964 4 March 1964 20 February 1964
Gambia	(M) - (L) - (W) -	27 April 1965 (s) 6 May 1965 (s) 27 April 1965 (s) <u>1/</u>
German Democratic Republic	(M) 8 August 1963 (L) * (W) -	30 December 1963 * -
Germany, Federal Republic of	(M) 19 August 1963 (L) 19 August 1963 (W) 19 August 1963	* 1 December 1964 <u>3/</u> 1 December 1964 <u>3/</u>
Ghana	(M) 8 August 1963 (L) 4 September 1963 (W) 9 August 1963	31 May 1965 27 November 1963 9 January 1964
Greece	(M) 9 August 1963 (L) 9 August 1963 (W) 8 August 1963	18 December 1963 18 December 1963 18 December 1963

<u>State</u>	(i) <u>Signature</u>	(ii) <u>Deposit</u>
Guatemala	(M) *	*
	(L) *	*
	(W) 23 September 1963	6 January 1964 4/
Guinea Bissau	(M) -	20 August 1976 (a)
	(L) -	*
	(W) -	*
Haiti	(M) *	-
	(L) *	-
	(W) 9 October 1963	-
Honduras	(M) 16 August 1963	*
	(L) 15 August 1963	2 December 1964
	(W) 8 August 1963	2 October 1964
Hungary	(M) 8 August 1963	23 October 1963
	(L) 8 August 1963	21 October 1963
	(W) 8 August 1963	22 October 1963
Iceland	(M) 12 August 1963	29 April 1964
	(L) 12 August 1963	29 April 1964
	(W) 12 August 1963	29 April 1964
India	(M) 8 August 1963	14 October 1963
	(L) 8 August 1963	10 October 1963
	(W) 8 August 1963	18 October 1963
Indonesia	(M) 23 August 1963	20 January 1964
	(L) 23 August 1963	8 May 1964
	(W) 23 August 1963	27 January 1964
Iran	(M) 8 August 1963	5 May 1964
	(L) 8 August 1963	5 May 1964
	(W) 8 August 1963	5 May 1964
Iraq	(M) 13 August 1963	3 December 1964
	(L) 13 August 1963	30 November 1964
	(W) 13 August 1963	1 December 1964
Ireland	(M) 9 August 1963	20 December 1963
	(L) 8 August 1963	18 December 1963
	(W) 8 August 1963	18 December 1963
Israel	(M) 8 August 1963	28 January 1964
	(L) 8 August 1963	15 January 1964
	(W) 8 August 1963	15 January 1964
Italy	(M) 8 August 1963	10 December 1964
	(L) 8 August 1963	10 December 1964
	(W) 8 August 1963	10 December 1964
Ivory Coast	(M) *	*
	(L) *	*
	(W) 5 September 1963	5 February 1965
Jamaica	(M) 13 August 1963	-
	(L) 13 August 1963	-
	(W) 13 August 1963	-

<u>State</u>	(i) <u>Signature</u>	(ii) <u>Deposit</u>
Japan	(M) 14 August 1963 (L) 14 August 1963 (W) 14 August 1963	15 June 1964 15 June 1964 15 June 1964
Jordan	(M) 19 August 1963 (L) 12 August 1963 (W) 12 August 1963	7 July 1964 29 May 1964 10 July 1964
Kenya	(M) - (L) - (W) -	30 June 1965 (a) 10 June 1965 (a) 11 June 1965 (a)
Korea, Republic of	(M) * (L) 30 August 1963 (W) 30 August 1963	* 24 July 1964 5/ 24 July 1964 5/
Kuwait	(M) 20 August 1963 (L) 20 August 1963 (W) 20 August 1963	17 June 1965 6/ 21 May 1965 20 May 1965 6/
Laos	(M) 12 August 1963 (L) 12 August 1963 (W) 12 August 1963	7 April 1965 10 February 1965 12 February 1965
Lebanon	(M) 13 August 1963 (L) 13 August 1963 (W) 12 August 1963	4 June 1965 20 May 1965 14 May 1965
Liberia	(M) 27 August 1963 (L) 16 August 1963 (W) 8 August 1963	16 June 1964 22 May 1964 19 May 1964
Libyan Arab Jamahiriya (Libya)	(M) 16 August 1963 (L) 9 August 1963 (W) 16 August 1963	* 15 July 1968 *
Luxembourg	(M) 13 September 1963 (L) 13 August 1963 (W) 3 September 1963	10 February 1965 10 February 1965 10 February 1965
Madagascar	(M) * (L) * (W) 23 September 1963	* * 15 March 1965
Malawi	(M) - (L) - (W) -	26 November 1964 (s) 7 January 1965 (s) 26 November 1964 (s) 1/
Malaysia (Federation of Malaya)	(M) 21 August 1963 (L) 12 August 1963 (W) 8 August 1963 8/	15 July 1964 16 July 1964 16 July 1964
Mali	(M) 23 August 1963 (L) 23 August 1963 (W) 23 August 1963	- - -
Malta	(M) - (L) - (W) -	25 November 1964 (s) 1 December 1964 (s) 25 November 1964 (s) 1/
Mauritania	(M) 8 October 1963 (L) 17 September 1963 (W) 13 September 1963	28 April 1964 15 April 1964 6 April 1964

<u>State</u>	(i) <u>Signature</u>	(ii) <u>Deposit</u>
Mauritius	(M) - (L) - (W) -	30 April 1969 (s) 12 May 1969 (s) 30 April 1969 (s) <u>8/</u>
Mexico	(M) 8 August 1963 (L) 8 August 1963 (W) 8 August 1963	27 December 1963 27 December 1963 27 December 1963
Mongolia, People's Republic of	(M) 8 August 1963 (L) 8 August 1963 (W) *	1 November 1963 7 November 1963 *
Morocco	(M) 27 August 1963 (L) 30 August 1963 (W) 27 August 1963	18 February 1966 1 February 1966 21 February 1966
Nepal	(M) 26 August 1963 (L) 26 August 1963 (W) 30 August 1963	7 October 1964 7 October 1964 7 October 1964
Netherlands	(M) 9 August 1963 (L) 9 August 1963 (W) 9 August 1963	14 September 1964 14 September 1964 <u>8/</u> 14 September 1964 <u>8/</u>
New Zealand	(M) 8 August 1963 (L) 8 August 1963 (W) 8 August 1963	16 October 1963 10 October 1963 10 October 1963
Nicaragua	(M) 16 August 1963 (L) 13 August 1963 (W) 13 August 1963	26 February 1965 26 January 1965 26 February 1965
Niger	(M) * (L) 24 September 1963 (W) 24 September 1963	3 July 1964 6 July 1964 9 July 1964
Nigeria	(M) 30 August 1963 (L) 2 September 1963 (W) 4 September 1963	25 February 1967 17 February 1967 28 February 1967
Norway	(M) 9 August 1963 (L) 9 August 1963 (W) 9 August 1963	21 November 1963 21 November 1963 21 November 1963
Pakistan	(M) 14 August 1963 (L) 14 August 1963 (W) 14 August 1963	- - -
Panama	(M) * (L) * (W) 20 September 1963	* * 24 February 1966
Paraguay	(M) 21 August 1963 (L) 15 August 1963 (W) 15 August 1963	- - -
Peru	(M) 23 August 1963 (L) 23 August 1963 (W) 23 August 1963	21 August 1964 4 August 1964 20 July 1964
Philippines	(M) 14 August 1963 (L) 8 August 1963 (W) 8 August 1963	8 February 1966 10 November 1965 15 November 1965 <u>2/</u>

<u>State</u>	(i) <u>Signature</u>	(ii) <u>Deposit</u>
Poland	(M) 8 August 1963 (L) 8 August 1963 (W) 8 August 1963	14 October 1963 14 October 1963 14 October 1963
Portugal	(M) * (L) 9 October 1963 (W) 9 October 1963	- - -
Romania	(M) 8 August 1963 (L) 8 August 1963 (W) 8 August 1963	12 December 1963 12 December 1963 12 December 1963
Rwanda	(M) * (L) * (W) 19 September 1963	16 December 1963 22 October 1963 27 December 1963
Samoa (Western)	(M) 6 September 1963 (L) 5 September 1963 (W) 6 September 1963	8 February 1965 19 January 1965 15 January 1965
San Marino	(M) 24 September 1963 (L) 20 September 1963 (W) 17 September 1963	27 November 1964 3 July 1964 9 July 1964
Senegal	(M) 9 October 1963 (L) 23 September 1963 (W) 20 September 1963	12 May 1964 6 May 1964 2 June 1964
Sierra Leone	(M) 9 September 1963 (L) 4 September 1963 (W) 11 September 1963	29 April 1964 21 February 1964 4 March 1964
Singapore	(M) - (L) - (W) -	12 July 1968 (s) 23 July 1968 (s) 12 July 1968 (s) <u>10/</u>
Somalia	(M) 19 August 1963 (L) * (W) 19 August 1963	- - -
South Africa	(M) - (L) - (W) -	22 November 1963 (a) 10 October 1963 (a) 10 October 1963 (a)
Spain	(M) * (L) 14 August 1963 (W) 13 August 1963	* 17 December 1964 17 December 1964
Sri Lanka (Ceylon)	(M) 23 August 1963 (L) 22 August 1963 (W) 22 August 1963	12 February 1964 13 February 1964 5 February 1964
Sudan	(M) 9 August 1963 (L) 9 August 1963 (W) 9 August 1963	28 March 1966 4 March 1966 4 March 1966
Swaziland	(M) - (L) - (W) -	3 June 1969 (a) 29 May 1969 (a) 29 May 1969 (a)

<u>State</u>	(i) <u>Signature</u>	(ii) <u>Deposit</u>
Sweden	(M) 12 August 1963 (L) 12 August 1963 (W) 12 August 1963	9 December 1963 9 December 1963 9 December 1963
Switzerland	(M) 26 August 1963 (L) 26 August 1963 (W) 26 August 1963	16 January 1964 16 January 1964 16 January 1964
Syrian Arab Republic ...	(M) 13 August 1963 (L) 13 August 1963 (W) 13 August 1963	1 June 1964 1 June 1964 1 June 1964
Tanzania, United Republic of (Tanganyika)	(M) 20 September 1963 (L) 16 September 1963 (W) 18 September 1963	* 6 February 1964 *
Thailand	(M) 8 August 1963 (L) 8 August 1963 (W) 8 August 1963	21 November 1963 15 November 1963 29 November 1963
Togo	(M) * (L) * (W) 18 September 1963	* * 7 December 1964
Tonga	(M) - (L) - (W) -	22 June 1971 (s) 7 July 1971 (s) 7 July 1971 (s) <u>1/</u>
Trinidad and Tobago	(M) 13 August 1963 (L) 12 August 1963 (W) 12 August 1963	6 August 1964 16 July 1964 14 July 1964
Tunisia	(M) 13 August 1963 (L) 12 August 1963 (W) 8 August 1963	26 May 1965 26 May 1965 3 June 1965
Turkey	(M) 9 August 1963 (L) 9 August 1963 (W) 9 August 1963	3 July 1965 8 July 1965 8 July 1965
Uganda	(M) * (L) 29 August 1963 (W) 29 August 1963	* 24 March 1964 2 April 1964
Ukrainian SSR	(M) 8 October 1963 (L) * (W) *	30 December 1963 * *
Union of Soviet Socialist Republics	(M) 5 August 1963 (L) * (W) *	10 October 1963 10 October 1963 10 October 1963
United Kingdom of Great Britain and Northern Ireland <u>11/</u>	(M) 5 August 1963 (L) * (W) *	10 October 1963 10 October 1963 10 October 1963
United States of America	(M) 5 August 1963 (L) * (W) *	10 October 1963 10 October 1963 10 October 1963
Upper Volta	(M) * (L) * (W) 30 August 1963	- - -

<u>State</u>	(i) <u>Signature</u>	(ii) <u>Deposit</u>
Uruguay	(M) 27 September 1963 (L) 27 September 1963 (W) 12 August 1963	* 25 February 1969 *
Venezuela	(M) 16 August 1963 (L) 20 August 1963 (W) 16 August 1963	22 February 1965 3 March 1965 29 March 1965
[Viet Nam, Republic of South] <u>12/</u>	(M) * (L) * (W) 1 October 1963	- - -
Yemen; Arab Republic of	(M) 13 August 1963 (L) * (W) 6 September 1963	- - -
Yemen, People's Democratic Republic of	(M) (L) (W)	1 June 1979 (a)
Yugoslavia	(M) 8 August 1963 (L) 8 August 1963 (W) 8 August 1963	31 January 1964 15 January 1964 3 April 1964
Zaire (Congo, Democratic Republic of)	(M) 12 August 1963 (L) 9 August 1963 (W) 9 August 1963	28 October 1965
Zambia	(M) - (L) - (W)	11 January 1965 (s) 8 February 1965 (s) 11 January 1965 (s) <u>1/</u>

- The action has not been taken.

* The action has not been taken with this Depositary.

1/ Succeeded to the Treaty by virtue of the ratification of the United Kingdom.

2/ With the following statement:

"In transmitting this instrument the Ambassador of the United Arab Republic, on behalf of his Government, wishes to express the following reservation: The ratification by the Government of the United Arab Republic of this Treaty does not mean or imply any recognition of Israel or any Treaty Relations with Israel."

3/ With the following declaration:

"The aforementioned Treaty is also applicable in Land Berlin with effect from the date on which it enters into force in the Federal Republic of Germany, taking into account the rights and responsibilities of the Allied authorities and the powers they retain in the fields of disarmament and demilitarization."

4/ With the following statement:

"The signing, approval, ratification and application by the Government of Guatemala of the Treaty banning nuclear weapon tests in the atmosphere, in outer space and under water does not imply that the Republic of Guatemala accords recognition as a sovereign State to any territory or recognition as a legal government to any régime which it does not at present recognize. Nor does it imply the establishment or restoration of diplomatic relations with those countries with which such relations are not at present maintained."

5/ With the following statement:

"The ratification by the Government of Korea of the said Treaty does not in any way mean or imply the recognition of any territory or régime which has not been recognized by the Republic of Korea as a State or Government."

6/ With the following statement:

"In ratifying the said Convention, the Government of the State of Kuwait takes the view that its signature and ratification of the said Convention does not in any way imply its recognition of Israel, nor does it oblige it to apply the provisions of the Convention in respect of the said country.

"The Government of the State of Kuwait wishes further to indicate that its understanding described above is in conformity with the general practice existing in Kuwait regarding signature, ratification or accession to a Convention of which a country not recognized by Kuwait is a party."

7/ In a note to the Secretary of State dated 30 April 1969 Mauritius stated the following:

"The Government of Mauritius declares that it considers itself bound ... [under the Treaty] as from the 12th March, 1968, the date on which Mauritius acceded to Independence."

8/ Ratification by the Netherlands is in respect of the Kingdom in Europe, Suriname and the Netherlands Antilles.

9/ With the following statement:

"In depositing the said instrument, the Philippine Government would like to state that ratification of the Treaty should not be construed as including or implying recognition by the Philippines of any State or Government party to the Treaty which has not heretofore been recognized by the Philippines."

10/ Succeeded to the Treaty by virtue of the ratification of the Federation of Malaysia.

11/ Statement communicated on 27 August 1963 to all States recognized by the United Kingdom:

"The Government of the United Kingdom wish to recall their view that if a régime is not recognized by the Government of a State, neither signature nor the deposit of any instrument by it, nor notification of any of those acts will bring about recognition of that régime by any other State."

12/ The Democratic Republic of Viet Nam and the Republic of South Viet Nam (the latter of which replaced the Republic of Viet Nam) united on 2 July 1976 to constitute the Socialist Republic of Viet Nam. At the time of preparing this publication no indication had been received from the Government of the Socialist Republic of Viet Nam regarding its position with respect to a possible succession.

D. NUCLEAR EXPLOSIONS FROM 1945 TO 1963 AND FROM 1963 TO 1979

Data on nuclear explosions is available from a number of sources, mainly non-official. A compilation of these data has been presented by the Stockholm International Peace Research Institute (SIPRI) in the SIPRI Yearbook of World Armament and Disarmament (1980). That Yearbook provides the following figures for nuclear explosions between 16 July 1945 and 31 December 1979 (the date for 1979 is marked by SIPRI as being preliminary):

I. 16 July 1945 - 5 August 1963 (the signing of the partial test ban Treaty).

USA	USSR	UK	France	Total
293	164	23	8	488

II. 5 August 1963 - 31 December 1979

a atmosphere
u underground

Year	USA		USSR		UK		France		China		India		Total
	a	u	a	u	a	u	a	u	a	u	a	u	
1963	0	14	0	0	0	0	0	1					15
1964	0	28	0	6	0	1	0	3	1	0			39
1965	0	29	0	9	0	1	0	4	1	0			44
1966	0	40	0	15	0	0	5	1	3	0			64
1967	0	29	0	15	0	0	3	0	2	0			49
1968	0	39	0	13	0	0	5	0	1	0			58
1969	0	28	0	15	0	0	0	0	1	1			45
1970	0	33	0	12	0	0	8	0	1	0			54
1971	0	15	0	19	0	0	5	0	1	0			40
1972	0	15	0	22	0	0	3	0	2	0			42
1973	0	11	0	14	0	0	5	0	1	0			31
1974	0	9	0	19	0	1	7	0	1	0	0	1	38
1975	0	16	0	15	0	0	0	2	0	1	0	0	34
1976	0	15	0	17	0	1	0	4	3	1	0	0	41
1977	0	12	0	16	0	0	0	6	1	0	0	0	35
1978	0	12	0	27	0	2	0	7	2	1	0	0	51
1979	0	15	0	28	0	1	0	9	0	0	0	0	53

III. 16 July 1945 - 31 December 1979

USA	USSR	UK	France	China	India	Total
653	426	30	86	25	1	1 221

E. PRESENT NUCLEAR ARSENALS

Strategic nuclear forces of the USSR and the United States

(a) Delivery vehicles:

	<u>USSR</u> ^{*/}	<u>United States</u> ^{*/}
Launchers of ICBMs	1,398	1,054
Fixed launchers of ICBMs	1,398	1,054
Launchers of ICBMs equipped with MIRVs	608	550
Launchers of SLBMs	950	656
Launchers of SLBMs equipped with MIRVs	144	496
Heavy bombers	156	573
Heavy bombers equipped for cruise missiles capable of a range in excess of 600 kilometers	0	3
Heavy bombers equipped only for ASBMs	0	0
ASBMs	0	0
ASBMs equipped with MIRVs	0	0

(b) Nuclear warheads as of 1 January 1980^{**/}

Total warheads on bombers and missiles	6,000	9,200
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(Official United States estimates)

Strategic nuclear forces of China, France and the United Kingdom^{***/}

China: ICBM: 2 CSS-3 (limited range)
 IRBM: 50-70 CSS-2
 MRBM: 40-50 CSS-1
 Aircraft: about 90 Tu-16 medium bombers

^{*/} Statement of data on the numbers of strategic offensive arms as of the date of signature of the Treaty on the Limitation of Strategic Offensive Arms (SALT II), CD/29.

^{**/} Stockholm International Peace Research Institute (SIPRI).

^{***/} The International Institute for Strategic Studies, The Military Balance 1979-1980.

France: SLBM: 64 in 4 SSBN, each with 16 M-20 missiles
(2 with 16 M-4 building).
IRBM: 18 in 2 squadrons, each with 9 SSBS S-2 missiles
(being replaced by S-3).
Aircraft:
Bombers: 6 squadrons with 33 Mirage IVA
Tankers: 3 squadrons with 11 KC-135F
Reserve: 16 Mirage IVA (including 12 reconnaissance)

United Kingdom: SLBM: 4 Resolution SSBN, each with 16 Polaris A3 missiles.
Ballistic Missile Early Warning System station at Fylingdales

Notes

- 1/ Resolution 913 (X) of 3 December 1955.
- 2/ Official Records of the Disarmament Commission, Supplement for January to December 1957, document DC/112, annex 12 (DC/SC.1/60).
- 3/ Resolution 1379 (XIV) of 20 November 1959.
- 4/ Resolution 1632 (XVI) of 27 October 1961.
- 5/ ENDC/28.
- 6/ ENDC/94.
- 7/ The 36 resolutions carry the following numbers: 1252 (XIII) of 4 November 1958; 1379 (XIV) of 20 November 1959; 1402 (XIV) of 21 November 1959; 1577 (XV) and 1578 (XV) of 20 December 1960; 1932 (XVI) of 27 October 1961; 1648 (XVI) of 6 November 1961; 1649 (XVI) of 8 November 1961; 1762 A and B (XVII) of 6 November 1962; 1910 (XVIII) of 27 November 1963; 2032 (XX) of 3 December 1965; 2163 (XXI) of 5 December 1966; 2343 (XXII) of 19 December 1967; 2455 (XXIII) of 20 December 1968; 2604 A and B (XIV) of 16 December 1969; 2663 A and B (XXV) of 7 December 1970; 2528 A, B and C (XXVI) of 16 December 1971; 2934 A, B and C (XXVII) of 29 November 1972; 3078 A and B (XXVIII) of 6 December 1973; 3257 (XXIX) of 9 December 1974; 3466 (XXX) and 3478 (XXX) of 11 December 1975; 31/66 of 10 December 1976 and 31/89 of 14 December 1976; 32/78 of 12 December 1977; 33/60 and 33/71 C of 14 December 1978; 34/73 of 11 December 1979.
- 8/ Resolutions 2932 (XX), 2163 (XXI), 2343 (XXII), 2455 (XXIII), 2604 B (XXIV), 2663 B (XIV), 2628 B (XXVI), 2828 C (XXVI), 2934 A (XXVII), 2934 B (XXVII), 3078 B (XXVIII), 3257 (XXIX), 3466 (XXX), 31/66, 32/78, 33/60, 33/71 C, 34/73. Prior to 1963, the General Assembly had adopted resolutions 1252 A (XIII), 1402 A and B (XIV), 1577 (XV), 1648 (XVI) and 1762 A (XVII) on the same subject.
- 9/ Resolutions 2828 A (XXVI), 2934 C (XXVII), 3078 A (XXVIII), 3257 (XXIX), 3466 (XXX), 31/66. Prior to 1963, the General Assembly had adopted resolution 1762 A (XVII) on the same subject.
- 10/ Resolutions 2934 B (XXVII), 3078 C (XXVIII), 3257 (XXIX), 3466 (XXX), 31/66, 33/60, 34/73.
- 11/ Resolution 1910 (XVIII).
- 12/ Resolutions 2032 (XX), 2163 (XXI), 2343 (XXII), 2455 (XXIII), 2604 B (XXIV), 2663 B (XXV), 2828 C (XXVI), 2934 A (XXVII), 2934 B (XXVII), 3078 B (XXVIII), 3257 (XXIX), 3466 (XXX), 31/66.
- 13/ Resolutions 2828 B (XXVI), 2934 A (XXVII), 2934 B (XXVII), 3078 B (XXVIII), 3257 (XXIX).

- 14/ Resolutions 1910 (XVIII), 2032 (XX), 2163 (XXI), 2343 (XXII), 2455 (XXIII), 2604 B (XXIV), 2663 B (XXV), 2828 C (XXVI), 2934 A (XXVII), 3078 B (XXVIII), 3257 (XXIX), 3466 (XXX), 31/66, 32/78, 33/60, 34/73.
- 15/ Resolutions 2828 A (XXVI), 2934 C (XXVII), 3078 A (XXVIII).
- 16/ Resolutions 2604 B (XXIV), 2663 B (XXV), 2934 B (XXVII), 3078 B (XXVIII).
- 17/ Resolutions 2828 B (XXVI), 2828 C (XXVI), 2934 B (XXVII), 3078 B (XXVIII), 3257 (XXIX), 3466 (XXX), 31/66, 32/78, 33/60, 34/73.
- 18/ Resolutions 2828 C (XXVI) and 2934 B (XXVII).
- 19/ Resolutions 2032 (XX), 2163 (XXI), 2343 (XXII), 2455 (XXIII), 2828 C (XXVI), 2934 (XXVII), 34/73.
- 20/ Resolutions 2604 A (XXIV) and 2663 A (XXV).
- 21/ Resolutions 2934 C (XXVII), 3078 A (XXVIII).
- 22/ Resolution 32/78.
- 23/ Resolution 33/60.
- 24/ Resolution 34/73.
- 25/ A/5488, DC/208.
- 26/ ENDC/145.
- 27/ ENDC/159.
- 28/ ENDC/177.
- 29/ ENDC/235.
- 30/ ENDC/242.
- 31/ ENDC/348.
- 32/ The Group of 12 of the CCD consisted of Argentina, Brazil, Burma, Egypt, Ethiopia, India, Mexico, Morocco, Nigeria, Pakistan, Sweden and Yugoslavia.
- 33/ CCD/354.
- 34/ CCD/431.
- 35/ Effects of a comprehensive test ban treaty on United States national security interests. Report of the Panel on the strategic arms limitation talks and the comprehensive test ban treaty of the Intelligence and Military Application of Nuclear Energy Subcommittee of the Committee on Armed Services. House of Representatives, with dissenting and supplementary views. Ninety-fifth Congress, Second Session, 13 October, 1978, H.A.S.C. No. 95-90, United States Government Printing Office, Washington, D.C., 1978, p. 13. (Cited hereinafter as Effects of a comprehensive test ban treaty on United States national security interests. Report).

- 36/ A/31/125.
- 37/ CCD/523.
- 38/ CCD/526 and Rev.1.
- 39/ CCD/558 and Add.1.
- 40/ CD/43.
- 41/ Official Records of the General Assembly, Tenth Special Session, Supplement No. 2 (A/S-10/2).
- 42/ Resolution 34/73 of 11 December 1979.
- 43/ CCD/PV.750.
- 44/ CCD/PV.780; CCD/PV.798; and CD/PV.46.
- 45/ A/S-10/PV.5; A/33/PV.8; A/C.1/33/PV.7; A/C.1/34/PV.8; and CD/PV.33.
- 46/ A/S-10/PV.14; A/33/PV.10; A/C.1/33/PV.12; A/C.1/34/PV.6; and CD/PV.2.
- 47/ A/S-10/PV.27; A/C.1/34/PV.8; A/C.1/34/PV.42; CD/PV.4; and CD/PV.33
- 48/ The Group of 21 of the Committee on Disarmament consists of Algeria, Argentina, Brazil, Burma, Cuba, Egypt, Ethiopia, India, Indonesia, Iran, Kenya, Mexico, Morocco, Nigeria, Pakistan, Peru, Sri Lanka, Sweden, Venezuela, Yugoslavia and Zaire.
- 49/ CD/50.
- 50/ Effects of a comprehensive test ban treaty on United States national security interests. Hearings before the Panel on the strategic arms limitation talks and the comprehensive test ban treaty of the Intelligence and Military Application of Nuclear Energy Subcommittee of the Committee on Armed Services, House of Representatives, Ninety-fifth Congress, Second Session, 14, 15 August, 1978, H.A.S.C. No. 95-89, United States Government Printing Office, Washington, D.C., 1978, pp. 133 and 181. (Cited hereinafter as Effects of a comprehensive test ban treaty on United States national security interests. Hearings.)
- 51/ The Test Ban, SIPRI Research Report, Stockholm Peace Research Institute, Stockholm, October 1971.
- 52/ CCD/558 and CD/43.
- 53/ Dahlman, O. and Israelson, H., 1977, Monitoring Nuclear Explosions, Elsevier Scientific Publishing Company, Amsterdam.
- 54/ CD/PV.46, p.10.
- 55/ Effects of a comprehensive test ban treaty on United States national security interests. Report, p.29.

- 56/ Dahlman, O. and Israelson, H., 1980, Internal Seismological Stations for Monitoring a Comprehensive Test Ban Treaty, National Defence Research Institute, Stockholm.
- 57/ Evernden, J.F., "Study of Seismological Evasion". Part I. General Discussion of Various Evasion Schemes. Bulletin of the Seismological Society of America, Vol. 66, pp. 245-280; and Lukasik, S.J., Statement in Hearings on extent of present capabilities for detecting and determining the nature of underground events, before the Subcommittee on Research, Development and Radiation of the Joint Committee on Atomic Energy, Congress of the United States, Ninety-second Congress, First Session, 27 and 28 October, 1971, United States Government Printing Office, Washington, D.C., pp. 17-67.
- 58/ According to press reports, 10 stations would be installed in the USSR and the same number in the United States. See International Herald Tribune, 6 October 1978, pp. 1-2.
- 59/ CD/PV.46, p.10.
- 60/ Effects of a comprehensive test ban treaty on United States national security interests. Hearings, pp. 67 and 130.
- 61/ Herbert York and G. Allen Greb, The Comprehensive Nuclear Test Ban, Discussion Paper No. 84, California Seminar on Arms Control and Foreign Policy, Santa Monica, California, June 1979, pp. 40-41.
- 62/ Fiscal Year 1980: Arms control impact statements. Statements submitted to the Congress by the President pursuant to Section 36 of the Arms Control and Disarmament Act, 96th Congress, First Session, Joint Committee Print, United States Government Printing Office, Washington, D.C., 1979, p.246.
- 63/ Document NPT/CONF/C.II/SR.9.
- 64/ Fiscal Year 1980: Arms control impact statements, op. cit., p.249.
- 65/ Charles Gilbert, Deputy Director, ERDA Division of Military Applications, quoted by Robert Gillete in "Laser Fusion: An Energy Option, but Weapons Simulation is First." Science, Vol. 188, 4 April 1975.
- 66/ CD/PV.4, p.23.
- 67/ The consequences of a Comprehensive Test Ban Treaty, Report of Senator Dewey F. Bartlett to the Committee on Armed Services. United States Senate, Ninety-fifth Congress, Second Session, 11 August, 1978. United States Government Printing Office, Washington, D.C., 1978, p.13.
- 68/ CD/PV.46. p.9.
- 69/ CD/PV.47, pp. 6-7.