

No. 20737

**INTERNATIONAL ATOMIC ENERGY AGENCY
and
UNITED STATES OF AMERICA**

Agreement for the application of safeguards in the United States of America (with protocol). Signed at Vienna on 18 November 1977

Authentic text: English.

Registered by the International Atomic Energy Agency on 12 February 1982.

**AGENCE INTERNATIONALE DE L'ÉNERGIE
ATOMIQUE
et
ÉTATS-UNIS D'AMÉRIQUE**

Accord relatif à l'application de garanties aux États-Unis d'Amérique (avec protocole). Signé à Vienne le 18 novembre 1977

Texte authentique : anglais.

Enregistré par l'Agence internationale de l'énergie atomique le 12 février 1982.

AGREEMENT¹ BETWEEN THE UNITED STATES OF AMERICA AND THE INTERNATIONAL ATOMIC ENERGY AGENCY FOR THE APPLICATION OF SAFEGUARDS IN THE UNITED STATES OF AMERICA

WHEREAS the United States of America (hereinafter referred to as the “United States”) is a Party to the Treaty on the Non-Proliferation of Nuclear Weapons (hereinafter referred to as the “Treaty”) which was opened for signature at London, Moscow and Washington on 1 July 1968² and which entered into force on 5 March 1970;

WHEREAS States Parties to the Treaty undertake to co-operate in facilitating the application of International Atomic Energy Agency (hereinafter referred to as the “Agency”) safeguards on peaceful nuclear activities;

WHEREAS non-nuclear-weapon States Parties to the Treaty undertake to accept safeguards, as set forth in an agreement to be negotiated and concluded with the Agency, on all source or special fissionable material in all their peaceful nuclear activities for the exclusive purpose of verification of the fulfilment of their obligations under the Treaty with a view to preventing diversion of nuclear energy from peaceful uses to nuclear weapons or other nuclear explosive devices;

WHEREAS the United States, a nuclear-weapon State as defined by the Treaty, has indicated that at such time as safeguards are being generally applied in accordance with paragraph 1 of Article III of the Treaty, the United States will permit the Agency to apply its safeguards to all nuclear activities in the United States—excluding only those with direct national security significance—by concluding a safeguards agreement with the Agency for that purpose;

WHEREAS the United States has made this offer and has entered into this agreement for the purpose of encouraging widespread adherence to the Treaty by demonstrating to non-nuclear-weapon States that they would not be placed at a commercial disadvantage by reason of the application of safeguards pursuant to the Treaty;

WHEREAS the purpose of a safeguards agreement giving effect to this offer by the United States would thus differ necessarily from the purposes of safeguards agreements concluded between the Agency and non-nuclear-weapon States Party to the Treaty;

WHEREAS it is in the interest of Members of the Agency, that, without prejudice to the principles and integrity of the Agency’s safeguards system, the expenditure of the Agency’s financial and other resources for implementation of such an agreement not exceed that necessary to accomplish the purpose of the Agreement;

WHEREAS the Agency is authorized, pursuant to Article III of the Statute of the International Atomic Energy Agency³ (hereinafter referred to as the “Statute”), to conclude such a safeguards agreement;

¹ Came into force on 9 December 1980, the date on which the Agency received written notification from the United States that statutory and constitutional requirements of the United States had been met, in accordance with article 24.

² United Nations, *Treaty Series*, vol. 729, p. 161.

³ *Ibid.*, vol. 276, p. 3, and vol. 471, p. 334.

NOW, THEREFORE, the United States and the Agency have agreed as follows:

PART I

Article 1. (a) The United States undertakes to permit the Agency to apply safeguards, in accordance with the terms of this Agreement, on all source or special fissionable material in all facilities within the United States, excluding only those facilities associated with activities with direct national security significance to the United States, with a view to enabling the Agency to verify that such material is not withdrawn, except as provided for in this Agreement, from activities in facilities while such material is being safeguarded under this Agreement.

(b) The United States shall, upon entry in force of this Agreement, provide the Agency with a list of facilities within the United States not associated with activities with direct national security significance to the United States and may, in accordance with the procedures set forth in Part II of this Agreement, add facilities to or remove facilities from that list as it deems appropriate.

(c) The United States may, in accordance with the procedures set forth in this Agreement, withdraw nuclear material from activities in facilities included in the list referred to in Article 1(b).

Article 2. (a) The Agency shall have the right to apply safeguards, in accordance with the terms of this Agreement, on all source or special fissionable material in all facilities within the United States, excluding only those facilities associated with activities with direct national security significance to the United States, with a view to enabling the Agency to verify that such material is not withdrawn, except as provided for in this Agreement, from activities in facilities while such material is being safeguarded under this Agreement.

(b) The Agency shall, from time to time, identify to the United States those facilities, selected from the then current list provided by the United States in accordance with Article 1(b), in which the Agency wishes to apply safeguards, in accordance with the terms of this Agreement.

(c) In identifying facilities and in applying safeguards thereafter on source or special fissionable material in such facilities, the Agency shall proceed in a manner which the Agency and the United States mutually agree takes into account the requirement on the United States to avoid discriminatory treatment as between United States commercial firms similarly situated.

Article 3. (a) The United States and the Agency shall co-operate to facilitate the implementation of the safeguards provided for in this Agreement.

(b) The source or special fissionable material subject to safeguards under this Agreement shall be that material in those facilities which shall have been identified by the Agency at any given time pursuant to Article 2(b).

(c) The safeguards to be applied by the Agency under this Agreement on source or special fissionable material in facilities in the United States shall be implemented by the same procedures followed by the Agency in applying its safeguards on similar material in similar facilities in non-nuclear-weapon States under agreements pursuant to paragraph 1 of Article III of the Treaty.

Article 4. The safeguards provided for in this Agreement shall be implemented in a manner designed:

- (a) To avoid hampering the economic and technological development of the United States or international co-operation in the field of peaceful nuclear activities, including international exchange of nuclear material;
- (b) To avoid undue interference in peaceful nuclear activities of the United States and in particular in the operation of facilities; and
- (c) To be consistent with prudent management practices required for the economic and safe conduct of nuclear activities.

Article 5. (a) The Agency shall take every precaution to protect commercial and industrial secrets and other confidential information coming to its knowledge in the implementation of this Agreement.

(b) (i) The Agency shall not publish or communicate to any State, organization or person any information obtained by it in connection with the implementation of this Agreement, except that specific information relating to the implementation thereof may be given to the Board of Governors of the Agency (hereinafter referred to as "the Board") and to such Agency staff members as require such knowledge by reason of their official duties in connection with safeguards, but only to the extent necessary for the Agency to fulfil its responsibilities in implementing this Agreement.

(ii) Summarized information on nuclear material subject to safeguards under this Agreement may be published upon the decision of the Board if the United States agrees thereto.

Article 6. (a) The Agency shall, in implementing safeguards pursuant to this Agreement, take full account of technological developments in the field of safeguards, and shall make every effort to ensure optimum cost-effectiveness and the application of the principle of safeguarding effectively the flow of nuclear material subject to safeguards under this Agreement by use of instruments and other techniques at certain strategic points to the extent that present or future technology permits.

(b) In order to ensure optimum cost-effectiveness, use shall be made, for example, of such means as:

- (i) Containment as a means of defining material balance areas for accounting purposes;
- (ii) Statistical techniques and random sampling in evaluating the flow of nuclear material; and
- (iii) Concentration of verification procedures on those stages in the nuclear fuel cycle involving the production, processing, use or storage of nuclear material from which nuclear weapons or other nuclear explosive devices could readily be made, and minimization of verification procedures in respect of other nuclear material, on condition that this does not hamper the Agency in applying safeguards under this Agreement.

Article 7. (a) The United States shall establish and maintain a system of accounting for and control of all nuclear material subject to safeguards under this Agreement.

(b) The Agency shall apply safeguards in accordance with Article 3(c) in such a manner as to enable the Agency to verify, in ascertaining that there has been no withdrawal of nuclear material, except as provided for in this Agree-

ment, from activities in facilities while such material is being safeguarded under this Agreement, findings of the accounting and control system of the United States. The Agency's verification shall include, *inter alia*, independent measurements and observations conducted by the Agency in accordance with the procedures specified in Part II. The Agency, in its verification, shall take due account of the technical effectiveness of the system of the United States.

Article 8. (a) In order to ensure the effective implementation of safeguards under this Agreement, the United States shall, in accordance with the provisions set out in Part II, provide the Agency with information concerning nuclear material subject to safeguards under this Agreement and the features of facilities relevant to safeguarding such material.

(b) (i) The Agency shall require only the minimum amount of information and data consistent with carrying out its responsibilities under this Agreement.

(ii) Information pertaining to facilities shall be the minimum necessary for safeguarding nuclear material subject to safeguards under this Agreement.

(c) If the United States so requests, the Agency shall be prepared to examine on premises of the United States design information which the United States regards as being of particular sensitivity. Such information need not be physically transmitted to the Agency provided that it remains readily available for further examination by the Agency on premises of the United States.

Article 9. (a) (i) The Agency shall secure the consent of the United States to the designation of Agency inspectors to the United States.

(ii) If the United States, either upon proposal of a designation or at any other time after designation has been made, objects to the designation, the Agency shall propose to the United States an alternative designation or designations.

(iii) If, as a result of the repeated refusal of the United States to accept the designation of Agency inspectors, inspections to be conducted under this Agreement would be impeded, such refusal shall be considered by the Board, upon referral by the Director General of the Agency (hereinafter referred to as "the Director General") with a view to its taking appropriate action.

(b) The United States shall take the necessary steps to ensure that Agency inspectors can effectively discharge their functions under this Agreement.

(c) The visits and activities of Agency inspectors shall be so arranged as:

(i) To reduce to a minimum the possible inconvenience and disturbance to the United States and to the peaceful nuclear activities inspected; and

(ii) To ensure protection of industrial secrets or any other confidential information coming to the inspectors' knowledge.

Article 10. The provisions of the International Organizations Immunities Act of the United States of America shall apply to Agency inspectors performing functions in the United States under this Agreement and to any property of the Agency used by them.

Article 11. Safeguards shall terminate on nuclear material upon determination by the Agency that the material has been consumed, or has been diluted in such a way that it is no longer usable for any nuclear activity relevant from the point of view of safeguards, or has become practicably irrecoverable.

Article 12. (a) If the United States intends to exercise its right to withdraw nuclear material from activities in facilities identified by the Agency pursuant to Articles 2(b) and 39(b) (other than those facilities removed, pursuant to Article 34(b)(i) from the list provided for by Article 1(b)) and to transfer such material to a destination in the United States other than to a facility included in the list established and maintained pursuant to Articles 1(b) and 34, the United States shall notify the Agency in advance of such withdrawal. Nuclear material in respect of which such notification has been given shall cease to be subject to safeguards under this Agreement as from the time of its withdrawal.

(b) Nothing in this Agreement shall affect the right of the United States to transfer material subject to safeguards under this Agreement to destinations not within or under the jurisdiction of the United States. The United States shall provide the Agency with information with respect to such transfers in accordance with Article 89. The Agency shall keep records of each such transfer and, where applicable, of the re-application of safeguards to the transferred nuclear material.

Article 13. Where nuclear material subject to safeguards under this Agreement is to be used in non-nuclear activities, such as the production of alloys or ceramics, the United States shall agree with the Agency, before the material is so used, on the circumstances under which the safeguards on such material may be terminated.

Article 14. The United States and the Agency will bear the expenses incurred by them in implementing their respective responsibilities under this Agreement. However, if the United States or persons under its jurisdiction incur extraordinary expenses as a result of a specific request by the Agency, the Agency shall reimburse such expenses provided that it has agreed in advance to do so. In any case the Agency shall bear the cost of any additional measuring or sampling which inspectors may request.

Article 15. In carrying out its functions under this Agreement within the United States, the Agency and its personnel shall be covered to the same extent as nationals of the United States by any protection against third-party liability provided under the Price-Anderson Act, including insurance or other indemnity coverage that may be required by the Price-Anderson Act with respect to nuclear incidents.

Article 16. Any claim by the United States against the Agency or by the Agency against the United States in respect of any damage resulting from the implementation of safeguards under this Agreement, other than damage arising out of a nuclear incident, shall be settled in accordance with international law.

Article 17. If the Board, upon report of the Director General, decides that an action by the United States is essential and urgent in order to ensure compliance with this Agreement, the Board may call upon the United States to take the required action without delay, irrespective of whether procedures have been invoked pursuant to Article 21 for the settlement of a dispute.

Article 18. If the Board, upon examination of relevant information reported to it by the Director General, determines there has been any non-compliance with this Agreement, the Board may call upon the United States to remedy forthwith such non-compliance. In the event there is a failure to take fully corrective action within a reasonable time, the Board may make the reports provided for in paragraph C of Article XII of the Statute and may also take, where applicable, the

other measures provided for in that paragraph. In taking such action the Board shall take account of the degree of assurance provided by the safeguards measures that have been applied and shall afford the United States every reasonable opportunity to furnish the Board with any necessary reassurance.

Article 19. The United States and the Agency shall, at the request of either, consult about any question arising out of the interpretation or application of this Agreement.

Article 20. The United States shall have the right to request that any question arising out of the interpretation or application of this Agreement be considered by the Board. The Board shall invite the United States to participate in the discussion of any such question by the Board.

Article 21. Any dispute arising out of the interpretation or application of this Agreement, except a dispute with regard to a determination by the Board under Article 18 or an action taken by the Board pursuant to such a determination which is not settled by negotiation or another procedure agreed to by the United States and the Agency shall, at the request of either, be submitted to an arbitral tribunal composed as follows: The United States and the Agency shall each designate one arbitrator, and the two arbitrators so designated shall elect a third, who shall be the Chairman. If, within thirty days of the request for arbitration, either the United States or the Agency has not designated an arbitrator, either the United States or the Agency may request the President of the International Court of Justice to appoint an arbitrator. The same procedure shall apply if, within thirty days of the designation or appointment of the second arbitrator, the third arbitrator has not been elected. A majority of the members of the arbitral tribunal shall constitute a quorum, and all decisions shall require the concurrence of two arbitrators. The arbitral procedure shall be fixed by the tribunal. The decisions of the tribunal shall be binding on the United States and the Agency.

Article 22. The Parties shall institute steps to suspend the application of Agency safeguards in the United States under other safeguards agreements with the Agency while this Agreement is in force. However, the United States and the Agency shall ensure that nuclear material being safeguarded under this Agreement shall be at all times at least equivalent in amount and composition to that which would be subject to safeguards in the United States under the agreements in question. The detailed arrangements for the implementation of this provision shall be specified in the subsidiary arrangements provided for in Article 39, and shall reflect the nature of any undertaking given under such other safeguards agreements.

Article 23. (a) The United States and the Agency shall, at the request of either, consult each other on amendments to this Agreement.

(b) All amendments shall require the agreement of the United States and the Agency.

Article 24. This Agreement or any amendments thereto shall enter into force on the date on which the Agency receives from the United States written notification that statutory and constitutional requirements of the United States for entry into force have been met.

Article 25. The Director General shall promptly inform all Member States of the Agency of the entry into force of this Agreement, or of any amendments thereto.

Article 26. The Agreement shall remain in force as long as the United States is a party to the Treaty except that the Parties to this Agreement shall, upon the request of either of them, consult and, to the extent mutually agreed, modify this Agreement in order to ensure that it continues to serve the purpose for which it was originally intended. If the Parties are unable after such consultation to agree upon necessary modifications, either Party may, upon six months' notice, terminate this Agreement.

PART II

Article 27. The purpose of this part of the Agreement is to specify the procedures to be applied in the implementation of the safeguards provisions of Part I.

Article 28. The objective of the safeguards procedures set forth in this part of the Agreement is the timely detection of withdrawal, other than in accordance with the terms of this Agreement, of significant quantities of nuclear material from activities in facilities while such material is being safeguarded under this Agreement.

Article 29. For the purpose of achieving the objective set forth in Article 28, material accountancy shall be used as a safeguards measure of fundamental importance, with containment and surveillance as important complementary measures.

Article 30. The technical conclusion of the Agency's verification activities shall be a statement, in respect of each material balance area, of the amount of material unaccounted for over a specific period, and giving the limits of accuracy of the amounts stated.

Article 31. Pursuant to Article 7, the Agency, in carrying out its verification activities, shall make full use of the United States' system of accounting for and control of all nuclear material subject to safeguards under this Agreement and shall avoid unnecessary duplication of the United States' accounting and control activities.

Article 32. The United States' system of accounting for and control of all nuclear material subject to safeguards under this Agreement shall be based on a structure of material balance areas, and shall make provision, as appropriate and specified in the Subsidiary Arrangements, for the establishment of such measures as:

- (a) A measurement system for the determination of the quantities of nuclear material received, produced, shipped, lost or otherwise removed from inventory, and the quantities on inventory;
- (b) The evaluation of precision and accuracy of measurements and the estimation of measurement uncertainty;
- (c) Procedures for identifying, reviewing and evaluating differences in shipper/receiver measurements;
- (d) Procedures for taking a physical inventory;
- (e) Procedures for the evaluation of accumulations of unmeasured inventory and unmeasured losses;

- (f) A system of records and reports showing, for each material balance area, the inventory of nuclear material and the changes in that inventory including receipts into and transfers out of the material balance area;
- (g) Provisions to ensure that the accounting procedures and arrangements are being operated correctly; and
- (h) Procedures for the provision of reports to the Agency in accordance with Articles 57 through 63 and 65 through 67.

Article 33. Safeguards under this Agreement shall not apply to material in mining or ore processing activities.

Article 34. The United States may, at any time, notify the Agency of any facility or facilities to be added to or removed from the list provided for in Article 1(b):

- (a) In case of addition to the list, the notification shall specify the facility or facilities to be added to the list and the date upon which the addition is to take effect;
- (b) In the case of removal from the list of a facility or facilities then currently identified pursuant to Articles 2(b) or 39(b):
 - (i) The Agency shall be notified in advance and the notification shall specify: the facility or facilities being removed, the date of removal, and the quantity and composition of the nuclear material contained therein at the time of notification. In exceptional circumstances, the United States may remove facilities without giving advance notification;
 - (ii) Any facility in respect of which notification has been given in accordance with sub-paragraph (i) shall be removed from the list and the nuclear material contained therein shall cease to be subject to safeguards under this Agreement in accordance with and at the time specified in the notification by the United States.
- (c) In the case of removal from the list of a facility or facilities not then currently identified pursuant to Articles 2(b) or 39(b), the notification shall specify the facility or facilities being removed and the date of removal. Such facility or facilities shall be removed from the list at the time specified in the notification by the United States.

Article 35. (a) Safeguards shall terminate on nuclear material subject to safeguards under this Agreement, under the conditions set forth in Article 11. Where the conditions of that Article are not met, but the United States considers that the recovery of safeguarded nuclear material from residues is not for the time being practicable or desirable, the United States and the Agency shall consult on the appropriate safeguards measures to be applied.

(b) Safeguards shall terminate on nuclear material subject to safeguards under this Agreement, under the conditions set forth in Article 13, provided that the United States and the Agency agree that such nuclear material is practicably irrecoverable.

Article 36. At the request of the United States, the Agency shall exempt from safeguards nuclear material, which would otherwise be subject to safeguards under this Agreement, as follows:

- (a) Special fissionable material, when it is used in gram quantities or less as a sensing component in instruments;
- (b) Nuclear material, when it is used in non-nuclear activities in accordance with Article 13, if such nuclear material is recoverable; and
- (c) Plutonium with an isotopic concentration of plutonium-238 exceeding 80%.

Article 37. At the request of the United States, the Agency shall exempt from safeguards nuclear material that would otherwise be subject to safeguards under this Agreement, provided that the total quantity of nuclear material which has been exempted in the United States in accordance with this Article may not at any time exceed:

- (a) One kilogram in total of special fissionable material, which may consist of one or more of the following:
 - (i) Plutonium;
 - (ii) Uranium with an enrichment of 0.2 (20%) and above, taken account of by multiplying its weight by its enrichment; and
 - (iii) Uranium with an enrichment below 0.2 (20%) and above that of natural uranium, taken account of by multiplying its weight by five times the square of its enrichment;
- (b) Ten metric tons in total of natural uranium and depleted uranium with an enrichment above 0.005 (0.5%);
- (c) Twenty metric tons of depleted uranium with an enrichment of 0.005 (0.5%) or below; and
- (d) Twenty metric tons of thorium;

or such greater amounts as may be specified by the Board for uniform application.

Article 38. If exempted nuclear material is to be processed or stored together with nuclear material subject to safeguards under this Agreement, provision shall be made for the re-application of safeguards thereto.

Article 39. (a) The United States and the Agency shall make Subsidiary Arrangements which shall:

- (i) Contain a current listing of those facilities identified by the Agency pursuant to Article 2(b) and thus containing nuclear material subject to safeguards under this Agreement; and
- (ii) Specify in detail, to the extent necessary to permit the Agency to fulfil its responsibilities under this Agreement in an effective and efficient manner, how the procedures laid down in this Agreement are to be applied.

(b) (i) After entry into force of this Agreement, the Agency shall identify to the United States, from the list provided in accordance with Article 1(b), those facilities to be included in the initial Subsidiary Arrangements listing;

(ii) The Agency may thereafter identify for inclusion in the Subsidiary Arrangements listing additional facilities from the list provided in accordance with Article 1(b) as that list may have been modified in accordance with Article 34.

(c) The Agency shall also designate to the United States those facilities to be removed from the Subsidiary Arrangements listing which have not otherwise

been removed pursuant to notification by the United States in accordance with Article 34. Such facility or facilities shall be removed from the Subsidiary Arrangements listing upon such designation to the United States.

(d) The Subsidiary Arrangements may be extended or changed by agreement between the Agency and the United States without amendment of this Agreement.

Article 40. (a) With respect to those facilities which shall have been identified by the Agency in accordance with Article 39(b)(i), such Subsidiary Arrangements shall enter into force at the same time as, or as soon as possible after, entry into force of this Agreement. The United States and the Agency shall make every effort to achieve their entry into force within 90 days after entry into force of this Agreement; an extension of that period shall require agreement between the United States and the Agency.

(b) With respect to facilities which, after the entry into force of this Agreement, have been identified by the Agency in accordance with Article 39(b)(ii) for inclusion in the Subsidiary Arrangements listing, the United States and the Agency shall make every effort to achieve the entry into force of such Subsidiary Arrangements within ninety days following such identification to the United States; an extension of that period shall require agreement between the Agency and the United States.

(c) Upon identification of a facility by the Agency in accordance with Article 39(b), the United States shall provide the Agency promptly with the information required for completing the Subsidiary Arrangements, and the Agency shall have the right to apply the procedures set forth in this Agreement to the nuclear material listed in the inventory provided for in Article 41, even if the Subsidiary Arrangements have not yet entered into force.

Article 41. The Agency shall establish, on the basis of the initial reports referred to in Article 60(a) below, a unified inventory of all nuclear material in the United States subject to safeguards under this Agreement, irrespective of its origin, and shall maintain this inventory on the basis of subsequent reports concerning those facilities, of the initial reports referred to in Article 60(b), of subsequent reports concerning the facilities listed pursuant to Article 39(b)(ii), and of the results of its verification activities. Copies of the inventory shall be made available to the United States at intervals to be agreed.

Article 42. Pursuant to Article 8, design information in respect of facilities identified by the Agency in accordance with Article 39(b)(i) shall be provided to the Agency during the discussion of the Subsidiary Arrangements. The time limits for the provision of design information in respect of any facility which is identified by the Agency in accordance with Article 39(b)(ii) shall be specified in the Subsidiary Arrangements and such information shall be provided as early as possible after such identification.

Article 43. The design information to be provided to the Agency shall include, in respect of each facility identified by the Agency in accordance with Article 39(b), when applicable:

(a) The identification of the facility, stating its general character, purpose, nominal capacity and geographic location, and the name and address to be used for routine business purposes;

- (b) A description of the general arrangement of the facility with reference, to the extent feasible, to the form, location and flow of nuclear material and to the general layout of important items of equipment which use, produce or process nuclear material;
- (c) A description of features of the facility relating to material accountancy, containment and surveillance; and
- (d) A description of the existing and proposed procedures at the facility for nuclear material accountancy and control, with special reference to material balance areas established by the operator, measurements of flow and procedures for physical inventory taking.

Article 44. Other information relevant to the application of safeguards shall also be provided to the Agency in respect of each facility identified by the Agency in accordance with Article 39(b), in particular on organizational responsibility for material accountancy and control. The United States shall provide the Agency with supplementary information on the health and safety procedures which the Agency shall observe and with which the inspectors shall comply at the facility.

Article 45. The Agency shall be provided with design information in respect of a modification relevant for safeguards purposes, for examination, and shall be informed of any change in the information provided to it under Article 44, sufficiently in advance for the safeguards procedures to be adjusted when necessary.

Article 46. The design information provided to the Agency shall be used for the following purposes:

- (a) To identify the features of facilities and nuclear material relevant to the application of safeguards to nuclear material in sufficient detail to facilitate verification;
- (b) To determine material balance areas to be used for Agency accounting purposes and to select those strategic points which are key measurement points and which will be used to determine flow and inventory of nuclear material; in determining such material balance areas the Agency shall, *inter alia*, use the following criteria:
 - (i) The size of the material balance area shall be related to the accuracy with which the material balance can be established;
 - (ii) In determining the material balance area, advantage shall be taken of any opportunity to use containment and surveillance to help ensure the completeness of flow measurements and thereby to simplify the application of safeguards and to concentrate measurement efforts at key measurement points;
 - (iii) A number of material balance areas in use at a facility or at distinct sites may be combined in one material balance area to be used for Agency accounting purposes when the Agency determines that this is consistent with its verification requirements; and
 - (iv) A special material balance area may be established at the request of the United States around a process step involving commercially sensitive information;
- (c) To establish the nominal timing and procedures for taking of physical inventory of nuclear material for Agency accounting purposes;

- (d) To establish the records and reports requirements and records evaluation procedures;
- (e) To establish requirements and procedures for verification of the quantity and location of nuclear material; and
- (f) To select appropriate combinations of containment and surveillance methods and techniques at the strategic points at which they are to be applied.

The results of the examination of the design information shall be included in the Subsidiary Arrangements.

Article 47. Design information shall be re-examined in the light of changes in operating conditions, of developments in safeguards technology or of experience in the application of verification procedures, with a view to modifying the action the Agency has taken pursuant to Article 46.

Article 48. The Agency, in co-operation with the United States, may send inspectors to facilities to verify the design information provided to the Agency pursuant to Articles 42 through 45, for the purposes stated in Article 46.

Article 49. In establishing a national system of materials control as referred to in Article 7, the United States shall arrange that records are kept in respect of each material balance area determined in accordance with Article 46(b). The records to be kept shall be described in the Subsidiary Arrangements.

Article 50. The United States shall make arrangements to facilitate the examination of records referred to in Article 49 by inspectors.

Article 51. Records referred to in Article 49 shall be retained for at least five years.

Article 52. Records referred to in Article 49 shall consist, as appropriate, of:

- (a) Accounting records of all nuclear material subject to safeguards under this Agreement; and
- (b) Operating records for facilities containing such nuclear material.

Article 53. The system of measurements on which the records used for the preparation of reports are based shall either conform to the latest international standards or be equivalent in quality to such standards.

Article 54. The accounting records referred to in Article 52(a) shall set forth the following in respect of each material balance area determined in accordance with Article 46(b):

- (a) All inventory changes, so as to permit a determination of the book inventory at any time;
- (b) All measurement results that are used for determination of the physical inventory; and
- (c) All adjustments and corrections that have been made in respect of inventory changes, book inventories and physical inventories.

Article 55. For all inventory changes and physical inventories the records referred to in Article 52(a) shall show, in respect of each batch of nuclear material: material identification, batch data and source data. The records shall account for uranium, thorium and plutonium separately in each batch of nuclear material. For each inventory change, the date of the inventory change and, when

appropriate, the originating material balance area and the receiving material balance area or the recipient shall be indicated.

Article 56. The operating records referred to in Article 52(b) shall set forth, as appropriate, in respect of each material balance area determined in accordance with Article 46(b):

- (a) Those operating data which are used to establish changes in the quantities and composition of nuclear material;
- (b) The data obtained from the calibration of tanks and instruments and from sampling and analyses, the procedures to control the quality of measurements and the derived estimates of random and systematic error;
- (c) A description of the sequence of the actions taken in preparing for, and in taking, a physical inventory, in order to ensure that it is correct and complete; and
- (d) A description of the actions taken in order to ascertain the cause and magnitude of any accidental or unmeasured loss that might occur.

Article 57. The United States shall provide the Agency with reports as detailed in Articles 58 through 67 in respect of nuclear material subject to safeguards under this Agreement.

Article 58. Reports shall be made in English.

Article 59. Reports shall be based on the records kept in accordance with Articles 49 through 56 and shall consist, as appropriate, of accounting reports and special reports.

Article 60. The United States shall provide the Agency with an initial report on all nuclear material contained in each facility which becomes listed in the Subsidiary Arrangements in accordance with Article 39(b):

- (a) With respect to those facilities listed pursuant to Article 39(b)(i), such reports shall be dispatched to the Agency within thirty days of the last day of the calendar month in which this Agreement enters into force, and shall reflect the situation as of the last day of that month.
- (b) With respect to each facility listed pursuant to Article 39(b)(ii), an initial report shall be dispatched to the Agency within thirty days of the last day of the calendar month in which the Agency identifies the facility to the United States and shall reflect the situation as of the last day of that month.

Article 61. The United States shall provide the Agency with the following accounting reports for each material balance area determined in accordance with Article 46(b):

- (a) Inventory change reports showing all changes in the inventory of nuclear material. The reports shall be dispatched as soon as possible and in any event within thirty days after the end of the month in which the inventory changes occurred or were established; and
- (b) Material balance reports showing the material balance based on a physical inventory of nuclear material actually present in the material balance area. The reports shall be dispatched as soon as possible and in any event within thirty days after the physical inventory has been taken.

The reports shall be based on data available as of the date of reporting and may be corrected at a later date, as required.

Article 62. Inventory change reports submitted in accordance with Article 61(a) shall specify identification and batch data for each batch of nuclear material, the date of the inventory change, and, as appropriate, the originating material balance area and the receiving material balance area or the recipient. These reports shall be accompanied by concise notes:

- (a) Explaining the inventory changes, on the basis of the operating data contained in the operating records provided for under Article 56(a); and
- (b) Describing, as specified in the Subsidiary Arrangements, the anticipated operational programme, particularly the taking of a physical inventory.

Article 63. The United States shall report each inventory change, adjustment and correction, either periodically in a consolidated list or individually. Inventory changes shall be reported in terms of batches. As specified in the Subsidiary Arrangements, small changes in inventory of nuclear material, such as transfers of analytical samples, may be combined in one batch and reported as one inventory change.

Article 64. The Agency shall provide the United States with semi-annual statements of book inventory of nuclear material subject to safeguards under this Agreement, for each material balance area, as based on the inventory change reports for the period covered by each such statement.

Article 65. Material balance reports submitted in accordance with Article 61(b) shall include the following entries, unless otherwise agreed by the United States and the Agency:

- (a) Beginning physical inventory;
- (b) Inventory changes (first increases, then decreases);
- (c) Ending book inventory;
- (d) Shipper/receiver differences;
- (e) Adjusted ending book inventory;
- (f) Ending physical inventory; and
- (g) Material unaccounted for.

A statement of the physical inventory, listing all batches separately and specifying material identification and batch data for each batch, shall be attached to each material balance report.

Article 66. The United States shall make special reports without delay:

- (a) If any unusual incident or circumstances lead the United States to believe that there is or may have been loss of nuclear material subject to safeguards under this Agreement that exceeds the limits specified for this purpose in the Subsidiary Arrangements; or
- (b) If the containment has unexpectedly changed from that specified in the Subsidiary Arrangements to the extent that unauthorized removal of nuclear material subject to safeguards under this Agreement has become possible.

Article 67. If the Agency so requests, the United States shall provide it with amplifications or clarifications of any report submitted in accordance with Articles 57 through 63, 65 and 66, in so far as relevant for the purpose of safeguards.

Article 68. The Agency shall have the right to make inspections as provided for in Articles 69 through 82.

Article 69. The Agency may make *ad hoc* inspections in order to:

- (a) Verify the information contained in the initial reports submitted in accordance with Article 60;
- (b) Identify and verify changes in the situation which have occurred since the date of the relevant initial report; and
- (c) Identify and if possible verify the quantity and composition of the nuclear material subject to safeguards under this Agreement in respect of which the information referred to in Article 89(a) has been provided to the Agency.

Article 70. The Agency may make routine inspections in order to:

- (a) Verify that reports submitted pursuant to Articles 57 through 63, 65 and 66 are consistent with records kept pursuant to Articles 49 through 56;
- (b) Verify the location, identity, quantity and composition of all nuclear material subject to safeguards under this Agreement; and
- (c) Verify information on the possible causes of material unaccounted for, shipper/receiver differences and uncertainties in the book inventory.

Article 71. Subject to the procedures laid down in Article 75, the Agency may make special inspections:

- (a) In order to verify the information contained in special reports submitted in accordance with Article 66; or
- (b) If the Agency considers that information made available by the United States, including explanations from the United States and information obtained from routine inspections, is not adequate for the Agency to fulfil its responsibilities under this Agreement.

An inspection shall be deemed to be special when it is either additional to the routine inspection effort provided for in Articles 76 through 80, or involves access to information or locations in addition to the access specified in Article 74 for *ad hoc* and routine inspections, or both.

Article 72. For the purposes specified in Articles 69 through 71, the Agency may:

- (a) Examine the records kept pursuant to Articles 49 through 56;
- (b) Make independent measurements of all nuclear material subject to safeguards under this Agreement;
- (c) Verify the functioning and calibration of instruments and other measuring and control equipment;
- (d) Apply and make use of surveillance and containment measures; and
- (e) Use other objective methods which have been demonstrated to be technically feasible.

Article 73. Within the scope of Article 72, the Agency shall be enabled:

- (a) To observe that samples at key measurement points for material balance accountancy are taken in accordance with procedures which produce repre-

sentative samples, to observe the treatment and analysis of the samples and to obtain duplicates of such samples;

- (b) To observe that the measurements of nuclear material at key measurement points for material balance accountancy are representative, and to observe the calibration of the instruments and equipment involved;
- (c) To make arrangements with the United States that, if necessary:
 - (i) Additional measurements are made and additional samples taken for the Agency's use;
 - (ii) The Agency's standard analytical samples are analysed;
 - (iii) Appropriate absolute standards are used in calibrating instruments and other equipment; and
 - (iv) Other calibrations are carried out;
- (d) To arrange to use its own equipment for independent measurement and surveillance, and if so agreed and specified in the Subsidiary Arrangements to arrange to install such equipment;
- (e) To apply its seals and other identifying and tamper-indicating devices to containments, if so agreed and specified in the Subsidiary Arrangements; and
- (f) To make arrangements with the United States for the shipping of samples taken for the Agency's use.

Article 74. (a) For the purposes specified in Article 69(a) and (b) and until such time as the strategic points have been specified in the Subsidiary Arrangements, Agency inspectors shall have access to any location where the initial report or any inspections carried out therewith indicate that nuclear material subject to safeguards under this Agreement is present.

(b) For the purposes specified in Article 69(c), the inspectors shall have access to any facility identified pursuant to Articles 2(b) or 39(b) in which nuclear material referred to in Article 69(c) is located.

(c) For the purposes specified in Article 70 the inspectors shall have access only to the strategic points specified in the Subsidiary Arrangements and to the records maintained pursuant to Articles 49 through 56; and

(d) In the event of the United States concluding that any unusual circumstances require extended limitations on access by the Agency, the United States and the Agency shall promptly make arrangements with a view to enabling the Agency to discharge its safeguards responsibilities in the light of these limitations. The Director General shall report each such arrangement to the Board.

Article 75. In circumstances which may lead to special inspections for the purposes specified in Article 71 the United States and the Agency shall consult forthwith. As a result of such consultations the Agency may:

- (a) Make inspections in addition to the routine inspection effort provided for in Articles 76 through 80; and
- (b) Obtain access, in agreement with the United States, to information or locations in addition to those specified in Article 74. Any disagreement concerning the need for additional access shall be resolved in accordance with

Articles 20 and 21; in case action by the United States is essential and urgent, Article 17 shall apply.

Article 76. The Agency shall keep the number, intensity and duration of routine inspections, applying optimum timing, to the minimum consistent with the effective implementation of the safeguards procedures set forth in this Agreement, and shall make the optimum and most economical use of inspection resources available to it.

Article 77. The Agency may carry out one routine inspection per year in respect of facilities listed in the Subsidiary Arrangements pursuant to Article 39 with a content or annual throughput, whichever is greater, of nuclear material not exceeding five effective kilograms.

Article 78. The number, intensity, duration, timing and mode of routine inspections in respect of facilities listed in the Subsidiary Arrangements pursuant to Article 39 with a content or annual throughput of nuclear material exceeding five effective kilograms shall be determined on the basis that in the maximum or limiting case the inspection regime shall be no more intensive than is necessary and sufficient to maintain continuity of knowledge of the flow and inventory of nuclear material, and the maximum routine inspection effort in respect of such facilities shall be determined as follows:

- (a) For reactors and sealed storage installations the maximum total of routine inspections per year shall be determined by allowing one sixth of man-year of inspection for each such facility;
- (b) For facilities, other than reactors or sealed storage installations, involving plutonium or uranium enriched to more than 5%, the maximum total of routine inspections per year shall be determined by allowing for each such facility $30 \times \sqrt{E}$ man-days of inspection per year, where E is the inventory or annual throughput of nuclear material, whichever is greater, expressed in effective kilograms. The maximum established for any such facility shall not, however, be less than 1.5 man-years of inspection; and
- (c) For facilities not covered by paragraphs (a) or (b), the maximum total of routine inspections per year shall be determined by allowing for each such facility one third of a man-year of inspection plus $0.4 \times E$ man-days of inspection per year, where E is the inventory or annual throughput of nuclear material, whichever is greater, expressed in effective kilograms.

The United States and the Agency may agree to amend the figures for the maximum inspection effort specified in this Article, upon determination by the Board that such amendment is reasonable.

Article 79. Subject to Articles 76 through 78 the criteria to be used for determining the actual number, intensity, duration, timing and mode of routine inspections in respect of any facility listed in the Subsidiary Arrangements pursuant to Article 39 shall include:

- (a) The form of the nuclear material, in particular, whether the nuclear material is in bulk form or contained in a number of separate items; its chemical composition and, in the case of uranium, whether it is of low or high enrichment; and its accessibility;
- (b) The effectiveness of the United States' accounting and control system, including the extent to which the operators of facilities are functionally inde-

pendent of the United States' accounting and control system; the extent to which the measures specified in Article 32 have been implemented by the United States; the promptness of reports provided to the Agency; their consistency with the Agency's independent verification; and the amount and accuracy of the material unaccounted for, as verified by the Agency;

- (c) Characteristics of that part of the United States fuel cycle in which safeguards are applied under this Agreement, in particular, the number and types of facilities containing nuclear material subject to safeguards under this Agreement, the characteristics of such facilities relevant to safeguards, notably the degree of containment; the extent to which the design of such facilities facilitates verification of the flow and inventory of nuclear material; and the extent to which information from different material balance areas can be correlated;
- (d) International interdependence, in particular the extent to which nuclear material, safeguarded under this Agreement, is received from or sent to other States for use or processing; any verification activities by the Agency in connection therewith; and the extent to which activities in facilities in which safeguards are applied under this Agreement are interrelated with those of other States; and
- (e) Technical developments in the field of safeguards, including the use of statistical techniques and random sampling in evaluating the flow of nuclear material.

Article 80. The United States and the Agency shall consult if the United States considers that the inspection effort is being deployed with undue concentration on particular facilities.

Article 81. The Agency shall give advance notice to the United States of the arrival of inspectors at facilities listed in the Subsidiary Arrangements pursuant to Article 39, as follows:

- (a) For *ad hoc* inspections pursuant to Article 69(c), at least 24 hours; for those pursuant to Article 69(a) and (b), as well as the activities provided for in Article 48, at least one week;
- (b) For special inspections pursuant to Article 71, as promptly as possible after the United States and the Agency have consulted as provided for in Article 75, it being understood that notification of arrival normally will constitute part of the consultations; and
- (c) For routine inspections pursuant to Article 70 at least twenty-four hours in respect of the facilities referred to in Article 78(b) and sealed storage installations containing plutonium or uranium enriched to more than 5% and one week in all other cases.

Such notice of inspections shall include the names of the inspectors and shall indicate the facilities to be visited and the periods during which they will be visited. If the inspectors are to arrive from outside the United States the Agency shall also give advance notice of the place and time of their arrival in the United States.

Article 82. Notwithstanding the provisions of Article 81, the Agency may, as a supplementary measure, carry out without advance notification a portion of the routine inspections pursuant to Article 78 in accordance with the principle

of random sampling. In performing any unannounced inspections, the Agency shall fully take into account any operational programme provided by the United States pursuant to Article 62(b). Moreover, whenever practicable, and on the basis of the operational programme, it shall advise the United States periodically of its general programme of announced and unannounced inspections, specifying the general periods when inspections are foreseen. In carrying out any unannounced inspections, the Agency shall make every effort to minimize any practical difficulties for the United States and facility operators bearing in mind the relevant provisions of Articles 44 and 87. Similarly the United States shall make every effort to facilitate the task of the inspectors.

Article 83. The following procedures shall apply to the designation of inspectors:

- (a) The Director General shall inform the United States in writing of the name, qualifications, nationality, grade and such other particulars as may be relevant, of each Agency official he proposes for designation as an inspector for the United States;
- (b) The United States shall inform the Director General within thirty days of the receipt of such a proposal whether it accepts the proposal;
- (c) The Director General may designate each official who has been accepted by the United States as one of the inspectors for the United States, and shall inform the United States of such designations; and
- (d) The Director General, acting in response to a request by the United States or on his own initiative, shall immediately inform the United States of the withdrawal of the designation of any official as an inspector for the United States.

However, in respect of inspectors needed for the activities provided for in Article 48 and to carry out *ad hoc* inspections pursuant to Article 69(a) and (b) the designation procedures shall be completed if possible within thirty days after the entry into force of this Agreement. If such designation appears impossible within this time limit, inspectors for such purposes shall be designated on a temporary basis.

Article 84. The United States shall grant or renew as quickly as possible appropriate visas, where required, for each inspector designated for [the] United States.

Article 85. Inspectors, in exercising their functions under Articles 48 and 69 to 73, shall carry out their activities in a manner designed to avoid hampering or delaying the construction, commissioning or operation of facilities, or affecting their safety. In particular inspectors shall not operate any facility themselves or direct the staff of a facility to carry out any operation. If inspectors consider that in pursuance of paragraphs 72 and 73, particular operations in a facility should be carried out by the operator, they shall make a request therefor.

Article 86. When inspectors require services available in the United States, including the use of equipment, in connection with the performance of inspections, the United States shall facilitate the procurement of such services and the use of such equipment by inspectors.

Article 87. The United States shall have the right to have inspectors accompanied during their inspections by its representatives, provided that

inspectors shall not thereby be delayed or otherwise impeded in the exercise of their functions.

Article 88. The Agency shall inform the United States of:

- (a) The results of inspections, at intervals to be specified in the Subsidiary Arrangements; and
- (b) The conclusions it has drawn from its verification activities in the United States, in particular by means of statements in respect of each material balance area determined in accordance with Article 46(b) which shall be made as soon as possible after a physical inventory has been taken and verified by the Agency and a material balance has been struck.

Article 89. (a) Information concerning nuclear material exported from and imported into the United States shall be provided to the Agency in accordance with arrangements made with the Agency as, for example, those set forth in INFCIRC/207.

(b) In the case of international transfers to or from facilities identified by the Agency pursuant to Articles 2(b) and 39(b) with respect to which information has been provided to the Agency in accordance with arrangements referred to in paragraph (a), a special report, as envisaged in Article 66, shall be made if any unusual incident or circumstances lead the United States to believe that there is or may have been loss of nuclear material, including the occurrence of significant delay, during the transfer.

DEFINITIONS

Article 90. For the purposes of this Agreement:

A. Adjustment means an entry into an accounting record or a report showing a shipper/receiver difference or material unaccounted for.

B. Annual throughput means, for the purposes of Articles 77 and 78, the amount of nuclear material transferred annually out of a facility working at nominal capacity.

C. Batch means a portion of nuclear material handled as a unit for accounting purposes at a key measurement point and for which the composition and quantity are defined by a single set of specifications or measurements. The nuclear material may be in bulk form or contained in a number of separate items.

D. Batch data means the total weight of each element of nuclear material and, in the case of plutonium and uranium, the isotopic composition when appropriate. The units of account shall be as follows:

- (a) Grams of contained plutonium;
- (b) Grams of total uranium and grams of contained uranium-235 plus uranium-233 for uranium enriched in these isotopes; and
- (c) Kilograms of contained thorium, natural uranium or depleted uranium.

For reporting purposes the weights of individual items in the batch shall be added together before rounding to the nearest unit.

E. Book inventory of a material balance area means the algebraic sum of the most recent physical inventory of that material balance area and of all inventory changes that have occurred since that physical inventory was taken.

F. Correction means an entry into an accounting record or a report to rectify an identified mistake or to reflect an improved measurement of a quantity previously entered into the record or report. Each correction must identify the entry to which it pertains.

G. Effective kilogram means a special unit used in safeguarding nuclear material. The quantity in effective kilograms is obtained by taking:

- (a) For plutonium, its weight in kilograms;
- (b) For uranium with an enrichment of 0.01 (1%) and above, its weight in kilograms multiplied by the square of its enrichment;
- (c) For uranium with an enrichment below 0.01 (1%) and above 0.005 (0.5%), its weight in kilograms multiplied by 0.0001; and
- (d) For depleted uranium with an enrichment of 0.005 (0.5%) or below, and for thorium, its weight in kilograms multiplied by 0.00005.

H. Enrichment means the ratio of the combined weight of the isotopes uranium-233 and uranium-235 to that of the total uranium in question.

I. Facility means:

- (a) A reactor, a critical facility, a conversion plant, a fabrication plant, a reprocessing plant, an isotope separation plant or a separate storage installation; or
- (b) Any location where nuclear material in amounts greater than one effective kilogram is customarily used.

J. Inventory change means an increase or decrease, in terms of batches, of nuclear material in a material balance area; such a change shall involve one of the following:

(a) Increases:

- (i) Import;
- (ii) Domestic receipt: receipts from other material balance areas, receipts from a non-safeguarded activity or receipts at the starting point of safeguards;
- (iii) Nuclear production: production of special fissionable material in a reactor; and
- (iv) De-exemption: reapplication of safeguards on nuclear material previously exempted therefrom on account of its use or quantity.

(b) Decreases:

- (i) Export;
- (ii) Domestic shipment: shipments to other material balance areas or shipments for a non-safeguarded activity;
- (iii) Nuclear loss: loss of nuclear material due to its transformation into other element(s) or isotope(s) as a result of nuclear reactions;
- (iv) Measured discard: nuclear material which has been measured, or estimated on the basis of measurements, and disposed of in such a way that it is not suitable for further nuclear use;
- (v) Retained waste: nuclear material generated from processing or from an operational accident, which is deemed to be unrecoverable for the time being but which is stored;

- (vi) Exemption: exemption of nuclear material from safeguards on account of its use or quantity; and
- (vii) Other loss: for example, accidental loss (that is, irretrievable and inadvertent loss of nuclear material as the result of an operational accident) or theft.

K. Key measurement point means a location where nuclear material appears in such a form that it may be measured to determine material flow or inventory. Key measurement points thus include, but are not limited to, the inputs and outputs (including measured discards) and storages in material balance areas.

L. Man-year of inspection means, for the purposes of Article 78, 300 man-days of inspection, a man-day being a day during which a single inspector has access to a facility at any time for a total of not more than eight hours.

M. Material balance area means an area in or outside of a facility such that:

- (a) The quantity of nuclear material in each transfer into or out of each material balance area can be determined; and
 - (b) The physical inventory of nuclear material in each material balance area can be determined when necessary in accordance with specified procedures,
- in order that the material balance for Agency safeguards purposes can be established.

N. Material unaccounted for means the difference between book inventory and physical inventory.

O. Nuclear material means any source or any special fissionable material as defined in Article XX of the Statute. The term source material shall not be interpreted as applying to ore or ore residue. Any determination by the Board under Article XX of the Statute after the entry into force of this Agreement which adds to the materials considered to be source material or special fissionable material shall have effect under this Agreement only upon acceptance by the United States.

P. Physical inventory means the sum of all the measured or derived estimates of batch quantities of nuclear material on hand at a given time within a material balance area, obtained in accordance with specified procedures.

Q. Shipper/receiver difference means the difference between the quantity of nuclear material in a batch as stated by the shipping material balance area and as measured at the receiving material balance area.

R. Source data means those data, recorded during measurement or calibration or used to derive empirical relationships, which identify nuclear material and provide batch data. Source data may include, for example, weight of compounds, conversion factors to determine weight of element, specific gravity, element concentration, isotopic ratios, relationship between volume and manometer readings and relationship between plutonium produced and power generated.

S. Strategic point means a location selected during examination of design information where, under normal conditions and when combined with the information from all strategic points taken together, the information necessary

and sufficient for the implementation of safeguards measures is obtained and verified; a strategic point may include any location where key measurements related to material balance accountancy are made and where containment and surveillance measures are executed.

PROTOCOL

Article 1. This Protocol specifies the procedures to be followed with respect to facilities identified by the Agency pursuant to Article 2 of this Protocol.

Article 2. (a) The Agency may from time to time identify to the United States those facilities included in the list, established and maintained pursuant to Articles 1(b) and 34 of the Agreement, of facilities not associated with activities having direct national security significance to the United States, other than those which are then currently identified by the Agency pursuant to Articles 2(b) and 39(b) of the Agreement, to which the provisions of this Protocol shall apply.

(b) The Agency may also include among the facilities identified to the United States pursuant to the foregoing paragraph, any facility which had previously been identified by the Agency pursuant to Articles 2(b) and 39(b) of the Agreement but which had subsequently been designated by the Agency pursuant to Article 39(c) of the Agreement for removal from the Subsidiary Arrangements listing.

(c) In identifying facilities pursuant to the foregoing paragraphs and in the preparation of Transitional Subsidiary Arrangements pursuant to Article 3 of this Protocol, the Agency shall proceed in a manner which the Agency and the United States mutually agree takes into account the requirement on the United States to avoid discriminatory treatment as between United States commercial firms similarly situated.

Article 3. The United States and the Agency shall make Transitional Subsidiary Arrangements which shall:

- (a) Contain a current listing of those facilities identified by the Agency pursuant to Article 2 of this Protocol;
- (b) Specify in detail how the procedures set forth in this Protocol are to be applied.

Article 4. (a) The United States and the Agency shall make every effort to complete the Transitional Subsidiary Arrangements with respect to each facility identified by the Agency pursuant to Article 2 of this Protocol within ninety days following such identification to the United States.

(b) With respect to any facility identified pursuant to Article 2(b) of this Protocol, the information previously submitted to the Agency in accordance with Articles 42 through 45 of the Agreement, the results of the examination of the design information and other provisions of the Subsidiary Arrangements relative to such facility, to the extent that such information, results and provisions satisfy the provisions of this Protocol relating to the submission and examination of information and the preparation of Transitional Subsidiary Arrangements, shall constitute the Transitional Subsidiary Arrangements for such facility, until and unless the United States and the Agency shall otherwise complete Tran-

sitional Subsidiary Arrangements for such facility in accordance with the provisions of this Protocol.

Article 5. In the event that a facility currently identified by the Agency pursuant to Article 2(a) of this Protocol is identified by the Agency pursuant to Articles 2(b) and 39(b) of the Agreement, the Transitional Subsidiary Arrangements relevant to such facility shall, to the extent that such Transitional Subsidiary Arrangements satisfy the provisions of the Agreement, be deemed to have been made part of the Subsidiary Arrangements to the Agreement.

Article 6. Design information in respect of each facility identified by the Agency pursuant to Article 2 of this Protocol shall be provided to the Agency during the discussion of the relevant Transitional Subsidiary Arrangements. The information shall include, when applicable:

- (a) The identification of the facility, stating its general character, purpose, nominal capacity and geographic location, and the name and address to be used for routine business purpose;
- (b) A description of the general arrangement of the facility with reference, to the extent feasible, to the form, location and flow of nuclear material and to the general layout of important items of equipment which use, produce or process nuclear material;
- (c) A description of features of the facility relating to material accountancy, containment and surveillance; and
- (d) A description of the existing and proposed procedures at the facility for nuclear material accountancy and control, with special reference to material balance areas established by the operator, measurements of flow and procedures for physical inventory taking.

Article 7. Other information relevant to the application of the provisions of this Protocol shall also be provided to the Agency in respect of each facility identified by the Agency in accordance with Article 2 of this Protocol, in particular on organizational responsibility for material accountancy and control. The United States shall provide the Agency with supplementary information on the health and safety procedures which the Agency shall observe and with which inspectors shall comply when visiting the facility in accordance with Article 11 of this Protocol.

Article 8. The Agency shall be provided with design information in respect of a modification relevant to the application of the provisions of this Protocol, for examination, and shall be informed of any change in the information provided to it under Article 7 of this Protocol, sufficiently in advance for the procedures under this Protocol to be adjusted when necessary.

Article 9. The design information provided to the Agency in accordance with the provisions of this Protocol, in anticipation of the application of safeguards under the Agreement, shall be used for the following purposes:

- (a) To identify the features of facilities and nuclear material relevant to the application of safeguards to nuclear material in sufficient detail to facilitate verification;
- (b) To determine material balance areas to be used for Agency accounting purposes and to select those strategic points which are key measurement

points and which will be used to determine flow and inventory of nuclear material; in determining such material balance areas the Agency shall, *inter alia*, use the following criteria:

- (i) The size of the material balance area shall be related to the accuracy with which the material balance can be established;
 - (ii) In determining the material balance area, advantage shall be taken of any opportunity to use containment and surveillance to help ensure the completeness of flow measurements and thereby to simplify the application of safeguards and to concentrate measurement efforts at key measurement points;
 - (iii) A number of material balance areas in use at a facility or at distinct sites may be combined in one material balance area to be used for Agency accounting purposes when the Agency determines that this is consistent with its verification requirements; and
 - (iv) A special material balance area may be established at the request of the United States around a process step involving commercially sensitive information;
- (c) To establish the nominal timing and procedures for taking of physical inventory of nuclear material for Agency accounting purposes;
- (d) To establish the records and reports requirements and records evaluation procedures;
- (e) To establish requirements and procedures for verification of the quantity and location of nuclear material; and
- (f) To select appropriate combinations of containment and surveillance methods and techniques and the strategic points at which they are to be applied.

The results of the examination of the design information shall be included in the relevant Transitional Subsidiary Arrangements.

Article 10. Design information provided in accordance with the provisions of this Protocol shall be re-examined in the light of changes in operating conditions, of developments in safeguards technology or of experience in the application of verification procedures, with a view to modifying the action taken pursuant to Article 9 of this Protocol.

Article 11. (a) The Agency, in co-operation with the United States, may send inspectors to facilities identified by the Agency pursuant to Article 2 of this Protocol to verify the design information provided to the Agency in accordance with the provisions of this Protocol, for the purposes stated in Article 9 of this Protocol or for such other purposes as may be agreed between the United States and the Agency.

(b) The Agency shall give notice to the United States with respect to each such visit at least one week prior to the arrival of inspectors at the facility to be visited.

Article 12. In establishing a national system of materials control as referred to in Article 7(a) of the Agreement, the United States shall arrange that records are kept in respect of each material balance area determined in accordance with Article 9(b) of this Protocol. The records to be kept shall be described in the relevant Transitional Subsidiary Arrangements.

Article 13. Records referred to in Article 12 of this Protocol shall be retained for at least five years.

Article 14. Records referred to in Article 12 of this Protocol shall consist, as appropriate, of:

- (a) Accounting records of all nuclear material stored, processed, used or produced in each facility; and
- (b) Operating records for activities within each facility.

Article 15. The system of measurements on which the records used for the preparation of reports are based shall either conform to the latest international standards or be equivalent in quality to such standards.

Article 16. The accounting records referred to in Article 14(a) of this Protocol shall set forth the following in respect of each material balance area determined in accordance with Article 9(b) of this Protocol:

- (a) All inventory changes, so as to permit a determination of the book inventory at any time;
- (b) All measurement results that are used for determination of the physical inventory; and
- (c) All adjustments and corrections that have been made in respect of inventory changes, book inventories and physical inventories.

Article 17. For all inventory changes and physical inventories the records referred to in Article 14(a) of this Protocol shall show, in respect of each batch of nuclear material: material identification, batch data and source data. The records shall account for uranium, thorium and plutonium separately in each batch of nuclear material. For each inventory change, the date of the inventory change and, when appropriate, the originating material balance area and the receiving material balance area or the recipient, shall be indicated.

Article 18. The operating records referred to in Article 14(b) of this Protocol shall set forth, as appropriate, in respect of each material balance area determined in accordance with Article 9(b) of this Protocol:

- (a) Those operating data which are used to establish changes in the quantities and composition of nuclear material;
- (b) The data obtained from the calibration of tanks and instruments and from sampling and analyses, the procedures to control the quality of measurements and the derived estimates of random and systematic error;
- (c) A description of the sequence of the actions taken in preparing for, and in taking, a physical inventory, in order to ensure that it is correct and complete; and
- (d) A description of the actions taken in order to ascertain the cause and magnitude of any accidental or unmeasured loss that might occur.

Article 19. The United States shall provide the Agency with accounting reports as detailed in Articles 20 through 25 of this Protocol in respect of nuclear material in each facility identified by the Agency pursuant to Article 2 of this Protocol.

Article 20. The accounting reports shall be based on the records kept in accordance with Articles 12 to 18 to this Protocol. They shall be made in English.

Article 21. The United States shall provide the Agency with an initial report on all nuclear material in each facility identified by the Agency pursuant to Article 2 of this Protocol. Such report shall be dispatched to the Agency within thirty days of the last day of the calendar month in which the facility is identified by the Agency and shall reflect the situation as of the last day of that month.

Article 22. The United States shall provide the Agency with the following accounting reports for each material balance area determined in accordance with Article 9(b) of this Protocol:

- (a) Inventory change reports showing all changes in the inventory of nuclear material. The reports shall be dispatched as soon as possible and in any event within thirty days after the end of the month in which the inventory changes occurred or were established; and
- (b) Material balance reports showing the material balance based on a physical inventory of nuclear material actually present in the material balance area. The reports shall be dispatched as soon as possible and in any event within thirty days after the physical inventory has been taken.

The reports shall be based on data available as of the date of reporting and may be corrected at a later date, as required.

Article 23. Inventory change reports submitted in accordance with Article 22(a) of this Protocol shall specify identification and batch data for each batch of nuclear material, the date of the inventory change, and, as appropriate, the originating material balance area and the receiving material balance area or the recipient. These reports shall be accompanied by concise notes:

- (a) Explaining the inventory changes, on the basis of the operating data contained in the operating records provided for in Article 18(a) of this Protocol; and
- (b) Describing, as specified in the relevant Transitional Subsidiary Arrangements, the anticipated operational programme, particularly the taking of a physical inventory.

Article 24. The United States shall report each inventory change, adjustment and correction, either periodically in a consolidated list or individually. Inventory changes shall be reported in terms of batches. As specified in the relevant Transitional Subsidiary Arrangements, small changes in inventory of nuclear material, such as transfers of analytical samples, may be combined in one batch and reported as one inventory change.

Article 25. Material balance reports submitted in accordance with Article 22(b) of this Protocol shall include the following entries, unless otherwise agreed by the United States and the Agency:

- (a) Beginning physical inventory;
- (b) Inventory changes (first increases, then decreases);
- (c) Ending book inventory;
- (d) Shipper/receiver differences;
- (e) Adjusted ending book inventory;
- (f) Ending physical inventory; and
- (g) Material unaccounted for.

A statement of the physical inventory, listing all batches separately and specifying material identification and batch data for each batch, shall be attached to each material balance report.

Article 26. The Agency shall provide the United States with semi-annual statements of book inventory of nuclear material in facilities identified pursuant to Article 2 of this Protocol, for each material balance area, as based on the inventory change reports for the period covered by each such statement.

Article 27. (a) If the Agency so requests, the United States shall provide it with amplifications or clarifications of any report submitted in accordance with Article 19 of this Protocol, in so far as consistent with the purpose of the Protocol.

(b) The Agency shall inform the United States of any significant observations resulting from its examination of reports received pursuant to Article 19 of this Protocol and from visits of inspectors made pursuant to Article 11 of this Protocol.

(c) The United States and the Agency shall, at the request of either, consult about any question arising out of the interpretation or application of this Protocol, including corrective action which, in the opinion of the Agency, should be taken by the United States to ensure compliance with its terms, as indicated by the Agency in its observations pursuant to paragraph (b) of this Article.

Article 28. The definitions set forth in Article 90 of the Agreement shall apply, to the extent relevant, to this Protocol.

DONE in Vienna on the eighteenth day of November 1977, in duplicate, in the English language.

For the United States of America:

GALEN L. STONE

For the International Atomic Energy Agency:

DAVID A. V. FISCHER