

II-6473 der Beilagen zu den Stenographischen Protokollen
des Nationalrates XVIII. Gesetzgebungsperiode

BUNDESMINISTERIUM FÜR
AUSWÄRTIGE ANGELEGENHEITEN

1004.03/2-II.8a/92

Herrn
Präsidenten des Nationalrates
Dr. Heinz FISCHER

Parlament
1017 W i e n

2862/AB
1992 -07-06
zu 2883/J

Die Abgeordneten zum Nationalrat Anschober, Freunde und Freundinnen haben unter Nr. 2883/J eine schriftlichen Anfrage betreffend Internationale Atomenergie-Organisation (IAEO) sowie Versäumnisse und Perspektiven der österreichischen Anti-Atom-Politik an mich gerichtet, die folgendermaßen lautet:

1. Welche Staaten bzw. Organisationen haben welt- bzw. europaweit Interesse an einem Ausstieg aus der Nutzung der Atomenergie?
2. Mit welchen dieser Staaten oder Organisationen wurden diesbezüglich bereits Kontakte hinsichtlich gemeinsamer Vorgangsweisen bei der Entwicklung und Umsetzung von Ausstiegsstrategien aufgenommen, und mit welchem Ergebnis wurden allfällige Gespräche geführt?
3. Sehen Sie die Internationale Atomenergie Organisation (IAEO), deren Mitglied Österreich seit 1957 ist, und an die derzeit jährlich rund 21 Millionen Schilling direkter Beiträge entrichtet werden, als eine dem Ausstieg aus der Atomenergie dienliche Organisation?

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4. Entstehen durch den Umstand, daß Amtssitz der IAEÖ Wien ist, noch zusätzliche Kosten, die über diese direkten Beiträge hinausgehen?

5. Wenn ja, wieviel wird seit 1957 zum Beispiel für das Gebäude, für die Verwaltung, den Betrieb, für Personal oder sonstiges von österreichischer Seite aufgewendet, von wem werden diese "indirekten Beiträge" an die IAEÖ aufgebracht?

6. Welche Kosten sind seit 1957 für die Errichtung und den Betrieb (incl. Personal) des SAL-Labors jährlich entstanden, und von wem wurden und werden diese übernommen?

7. Der Betrieb des Labors beruht auf einem Anhang zum Amtssitzabkommen mit der IAEÖ, welche Laufzeit hat dieses Amtssitzabkommen, bzw. in welchem Jahr läuft es aus?

8. Österreich ist nunmehr das zweite und letzte Jahr im - nur dem Generalsekretär unterstellten - Entscheidungsgremium, dem Gouverneursrat der IAEÖ vertreten. Werden Sie sich dafür einsetzen, daß der dortige Vertreter Österreichs entsprechende Anträge auf Satzungsänderung der IAEÖ in Richtung "Internationale Atomausstiegsorganisation" einbringt, oder wurde dies bereits versucht?

9. Inwieweit besteht seitens der österreichischen Vertretung in der IAEÖ Berichterstattungspflicht gegenüber dem Minister und der Bundesregierung über Besprechungen und Beschlüsse des Gouverneursrat?

10. Inwieweit besteht seitens der österreichischen Vertretung in der IAEÖ Berichterstattungspflicht gegenüber dem Minister und der Bundesregierung über die aktuellen Sitzungen und Konferenzen?

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11. Im Bereich der Sicherheitskontrolle durch die IAE0 bestehen grundlegende Mängel. So haben die auf Basis des Nichtverbreitungsvertrages von IAE0-Safeguards durchgeführten Kontrollen das Ziel, eine Abzweigung von spaltbarem Material sichtbar zu machen, nicht aber eine Abzweigung von vorneherein z.B. durch technische Maßnahmen zu unterbinden. Auch ist bekannt, daß die fünf offiziellen Atomwaffenstaaten USA, GUS, GB, Frankreich und China mit Ausnahme einiger weniger Anlagen, ihre zivilen und militärischen Anlagen nicht den Kontrollen der Safeguards der IAE0 unterziehen. Ist Ihnen bekannt, bei wievielen Reaktor- und Nichtreaktoranlagen im Jahr 1991 das Inspektionsziel der IAE0, auch unter dem Aspekt der "rechtzeitigen Entdeckung", erreicht wurde?

12. Ist Ihnen bekannt, in wievielen Ländern Inspektionen der IAE0-Safeguards nur auf Einladung der jeweiligen Behörden erfolgen können?

13. Innerhalb der Bundesregierung sind derzeit die Fragen der Kernenergienutzung im bilateralen und multilateralen Kontext auf verschiedene Ministerien verstreut. Halten Sie es für sinnvoll, hinsichtlich einer größeren Effizienz und einer leichteren Klärung der politischen Verantwortlichkeit, diese Agenden zukünftig z.B. direkt durch das Bundeskanzleramt wahrzunehmen, oder entspricht die aktuelle Struktur und personelle Besetzung der Zielsetzung des Ausstiegs aus der Kernenergie?

14. Vor wenigen Wochen fand in Wien eine Konferenz der IAE0 statt, deren Inhalt die Schadenersatzhaftung für die Folgen von Atomunfällen war. Halten Sie den Erlass von Richtlinien, die KKW-Betreiber zu einem Versicherungsabschluß verpflichten, für ein geeignetes Mittel, um die Sozialisierung von Unfallfolgekosten zu vermeiden, und eine Eindämmung des KKW-Ausbaus zu erreichen?

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15. Hat der österreichische Vertreter bei dieser Sitzung der IAE0 dahingehende Vorschläge eingebracht?

16. Derzeit wird in Einklang mit der EG die Europäische Energiecharta konkretisiert, was unter anderem in Osteuropa die Weichen in Richtung Atomausbau stellen würde. Auch werden seitens der EG im Zusammenhang mit der Nachrüstung von osteuropäischen Reaktoren Gelder u.a. aus dem Programm PHARE bereitgestellt, so z.B. für Bohunice und Kosloduj (11,5 Mio ECU). Bulgarische Wissenschaftler und Politiker sprechen davon, daß kein Geld für die Reaktorsanierung eingesetzt werden dürfe, da dadurch die Mittel für Sofortmaßnahmen zum Ausstieg fehlten, und weiters, daß die Finanzierung derartiger Alternativen seitens der EG nicht vorgesehen ist. Die Betreiber des in Bau befindlichen Kernkraftwerkes Temelin, 65 Kilometer vor der österreichischen Grenze deuteten an, daß der Weiterbau der 2 mal 1000 MW-Reaktoren von der Finanzierung durch das EG-Programm PHARE abhängig ist. Ist Ihnen bekannt, in welcher Höhe insgesamt seitens der EG Mittel für die Nachrüstung dieser oder anderer Reaktoren bereitgestellt wurden und werden?

17. Haben Sie im Rahmen Ihrer Möglichkeiten zu dieser Mittelvergabe Stellung bezogen?

18. Im Gegensatz zu oben angeführten Fakten wird versucht, die Tatsache kernenergiefreier EG-Mitgliedsstaaten als liberale EG-Haltung im Atombereich darzustellen, bzw. den EURATOM-Vertrag als "veraltet" zu verharmlosen. Teilen Sie trotz obiger Fakten diese Auffassung, bzw. sehen Sie diese Vorgangsweise als eine liberale Haltung der EG im Atombereich?

19. Sehen Sie die Chancen, als Mitgliedsland der EG, die auf dem EURATOM-Vertrag beruhende Atomgesinnung grundlegend zu ändern, größer an als vergleichsweise die Änderung der IAE0-Satzungen, deren Mitgliedsstaaten zu 75% kernenergiefrei sind?

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20. Sind Ihnen Anträge von EURATOM-Mitgliedsstaaten bekannt, die sinngemäß zum Inhalt die Änderung des EURATOM-Vertrages dahingehend hatten, daß oberste Zielsetzung die gesamteuropäische Erarbeitung von Ausstiegsmöglichkeiten werden soll?

21. Wenn ja, wann, von welchen Ländern und mit welchem konkreten Inhalt wurden solche Anträge eingebracht, und welche Auswirkungen hatte das?

22. In welcher Weise, mit welchem konkreten Inhalt, würde Österreich im Falle einer EG- bzw. EURATOM-Mitgliedschaft derartige Anträge zur Änderung des EURATOM-Vertrages in Richtung Atomausstieg einbringen?

23. Ist Ihnen bekannt, daß bei den Kontrollen der EURATOM-Safeguards "zivile" Anlagen in Frankreich und Großbritannien teilweise ausgenommen sind?

24. Haben Sie gegen die derzeit geplanten Finanzierungen osteuropäischer Kernanlagen in Milliardenhöhe durch die EBRD im Rahmen ihrer Möglichkeiten Stellung bezogen?

25. Sehen Sie die soeben mit der Ukraine über 15 Jahre und eine Menge von 10.800 GWh abgeschlossenen Stromlieferverträge als förderlich für den Ausstieg aus der Atomindustrie, bzw. haben Sie dazu Stellung bezogen?

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Ich beehre mich, diese Anfrage wie folgt zu beantworten:

Zu Frage 1:

Was die Nutzung der Atomenergie allgemein betrifft, gibt es keinen Staat der Welt, der auf alle Aspekte ihrer Anwendung verzichten würde. Das gilt insbesondere im Hinblick auf die Nützlichkeit der Nuklearenergie in der Forschung sowie auch in der industriellen und medizinischen Anwendung.

Was die Nutzung der Nuklearenergie zum Zwecke der Elektrizitätsgewinnung betrifft, ist die internationale Gemeinschaft eine pluralistische Gesellschaft, d.h., daß es Staaten gibt, die ihre Verwendung für nützlich bzw. unverzichtbar halten; solche, die diese Art der Energieerzeugung derzeit nicht anwenden, die Nutzung aber nicht ausgeschlossen haben; und Staaten wie Österreich, die für ihren nationalen Bereich diese ausgeschlossen haben. Die Willensbildung in internationalen Organisationen, einschließlich der IAEO, ist das Produkt des politischen Willens der Gesamtheit ihrer Mitgliedstaaten, weshalb für sie das oben Gesagte analog gilt. Es kann angenommen werden, daß bei einigen Mitgliedstaaten der Vereinten Nationen zumindest ein oder mehrere Organisationen für den Ausstieg aus der Nutzung der Atomenergie sind. Da eine Übersicht über diese Organisationen nicht vorliegt und die Erstellung nicht möglich erscheint, ist es auch nicht möglich, mit allen Kontakt zu halten.

Zu Frage 2:

Es gibt neben Österreich andere Staaten, die für ihren nationalen Bereich den Ausstieg aus der Kernenergie zur Stromerzeugung planen oder erwägen.

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Österreich geht darüber hinaus, indem seine Politik dahingeht zu trachten, andere Staaten in ihren autonomen Entscheidungen über Ausstieg oder Nichtausstieg aus der Kernenergie im Sinne einer Ausstiegsentscheidung zu beeinflussen. Es gibt aber keine Möglichkeit, anderen Staaten ihre Haltung zur Atomenergie vorzuschreiben.

Zu Frage 3:

Die Antwort auf diese Frage geht aus Artikel 2 der Statuten hervor, der die Ziele der Organisation beschreibt und folgendermaßen lautet: "Ziel der Behörde ist es, den Beitrag der Atomenergie zum Frieden, zur Gesundheit und zum Wohlstand auf der ganzen Welt rascher und in größerem Ausmaße wirksam werden zu lassen. Sie stellt so weit als möglich sicher, daß die von ihr oder über ihr Ersuchen oder unter ihrer Überwachung oder Kontrolle geleistete Hilfe nicht zur Förderung militärischer Zwecke verwendet wird." Wie daraus hervorgeht, ist die IAEA keine dem Ausstieg aus der Atomenergie dienliche Organisation. Sie hat aber in jüngster Zeit sich vermehrt den Aufgaben einer verstärkten Sicherheit von Kernkraftanlagen zugewendet.

Zu Frage 4:

Ja.

Zu Frage 5:

Im Zuständigkeitsbereich des Bundesministeriums für auswärtige Angelegenheiten sind außer dem jährlichen Mitgliedsbeitrag gemäß Beschluß der Bundesregierung von Österreich als Sitzstaat der IAEA auch bestimmte Kosten zu tragen, welche im Zusammenhang mit der Abhaltung der jährlichen

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IAEO-Generalkonferenzen anfallen, die wegen ihres Umfangs nicht im Amtssitzgebäude, sondern in anderen Konferenzeinrichtungen in Wien stattfinden.

Hiefür sind zu Lasten des Budgetkapitels "Äußeres" zwischen 1957 und 1991 insgesamt S 46,4 Mio. angefallen.

Zu Frage 6:

Kosten für Errichtung und Betrieb des IAEO-Safeguards Analytical Laboratory (SAL) in Seibersdorf fallen im Zuständigkeitsbereich des Außenministeriums zu Lasten des Budgetkapitels "Äußeres" nicht an.

Zu Frage 7:

Das Abkommen zwischen der Republik Österreich und der Internationalen Atomenergie-Organisation über den Amtssitz der IAEO (Amtssitzabkommen), BGBl. Nr. 82/1985 und BGBl. Nr. 413/1971, tritt gemäß Artikel XX, Abschnitt 52e außer Kraft, wenn

- "1. darüber zwischen der Regierung und der IAEO Einvernehmen herrscht; und
2. der ständige Amtssitz der IAEO aus dem Gebiet der Republik Österreich verlegt wird."

Das gleiche gilt für das Abkommen zwischen der Republik Österreich und der IAEO betreffend die Laboratorien in Seibersdorf, BGBl. Nr. 326/85.

Zu Frage 8:

Für eine Satzungsänderung ist gemäß Artikel XVIII der Satzung eine qualifizierte Mehrheit erforderlich.

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Ein Antrag auf Satzungsänderung, der den Zweck der Organisation verändern würde, hätte keinerlei Aussicht, die erforderliche Zustimmung zu finden. Der österreichische Standpunkt, daß die Nutzung der Nuklearenergie zur Stromerzeugung ausgeschlossen sein sollte, und daß nach österreichischer Ansicht dieses Beispiel internationale Nachahmung finden sollte, ist international bekannt und wird auch jährlich in der Generaldebatte der Generalkonferenz wiederholt. Eine darüberhinausgehende ständige Wiederholung dieses allgemein bekannten Standpunktes erscheint nicht zielführend.

Zu Frage 9:

Im Hinblick darauf, daß die Ständige Vertretung Österreichs bei der IAEA und das ihr vorgesetzte Bundesministerium für auswärtige Angelegenheiten infolge des Sitzes der IAEA in Wien nicht räumlich getrennt sind, hat es sich als zweckmäßig erwiesen, die Ständige Vertretung in die zuständige Abteilung zu integrieren. Diese Abteilung ist selbstverständlich voll in die Entscheidungsstrukturen des Bundesministeriums für auswärtige Angelegenheiten eingebunden.

Zu Frage 10:

Die Antwort auf Frage 10 ergibt sich in Analogie zur Antwort auf Frage 9.

Zu Frage 11:

Zu dieser Frage wird auf die detaillierten Ausführungen zum Kapitel "Safeguards" des jeweils im Herbst im Verlag der IAEA erscheinenden und das vorangegangene Kalenderjahr deckenden IAEA-Jahresberichts verwiesen (Ausgabe 1990, GC (XXXV)/953, siehe Beilage).

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Zu Frage 12:

Die IAEO kann Sicherheitskontrollinspektionen in allen jenen Ländern vornehmen, die mit ihr Sicherheitskontrollabkommen abgeschlossen haben. Auch diesbezüglich ist auf die in der Antwort zu Frage 11 angeführte Publikation zu verweisen, die eine detaillierte Auflistung enthält.

Zu Frage 13:

Zu dieser Frage verweise ich auf die Beantwortung einer gleichlautenden Frage, welche Sie mit Anfrage Nr. 2884/J vom 6.5.1992 unter Pkt. 23 an den Herrn Bundeskanzler gerichtet haben.

Zu Frage 14:

Völkerrechtliche Grundlagen für die Haftung bei Nuklearschäden bestehen derzeit in einem für die meisten OECD-Staaten verbindlichen Pariser Übereinkommen (Übereinkommen über die Haftung gegenüber Dritten auf dem Gebiete der Kernenergie vom 29.7.1960, in Kraft seit 1.4.1968) und außerhalb der OECD in einem Wiener Übereinkommen der IAEO (Übereinkommen über die zivile Haftung für nukleare Schäden vom 21.5.1963, in Kraft seit 12.11.1977). Österreich hat seinerzeit keines dieser Übereinkommen ratifiziert und lehnt aus heutiger Sicht - nach den Erfahrungen von Tschernobyl - deren Grundkonzept ab, welches u.a. darin besteht, unter Ausklammerung der Umweltschäden das Haftungsvolumen im Schadensfall auf ein für die Versicherungswirtschaft tragbares Volumen zu begrenzen. Österreich strebt im Rahmen der IAEO eine Neuregelung an, die auch Umweltschäden berücksichtigt, die das Haftungsvolumen im Schadensfall um ein Vielfaches erhöht und den Staat, dessen Anlage den Schaden verursachte, stärker in die Haftung einbindet.

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Dieses Bemühen, das u.a. von Australien, Italien und Kanada mitgetragen wird, stößt auf den Widerstand etablierter westeuropäischer Proponenten der nuklearen Stromerzeugung wie Frankreich und Großbritannien, die das derzeitige System allenfalls verbessern, aber nicht verändern wollen; auch die ursprünglich aufgeschlossene Haltung Deutschlands hat sich zuletzt in diese Richtung bewegt.

Zu Frage 15:

In prozeduraler Hinsicht bemühte sich der österreichische Vertreter bei der Konferenz der IAE0, teilweise unterstützt durch die Niederlande, um eine Internationalisierung des Verfahrens zur Geltendmachung grenzüberschreitender Nuklearschäden, das nach dem derzeitigen System des Pariser und des Wiener Übereinkommens vor den Zivilgerichten des Verursacherstaates abzuwickeln ist. Auch hier stieß er auf Widerstand u.a. der vorerwähnten westeuropäischen Staaten, Deutschlands und Schwedens sowie der USA. Die europäischen GUS-Staaten mit ihrem beachtlichen Gefährdungspotential an Nuklearanlagen haben bisher nicht aktiv am Verhandlungsprozeß teilgenommen. Für Österreich und die anderen Staaten, die eine Neuregelung in dem oben dargestellten Sinn anstreben, ist es unter diesen Voraussetzungen schwierig, den Verhandlungsprozeß in ihrem Sinn zu beeinflussen. Im 2. Halbjahr 1992 finden weitere Verhandlungsrunden statt, bei denen versucht werden wird, Grundzüge eines Ergebnisses zu erarbeiten, das u.a. die Einbeziehung der Umweltschäden in den Schadensbegriff der Nuklearhaftung, eine Erhöhung des Haftungsvolumens und einen zusätzlichen internationalen Finanzierungsmechanismus ("pooling of operators" oder zwischenstaatlicher Solidaritätsfonds) zur Ergänzung der Versicherungsleistung im Schadensfall beinhalten könnte.

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Zu Frage 16 bis 23:

Mit Bezug auf diese Fragen verweise ich auf die Beantwortung durch den Herrn Bundeskanzler von gleichlautenden Fragen, welche Sie an diesen mit Anfrage Nr. 2884/J vom 6.5.1992 unter den Punkten 26. bis 33. gerichtet haben.

Zu Frage 24:

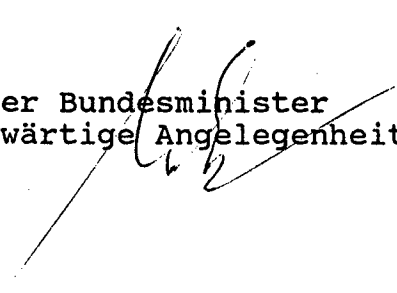
Mit Bezug auf diese Frage verweise ich auf die Beantwortung einer sinngemäß gleichlautenden Anfragen, welche Sie an den Herrn Bundeskanzler (Nr. 2884/J, Pkt. 11) gerichtet haben.

Zu Frage 25:

Mangels energiepolitischer Zuständigkeit des Außenministeriums verweise ich mit Bezug auf diese Frage auf die Beantwortung sinngemäß gleicher Anfragen, welche Sie an den Herrn Bundeskanzler (Nr. 2884/J, Pkt. 5) gerichtet haben.

Wien, am 3. IV 1992

Der Bundesminister
für auswärtige Angelegenheiten



GC(XXXV)/95

THE ANNUAL REPORT FOR 1990



INTERNATIONAL ATOMIC ENERGY AGENCY

SAFEGUARDS

Safeguards

Safeguards statement

In carrying out the safeguards obligations of the Agency in 1990, the Secretariat, as in previous years, did not detect any event which would indicate the diversion of a significant amount of safeguarded nuclear material — or the misuse of facilities, equipment or non-nuclear material subject to safeguards — for the manufacture of any nuclear weapon, or for any other military purpose, or for the manufacture of any other nuclear explosive device, or for purposes unknown. (In the case of voluntary-offer agreements with nuclear-weapon States, nuclear material subject to safeguards was not withdrawn from safeguards except in conformity with these agreements.) It is considered reasonable to conclude that the nuclear material under Agency safeguards in 1990 remained in peaceful nuclear activities or was otherwise adequately accounted for. This statement is based on all the information available to the Agency, including information derived from safeguards activities conducted in the field and at Headquarters and information provided in reports submitted by States.

Safeguards coverage

As of 31 December 1990, 177 safeguards agreements were in force with 104 States (and with Taiwan, China), compared to 172 agreements with 101 States (and with Taiwan, China) at the end of 1989.

Safeguards agreements pursuant to the Treaty on the Non-Proliferation of Nuclear Weapons (NPT) entered into force with:

St. Lucia, in February;
 Viet Nam, in February;
 Tunisia, in March;
 Malta, in November;
 Kiribati, in December.

A project agreement for the supply of fuel for a research reactor entered into force with Zaire in September. In addition, the unilateral submission agreement with Algeria covering a research reactor, which had entered into force provisionally in February 1989, entered into force definitively in April 1990.

The NPT safeguards agreement of 7 March 1972 concluded with the German Democratic Republic (INFCIRC/181) is no longer in force as of 3 October 1990. On that date the German Democratic Republic acceded to the Federal Republic of Germany. Consequently, the safeguards agreement of 5 April 1973 between the non-nuclear-weapon States of the European Atomic Energy Community (EURATOM), EURATOM itself and the Agency (INFCIRC/193) now applies to nuclear installations in the former German Democratic Republic.

Safeguards agreements were concluded with Togo (pursuant to NPT) and with Pakistan (covering a miniature neutron source reactor). These agreements have not yet entered into force.

In 1990 safeguards were applied in 42 States under agreements pursuant to NPT or to NPT and the Treaty of Tlatelolco, in one State under an agreement pursuant to the Treaty of Tlatelolco and in ten States under INFCIRC/66/Rev.2-type agreements. (The Agency also applies safeguards to nuclear installations in Taiwan, China.)

In the States that have concluded INFCIRC/153-type agreements with the Agency, safeguards were applied to all peaceful nuclear activities. In some of the States where safeguards were being applied pursuant to INFCIRC/66/Rev.2-type

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Number of states having significant nuclear activities at the end of the year indicated

	Number of States		
	1988	1989	1990
States with safeguards applied under NPT or NPT Tlatelolco agreements	41	42	42
States with safeguards applied under Tlatelolco agreements	1	1	1
States with safeguards applied under INFCIRC/66/Rev.2-type agreements ^a	10	10	9
Nuclear-weapon States with safeguards applied under voluntary-offer agreements	4	4	4
Other nuclear-weapon States	1	1	1
Total number of States with significant nuclear activities	57	58	57

^a Some States with INFCIRC/66/Rev.2-type agreements which have not yet been suspended, although NPT agreements have entered into force, are listed under NPT agreements only. Nuclear-weapon States with INFCIRC/66/Rev.2-type agreements in force are not included. Safeguards are also applied to nuclear installations in Taiwan, China.

Safeguards coverage (cont.)

agreements. unsafeguarded facilities were known to be in operation or under construction. All nuclear-weapon States have unsafeguarded nuclear fuel cycles.

Voluntary-offer agreements were in force with the five nuclear-weapon States. In accordance with the agreements with four of these States, certain facilities were designated by the Agency for inspection and were inspected. In one of these States, safeguards were also applied at some facilities under INFCIRC/66/Rev.2-type agreements. Preparations continued for the implementation of safeguards pursuant to the voluntary-offer agreement concluded with the fifth nuclear-weapon State.

Status of agreements pursuant to treaty obligations

As of 31 December 1990, safeguards agreements were in force with 86 States pursuant to NPT. For 51 non-nuclear-weapon States party to NPT there is still no safeguards agreement in force in accordance with Article III.4 of the Treaty. As far as the Agency is aware, only two of these States have significant nuclear activities. Safeguards were being applied in these two States pursuant to other agreements pending the entry into force of a safeguards agreement pursuant to NPT.

NPT safeguards agreements have already been concluded with ten of the eleven signatories of the South Pacific Nuclear Free Zone Treaty (Rarotonga Treaty), and safeguards were applied in one of these States pursuant to such an agreement.

Nineteen of the 23 Latin American States party to the Treaty of Tlatelolco have concluded agreements with the Agency pursuant to the Treaty of Tlatelolco, 16 of which are in force. Two States with territories in the zone of application of the Treaty of Tlatelolco have also concluded similar agreements.

The Governments of Argentina and Brazil signed a declaration of common nuclear policy on 28 November, which contained an undertaking to start negotiations with the Agency for the conclusion of a joint safeguards agreement which would have as its basis a common system of accounting and control. Upon conclusion of such an agreement, the two States would adopt pertinent measures leading to the full entry into force for both countries of the Treaty of Tlatelolco.

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**Situation on 31 December 1990 with respect to the conclusion of safeguards agreements
between the Agency and non-nuclear-weapon States in connection with NPT**

Non-nuclear-weapon States which have signed, ratified, acceded to or succeeded to NPT ^a (1)	Date of ratification, accession or succession ^a (2)	Safeguards agreement with the Agency (3)	INFCIRC (4)
Afghanistan	4 February 1970	In force: 20 February 1978	257
Albania	12 September 1990		
Antigua and Barbuda ^b	1 November 1981	Signed: 1 February 1990	
Australia	23 January 1973	In force: 10 July 1974	217
Austria	27 June 1969	In force: 23 July 1972	156
Bahamas	10 July 1973		
Bahrain	5 November 1988		
Bangladesh	27 September 1979	In force: 11 June 1982	301
Barbados	21 February 1980		
Belgium	2 May 1975	In force: 21 February 1977	193
Belize	9 August 1985	Approved by the Board, Feb. 1986	
Benin	31 October 1972		
Bhutan	23 May 1985	In force: 24 October 1989	371
Bolivia ^b	26 May 1970	Signed: 23 August 1974	
Botswana	28 April 1969		
Brunei Darussalam	25 March 1985	In force: 4 November 1987	365
Bulgaria	5 September 1969	In force: 29 February 1972	178
Burkina Faso	3 March 1970		
Burundi	19 March 1971		
Cameroon	8 January 1969		
Canada	8 January 1969	In force: 21 February 1972	164
Cape Verde	24 October 1979		
Central African Republic	25 October 1970		
Chad	10 March 1971		
Colombia	8 April 1986		
Congo	23 October 1978		
Costa Rica ^b	3 March 1970	In force: 22 November 1979	278
Côte d'Ivoire	6 March 1973	In force: 8 September 1983	309
Cyprus	10 February 1970	In force: 26 January 1973	189
Czechoslovakia	22 July 1969	In force: 3 March 1972	173
Democratic Kampuchea	2 June 1972		
Democratic People's Republic of Korea	12 December 1985		
Denmark ^c	3 January 1969	In force: 21 February 1977	193
Dominica	10 August 1984		
Dominican Republic ^b	24 July 1971	In force: 11 October 1973	201
Ecuador ^b	7 March 1969	In force: 10 March 1975	231
Egypt	26 February 1981	In force: 30 June 1982	302
El Salvador ^b	11 July 1972	In force: 22 April 1975	232
Equatorial Guinea	1 November 1984	Approved by the Board, June 1986	
Ethiopia	5 February 1970	In force: 2 December 1977	261

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Table (cont.)

Non-nuclear-weapon States which have signed, ratified, acceded to or succeeded to NPT ^a (1)	Date of ratification, accession or succession ^a (2)	Safeguards agreement with the Agency (3)	INFCIRC (4)
Fiji	14 July 1972	In force: 22 March 1973	192
Finland	5 February 1969	In force: 9 February 1972	155
Gabon	19 February 1974	Signed: 3 December 1979	
Gambia	12 May 1975	In force: 8 August 1978	277
Germany, Federal Republic of ^d	2 May 1975	In force: 21 February 1977	193
Ghana	5 May 1970	In force: 17 February 1975	226
Greece ^c	11 March 1970	Accession: 17 December 1981	193
Grenada	19 August 1974		
Guatemala ^b	22 September 1970	In force: 1 February 1982	299
Guinea	29 April 1985		
Guinea-Bissau	20 August 1976		
Haiti ^b	2 June 1970	Signed: 6 January 1975	
Holy See	25 February 1971	In force: 1 August 1972	187
Honduras ^b	16 May 1973	In force: 18 April 1975	235
Hungary	27 May 1969	In force: 30 March 1972	174
Iceland	18 July 1969	In force: 16 October 1974	215
Indonesia	12 July 1979	In force: 14 July 1980	283
Iran, Islamic Republic of	2 February 1970	In force: 15 May 1974	214
Iraq	29 October 1969	In force: 29 February 1972	172
Ireland	1 July 1968	In force: 21 February 1977	193
Italy	2 May 1975	In force: 21 February 1977	193
Jamaica ^b	5 March 1970	In force: 6 November 1978	265
Japan	8 June 1976	In force: 2 December 1977	255
Jordan	11 February 1970	In force: 21 February 1978	258
Kenya	11 June 1970		
Kiribati	18 April 1985	In force: 19 December 1990	390
Korea, Republic of	23 April 1975	In force: 14 November 1975	236
Kuwait	17 November 1989		
Lao People's Democratic Republic	20 February 1970	Approved by the Board, Feb. 1989	
Lebanon	15 July 1970	In force: 5 March 1973	191
Lesotho	20 May 1970	In force: 12 June 1973	199
Liberia	5 March 1970		
Libyan Arab Jamahiriya	26 May 1975	In force: 8 July 1980	282
Liechtenstein	20 April 1978	In force: 4 October 1979	275
Luxembourg	2 May 1975	In force: 21 February 1977	193
Madagascar	8 October 1970	In force: 14 June 1973	200
Malawi	18 February 1986		
Malaysia	5 March 1970	In force: 29 February 1972	182
Maldives	7 April 1970	In force: 2 October 1977	253
Mali	10 February 1970		
Malta	6 February 1970	In force: 13 November 1990	387
Mauritius	25 April 1969	In force: 31 January 1973	190
Mexico ^b	21 January 1969	In force: 14 September 1973	197
Mongolia	14 May 1969	In force: 5 September 1972	188
Morocco	27 November 1970	In force: 18 February 1975	228

SAFEGUARDS

Table (cont.)

Non-nuclear-weapon States which have signed, ratified, acceded to or succeeded to NPT ^a	Date of ratification, accession or succession ^a	Safeguards agreement with the Agency	INFCIRC
(1)	(2)	(3)	(4)
Mozambique	4 September 1990		
Nauru	7 June 1982	In force: 13 April 1984	317
Nepal	5 January 1970	In force: 22 June 1972	186
Netherlands ^f	2 May 1975	In force: 21 February 1977	193
New Zealand	10 September 1969	In force: 29 February 1972	185
Nicaragua ^b	6 March 1973	In force: 29 December 1976	246
Nigeria	27 September 1968	In force: 29 February 1988	358
Norway	5 February 1969	In force: 1 March 1972	177
Panama ^b	13 January 1977	Signed: 22 December 1988	
Papua New Guinea	25 January 1982	In force: 13 October 1983	312
Paraguay ^b	4 February 1970	In force: 20 March 1979	279
Peru ^b	3 March 1970	In force: 1 August 1979	273
Philippines	5 October 1972	In force: 16 October 1974	216
Poland	12 June 1969	In force: 11 October 1972	179
Portugal ^g	15 December 1977	Accession: 1 July 1986	193
Qatar	3 April 1989		
Romania	4 February 1970	In force: 27 October 1972	180
Rwanda	20 May 1975		
St. Lucia	28 December 1979	In force: 2 February 1990	379
St. Vincent and the Grenadines	6 November 1984		
Samoa	17 March 1975	In force: 22 January 1979	268
San Marino	10 August 1970	Approved by the Board, Feb. 1977	
São Tome and Principe	20 July 1983		
Saudi Arabia	3 October 1988		
Senegal	17 December 1970	In force: 14 January 1980	276
Seychelles	12 March 1985		
Sierra Leone	26 February 1975	Signed: 10 November 1977	
Singapore	10 March 1976	In force: 18 October 1977	259
Solomon Islands	17 June 1981		
Somalia	5 March 1970		
Spain	5 November 1987	Accession: 5 April 1989	193
Sri Lanka	5 March 1979	In force: 6 August 1984	320
Sudan	31 October 1973	In force: 7 January 1977	245
Suriname ^b	30 June 1976	In force: 2 February 1979	269
Swaziland	11 December 1969	In force: 28 July 1975	227
Sweden	9 January 1970	In force: 14 April 1975	234
Switzerland	9 March 1977	In force: 6 September 1978	264
Syrian Arab Republic	24 September 1969		
Thailand	7 December 1972	In force: 16 May 1974	241
Togo	26 February 1970	Signed: 29 November 1990	
Tonga	7 July 1971	Approved by the Board, Feb. 1975	
Trinidad and Tobago	30 October 1986		
Tunisia	26 February 1970	In force: 13 March 1990	381
Turkey	17 April 1980	In force: 1 September 1981	295
Tuvalu	19 January 1979	Approved by the Board, Feb. 1986	

SAFEGUARDS

Table (cont.)

Non-nuclear-weapon States which have signed, ratified, acceded to or succeeded to NPT ^a (1)	Date of ratification, accession or succession ^a (2)	Safeguards agreement with the Agency (3)	INFCIRC (4)
Uganda	20 October 1982		
Uruguay ^b	31 August 1970	In force: 17 September 1976	157
Venezuela ^c	26 September 1975	In force: 11 March 1982	300
Viet Nam	14 June 1982	In force: 23 February 1990	376
Yemen, Republic of	1 June 1979		
Yugoslavia	3 March 1970	In force: 28 December 1973	204
Zaire	4 August 1970	In force: 9 November 1972	183

- ^a The information reproduced in columns (1) and (2) was provided to the Agency by depositary Governments of NPT, and an entry in column (1) does not imply the expression of any opinion on the part of the Secretariat concerning the legal status of any country or territory or of its authorities, or concerning the delimitation of its frontiers. The Table does not contain information relating to the participation of Taiwan, China, in NPT.
- ^b The relevant safeguards agreement refers to both NPT and the Treaty of Tlatelolco.
- ^c The NPT safeguards agreement with Denmark (INFCIRC/176), in force since 1 March 1972, has been replaced by the agreement of 5 April 1973 between the non-nuclear-weapon States of EURATOM, EURATOM and the Agency (INFCIRC/193) but still applies to the Faroe Islands. Upon Greenland's secession from EURATOM as of 31 January 1985, the Agreement between the Agency and Denmark (INFCIRC/176) re-entered into force as to Greenland.
- ^d The NPT safeguards agreement of 7 March 1972 concluded with the German Democratic Republic (INFCIRC/181) is no longer in force with effect from 3 October 1990, on which date the German Democratic Republic acceded to the Federal Republic of Germany.
- ^e The application of Agency safeguards in Greece under the agreement INFCIRC/166, provisionally in force since 1 March 1972, was suspended on 17 December 1981, on which date Greece acceded to the agreement of 5 April 1973 (INFCIRC/193) between the non-nuclear-weapon States of EURATOM, EURATOM and the Agency.
- ^f An agreement had also been concluded in respect of the Netherlands Antilles (INFCIRC/229). This agreement entered into force on 5 June 1975.
- ^g The NPT safeguards agreement with Portugal (INFCIRC/272), in force since 14 June 1979, was suspended on 1 July 1986, on which date Portugal acceded to the agreement between the non-nuclear-weapon States of EURATOM, EURATOM and the Agency of 5 April 1973 (INFCIRC/193).

SAFEGUARDS

**Situation on 31 December 1990 with respect to the conclusion of
safeguards agreements between the Agency and States party to the Treaty of Tlatelolco***

States party to the Treaty of Tlatelolco (1)	Date of becoming a party to the Treaty of Tlatelolco (2)	Safeguards agreement with the Agency (3)	INFCIRC (4)
Antigua and Barbuda ^b	11 October 1983	Signed: 1 February 1990	
Bahamas	26 April 1977		
Barbados	25 April 1969		
Bolivia ^b	18 February 1969	Signed : 23 August 1974	
Colombia	6 September 1972	In force: 22 December 1982	306
Costa Rica ^b	25 August 1969	In force: 22 November 1979	278
Dominican Republic ^b	14 June 1968	In force: 11 October 1973	201
Ecuador ^b	11 February 1969	In force: 10 March 1975	231
El Salvador ^b	22 April 1968	In force: 22 April 1975	232
Grenada	20 June 1975		
Guatemala ^b	6 February 1970	In force: 1 February 1982	299
Haiti ^b	23 May 1969	Signed : 6 January 1975	
Honduras ^b	23 September 1968	In force: 18 April 1975	235
Jamaica ^b	26 June 1969	In force: 6 November 1978	265
Mexico ^{b, c}	20 September 1967	In force: 14 September 1973	197
Nicaragua ^b	24 October 1968	In force: 29 December 1976	246
Panama ^d	11 June 1971	In force: 23 March 1984	316
Paraguay ^b	19 March 1969	In force: 20 March 1979	279
Peru ^e	4 March 1969	In force: 1 August 1979	273
Suriname ^b	10 June 1977	In force: 2 February 1979	269
Trinidad and Tobago	27 June 1975		
Uruguay ^b	20 August 1968	In force: 17 September 1976	157
Venezuela ^b	23 March 1970	In force: 11 March 1982	300
In addition, there are the following safeguards agreements with States party to Additional Protocol I to the Treaty: ^e			
	Netherlands ^b	In force: 5 June 1975	229
	United States of America	In force: 6 April 1989	366

* The information reproduced in columns (1) and (2) was taken from the relevant OPANAL status report.

In addition to the States listed in column (1), Argentina has signed the Treaty but not ratified it, while Brazil and Chile have ratified it but have not yet become parties to the Treaty as they have not so far made the declaration provided for in Article 28 of the Treaty. Dominica signed the Treaty on 2 May 1989.

The relevant safeguards agreement refers to both the Treaty of Tlatelolco and NPT.

The application of safeguards under an agreement with Mexico in connection with the Treaty of Tlatelolco which entered into force on 6 September 1968 (INFCIRC/118) was suspended after the conclusion of an agreement with Mexico in connection with both the Treaty of Tlatelolco and NPT (INFCIRC/197).

An agreement has also been concluded in 1988 pursuant to both the Treaty of Tlatelolco and NPT, which has not yet entered into force.

Additional Protocol I refers to States outside Latin America which have de jure or de facto jurisdiction over territories within the limits of the geographical zone established in the Treaty.

SAFEGUARDS

**Agreements providing for safeguards, other than those in connection with NPT
or the Treaty of Tlatelolco, approved by the Board as of 31 December 1990**

Party(ies) ^a	Subject	Entry into force	INFCIRC
(While the Agency is a party to each of the following agreements, only the State(s) party to them is (are) listed.)			
<i>(a) Project agreements</i>			
Argentina	Siemens SUR-100	13 March 1970	143
	RAEP Reactor	2 December 1964	62
Chile	Herald Reactor	19 December 1969	137
Finland ^b	FiR-1 Reactor	30 December 1960	24
	FINN sub-critical assembly	30 July 1963	53
Greece ^b	GRR-1 Reactor	1 March 1972	163
Indonesia ^b	Additional core-load for TRIGA Reactor	19 December 1969	136
Iran, Islamic Republic of ^b	UTRR Reactor	10 May 1967	97
Jamaica ^b	Fuel for research reactor	25 January 1984	315
Japan ^b	JRR-3	24 March 1959	3
Malaysia ^b	TRIGA-II Reactor	22 September 1980	287
Mexico ^b	TRIGA-III Reactor	18 December 1963	52
	Siemens SUR-100	21 December 1971	162
	Laguna Verde Nuclear Power Plant	12 February 1974	203
Morocco ^b	Fuel for research reactor	2 December 1983	313
Pakistan	PRR Reactor	5 March 1962	34
	Booster rods for KANUPP	17 June 1968	116
Peru ^b	Research reactor and fuel therefor	9 May 1978	266
Philippines ^c	PRR-1 Reactor	28 September 1966	88
Romania ^b	TRIGA Reactor	30 March 1973	206
	Experimental fuel elements	1 July 1983	307
Spain ^b	Coral-I Reactor	23 June 1967	99
Thailand ^b /United States of America	Fuel for research reactor	30 September 1986	342
Turkey ^b	Sub-critical assembly	17 May 1974	212
Uruguay ^c	URR Reactor	24 September 1965	67
Venezuela ^c	RV-1 Reactor	7 November 1975	238
Viet Nam ^c	Fuel for research reactor	1 July 1983	308
Yugoslavia ^c	TRIGA-II Reactor	4 October 1961	32
	Krško Nuclear Power Plant	14 June 1974	213
Zaire ^b	TRICO Reactor	27 June 1962	37
	Fuel for research reactor	20 September 1990	389
<i>(b) Unilateral submissions</i>			
Algeria	Research reactor	9 April 1990	361
Albania	All nuclear material and facilities	25 March 1988	359
Argentina	Atucha Power Reactor Facility	3 October 1972	168
	Nuclear material	23 October 1973	202
	Embalse Power Reactor Facility	6 December 1974	224
	Equipment and nuclear material	22 July 1977	250
	Nuclear material, material, equipment and facilities	22 July 1977	251
	Atucha II Nuclear Power Plant	15 July 1981	294
	Heavy water plant	14 October 1981	296
	Heavy water	14 October 1981	297
	Nuclear material	8 July 1982	303

SAFEGUARDS

Table (cont.)

Party(ies)*	Subject	Entry into force	INFCIRC
Chile	Nuclear material	31 December 1974	256
	Nuclear material	22 September 1982	304
	Nuclear material	18 September 1987	350
Cuba	Nuclear research reactor and fuel therefor	25 September 1980	298
	Nuclear power plant and nuclear material	5 May 1980	281
	Zero-power nuclear reactor and fuel therefor	7 October 1983	311
Democratic People's Republic of Korea	Research reactor and nuclear material for this reactor	20 July 1977	252
India	Nuclear material, material and facilities	17 November 1977	260
	Nuclear power station	27 September 1988	360
	Nuclear material	11 October 1989	374
Pakistan	Nuclear material	2 March 1977	248
	Miniature neutron source reactor	Approved by the Board, February 1990	
Spain	Nuclear material ^d	18 June 1975	221
	Vandellos Nuclear Power Plant ^d	11 May 1981	292
	Specified nuclear facilities ^d	11 May 1981	291*
United Kingdom	Nuclear material	14 December 1972	175
Viet Nam	Research reactor and fuel therefor	12 June 1981	293
<i>(c) Agreements concluded with nuclear-weapon States on the basis of voluntary offers</i>			
China	Nuclear material in facilities selected from list of facilities provided by China	18 September 1989	369
France	Nuclear material in facilities submitted to safeguards	12 September 1981	290
Union of Soviet Socialist Republics	Nuclear material in facilities selected from list of facilities provided by the USSR	10 June 1985	327
United Kingdom	Nuclear material in facilities designated by the Agency	14 August 1978	263
United States of America	Nuclear material in facilities designated by the Agency	9 December 1980	288
<i>(d) Other agreements</i>			
Argentina/United States of America		25 July 1969	130
Austria ^d /United States of America		24 January 1970	152
Brazil/Germany, Federal Republic of ^d		26 February 1976	237
Brazil/United States of America		31 October 1968	110
Colombia/United States of America		9 December 1970	144
India/Canada ^d		30 September 1971	211
India/United States of America		27 January 1971	154
Iran, Islamic Republic of ^d /United States of America		20 August 1969	127
Israel/United States of America		4 April 1975	249
Japan ^d /Canada ^d		20 June 1966	85
Japan ^d /France		22 September 1972	171

* Amended in 1985 to cover specified nuclear facilities. The amendment entered into force on 8 November 1985 (INFCIRC/291/Mod.1/Corr.1).

SAFEGUARDS

Table (cont.)

Party(ies) ^a	Subject	Entry into force	INFCIRC
Japan/United Kingdom		15 October 1968	125
Korea, Republic of/ United States of America		5 January 1968	111
Korea, Republic of ^d /France		22 September 1975	233
Pakistan/Canada		17 October 1969	135
Pakistan/France		18 March 1976	239
Philippines ^d /United States of America		19 July 1968	120
Portugal ^d /United States of America ^e		19 July 1969	131
South Africa/United States of America		26 July 1967	98
South Africa/France		5 January 1977	244
Spain/Germany, Federal Republic of ^d		29 September 1982	305
Spain/United States of America		9 December 1966	92
Spain/Canada ^d		10 February 1977	247
Sweden ^d /United States of America		1 March 1972	165
Switzerland ^d /United States of America ^e		28 February 1972	161
Turkey ^d /United States of America ^e		5 June 1969	123
Venezuela ^d /United States of America ^e		27 March 1968	122
(e) The Agency also applies safeguards under two agreements (INFCIRC/133 and INFCIRC/158) to the nuclear facilities in Taiwan, China. Pursuant to the decision adopted by the Board of Governors on 9 December 1971 that the Government of the People's Republic of China is the only government which has the right to represent China in the Agency, the relations between the Agency and the authorities in Taiwan are non-governmental. The agreements are implemented by the Agency on that basis.			

- ^a An entry in this column does not imply the expression of any opinion whatsoever on the part of the Secretariat concerning the legal status of any country or territory or of its authorities or concerning the delimitation of its frontiers.
- ^b Agency safeguards are being applied to the items required to be safeguarded under this (these) project agreement(s) pursuant to an agreement in connection with NPT covering the State indicated.
- ^c The requirement for the application of safeguards under this agreement is satisfied by the application of safeguards pursuant to the agreement of 12 June 1981 (INFCIRC/293).
- ^d Application of Agency safeguards under this agreement has been suspended in the State indicated as the State has concluded an agreement in connection with NPT.
- ^e Application of Agency safeguards under this agreement has been suspended in the United States of America in order to comply with a provision of INFCIRC/288.

SAFEGUARDS

Planning, direction, co-ordination, control and evaluation**SAGSI**

Two regular meetings (the first including a visit to the Federal Republic of Germany) and one working group meeting (in Czechoslovakia) were held by the Standing Advisory Group on Safeguards Implementation (SAGSI). At the first regular meeting, SAGSI initiated a study of new and improved safeguards procedures, with the aim especially of critically examining the various issues involved. SAGSI also advised on the proposed methodology for the development of the safeguards R&D programme and the application of this methodology to the formulation of the R&D activities for 1991-1992. At its second meeting, SAGSI completed its consideration of the 1991-1992 R&D programme and began a more detailed study of the new and improved safeguards procedures.

Effectiveness evaluation

An evaluation of inspection goal attainment for 1989 was made according to the safeguards criteria and the results were reported to the Board of Governors in the Safeguards Implementation Report (SIR). The criteria were communicated to Member States to facilitate their assessment of the credibility of the Agency's verification procedures and to contribute to further co-operation between the States and the Agency in applying safeguards.

The preparation of safeguards criteria to be used for implementation and evaluation purposes in the period 1991-1995 was concluded, account being taken of current practices, criteria and policies and of recommendations provided by SAGSI on long term guidelines for future safeguards implementation under INFCIRC/66 and INFCIRC/153-type agreements.

Support programmes

The new support programme management and administrative procedures were implemented, resulting in an R&D programme which is better focused on projects of highest priority. As a result of increased collaboration between Member State support programmes, there has also been an improvement in programme effectiveness.

A remote access link to the Headquarter's Support Programme Information and Communication System (SPRICS) was installed, tested and put into operation via a public data transmission utility. The United States support programme office is regularly using this facility. Tests are under way to extend this service to support programme offices in Australia, Canada and France.

SAFEGUARDS**Additional support provided by Member States**

States and organizations representing groups of States having formal support programmes (initiated in the year indicated)	States having R&D contracts and test programmes
Australia 1989 Belgium* 1982 Canada 1977 European Atomic Energy Community 1981 Finland 1988 France 1983 German Democratic Republic** 1988 Germany, Federal Republic of 1978 Indonesia 1989 Japan 1981 Sweden 1987 USSR 1982 United Kingdom 1980 United States of America 1976	Argentina Austria Bulgaria Czechoslovakia Hungary Italy Pakistan Switzerland Yugoslavia

* Presently inactive.

** Discontinued in the course of 1990.

SAFEGUARDS

Safeguards operations

Verification

In carrying out its verification activities, the Agency found a number of discrepancies and anomalies. These were all subject to thorough investigation and follow-up.

Specific inspection activities included the following:

- A new method for carrying out non-destructive assay (NDA) measurements for on-load reactor (OLR) spent fuel bundles placed in concrete canisters for long term storage was successfully tested for the first time in one State.
- 'Cobra' seals, with an improved verification system, were tested successfully and the seals applied to spent fuel assemblies in dry storage canisters at two facilities.
- A revised safeguards approach for light water reactors (LWRs) using MOX fuel was implemented at the beginning of the year.

After discussion with States, more up to date safeguards equipment and techniques were introduced in a number of facilities:

- As part of the programme to install modulated integrated video system (MIVS) closed circuit television systems and to replace the Minolta cameras, the installation of 43 MIVS was completed in 19 facilities.
- To ensure more efficient use of resources, procedures for the joint use of standard NDA equipment was agreed upon and implemented for low enriched uranium (LEU) facilities in one State.
- Improved working practices, including the large scale application of isotope spiking techniques in measurement systems and underwater television in the transfer bay, were introduced at a reprocessing facility.
- The near-real-time accountancy concept was tested at a major MOX facility and should be ready for routine use in 1991. Discussions were initiated on the introduction of this concept at a reprocessing plant.
- The use of the computerized inspection field support system (IFSS) was expanded to include some LEU facilities.
- The concept of short notice random inspections (SNRIs) at multi-unit OLRs to safeguard the core fuel was tested for the first time.
- An advanced safeguards verification system was installed in the handling and storage units at a reprocessing plant for implementation in early 1991.

Negotiation and liaison
with States

Committees and other regular forms of contact between the Agency and Member States, including working arrangements with facility operators, continued to make a significant contribution to the further improvement of safeguards implementation:

- The IAEA Regional Offices in Toronto and in Tokyo continued to make a significant contribution to effective and efficient safeguards implementation. Both offices now cover safeguards operations in several States in their respective regions.
- Some progress was made in the negotiation of Subsidiary Arrangements. Two General Parts to Subsidiary Arrangements (two in 1989) and 46 (9 new and 37 revised) Facility Attachments (88 in 1989) entered into force.
- Negotiations were initiated on facility attachments required for a commercial scale enrichment facility and for a large plutonium storage facility.
- Discussions were initiated on verification problems encountered at the storage facility of a large scale reprocessing plant.

SAFEGUARDS**Safeguards inspection verification activities**

	1988	1989	1990
Inspections performed	2 128	2 196	2 188
Person-days of inspection	9 379	10 132	10 381
Seals applied to nuclear material or Agency safeguards equipment detached and subsequently verified (including seals applied jointly with a group of States)	28 700	24 800	26 600
Surveillance films developed at Headquarters	1 650	1 860	1 900
Surveillance films developed in the field	1 400	1 460	1 400
Plutonium and uranium samples analysed	1 170	1 200	1 510
Analytical results reported	3 040	2 890	3 890

SAFEGUARDS

Approximate quantities of material subject to Agency safeguards at the end of 1990

Type of material	Quantity of material (t)			
	INFCIRC/153 ^a	INFCIRC/66 ^b	Nuclear-weapon States	Quantity in SQ
Nuclear material				
Plutonium ^c contained in irradiated fuel	212.4 ^d	22.2	75.0	38 710
Separated plutonium outside reactor cores	8.5	0	11.6	2 516
Recycled plutonium in fuel elements in reactor cores	1.8	0	0	220
HEU (equal to or greater than 20% uranium-235)	11.3	0.4	0	268
LEU (less than 20% uranium-235)	25 849	2 084	7 678	10 900
Source material ^e (natural or depleted uranium and thorium)	39 520	2 821	19 765	4 618
<i>Total significant quantities</i>				<i>57 232</i>
Non-nuclear material^f				
Heavy water	0	1 785	0	89

^a Covering safeguards agreements pursuant to NPT and/or Treaty of Tlatelolco.

^b Excluding installations in nuclear-weapon States: including installations in Taiwan, China.

^c The quantity includes an estimated 64.3 t (8039 SQ) of plutonium in irradiated fuel, which is not yet reported to the Agency under the agreed reporting procedures (the non-reported plutonium is contained in irradiated fuel assemblies to which item accountability and containment and surveillance (C/S) measures are applied).

^d Includes plutonium previously included in the inventory of a State under INFCIRC/66/Rev.2-type agreements and which has not yet been covered by INFCIRC/153-type State reports.

^e This table does not include material within the terms of subparagraphs 34(a) and (b) of INFCIRC/153 (Corrected).

^f Non-nuclear material subject to Agency safeguards under INFCIRC/66/Rev.2-type agreements.

**Number of installations under safeguards or containing safeguarded material
on 31 December 1990**

Installation category	Number of installations			
	INFCIRC/153 ^a	INFCIRC/66 Rev. 2 ^b	Nuclear-weapon States	Total ^c
Power reactors	168	16	1	185 (183)
Research reactors and critical assemblies	146	23	1	170 (173)
Conversion plants	6	3	0	9 (8)
Fuel fabrication plants	34	9	2	45 (43)
Reprocessing plants	4	1	0	5 (5)
Enrichment plants	5 ^d	1	1	7 (7)
Separate storage facilities	37	5	4	46 (45)
Other facilities	45	3	0	48 (51)
Subtotals	445	61	9	515 (515)
Other locations	368	27	0	395 (405)
Non-nuclear installations	0	2	0	2 (2)
Totals	813	90	9	912 (922)

^a Covering safeguards agreements pursuant to NPT and/or Treaty of Tlatelolco.

^b Excluding installations in nuclear-weapon States: including installations in Taiwan, China.

^c Numbers for 1989 are indicated in parentheses for comparison.

^d Including two locations associated with enrichment technology.

SAFEGUARDS

**Facilities under Agency safeguards or containing safeguarded material
on 31 December 1990**

Power reactors

State ^a	Abbreviated name of installation	Location	Subsidiary arrangements in force
Argentina	Atucha NPS	Lima	x
	Embalse PR	Embalse	—
Belgium	BR3	Mol	x
	DOEL-1	Doel	x
	DOEL-2	Doel	x
	DOEL-3	Doel	x
	DOEL-4	Doel	x
	Tihange-1	Tihange	x
	Tihange-2	Tihange	x
	Tihange-3	Tihange	x
Brazil	Angra-1	Angra dos Reis	x
Bulgaria	Kozloduy-I. Unit 1	Kozloduy	x
	Kozloduy-I. Unit 2	Kozloduy	x
	Kozloduy-II. Unit 1	Kozloduy	x
	Kozloduy-II. Unit 2	Kozloduy	x
	Kozloduy-III. Unit 1	Kozloduy	x
	Kozloduy-III. Unit 2	Kozloduy	x
Canada	Bruce A. Unit 1	Tiverton	x
	Bruce A. Unit 2	Tiverton	x
	Bruce A. Unit 3	Tiverton	x
	Bruce A. Unit 4	Tiverton	x
	Bruce B. Unit 5	Tiverton	x
	Bruce B. Unit 6	Tiverton	x
	Bruce B. Unit 7	Tiverton	x
	Bruce B. Unit 8	Tiverton	x
	Darlington A. Unit 1	Bowmanville	x
	Darlington A. Unit 2	Bowmanville	x
	Gentilly-2	Gentilly	x
	Pickering A. Unit 1	Pickering	x
	Pickering A. Unit 2	Pickering	x
	Pickering A. Unit 3	Pickering	x
	Pickering A. Unit 4	Pickering	x
	Pickering B. Unit 5	Pickering	x
	Pickering B. Unit 6	Pickering	x
	Pickering B. Unit 7	Pickering	x
	Pickering B. Unit 8	Pickering	x
	Point Lepreau G.S.	Point Lepreau	x
Czechoslovakia	A1	Bohunice	x
	EDU-1. Unit 1	Dukovany	x
	EDU-1. Unit 2	Dukovany	x
	EDU-2. Unit 1	Dukovany	x
	EDU-2. Unit 2	Dukovany	x
	V-1. Unit 1	Bohunice	x
	V-1. Unit 2	Bohunice	x
	V-2. Unit 1	Bohunice	x
	V-2. Unit 2	Bohunice	x

SAFEGUARDS

Power reactors (cont.)

State ^a	Abbreviated name of installation	Location	Subsidiary arrangements in force
Finland	Loviisa-1	Loviisa	x
	Loviisa-2	Loviisa	x
	TVO-1	Olkiluoto	x
	TVO-2	Olkiluoto	x
Germany, Federal Republic of	AVR	Jülich	—
	GKW Grohnde	Grohnde	—
	GKN-2	Neckarwestheim	x
	KKW Biblis-A	Biblis	x
	KKW Biblis-B	Biblis	x
	KKW Brokdorf	Brokdorf	—
	KKW Brunsbüttel	Brunsbüttel	x
	KKW Emsland	Lingen	x
	KKW Grafenrheinfeld	Grafenrheinfeld	—
	KKW Isar	Ohu bei Landshut	x
	KKW Isar-2	Essenbach	—
	KKW Krümmel	Geesthacht	x
	KKW Mülheim-Kärlich	Mülheim-Kärlich	x
	KKW Neckarwestheim	Neckarwestheim	x
	KKW Obrigheim	Obrigheim	x
	KKW Philippsburg-1	Philippsburg	x
	KKW Philippsburg-2	Philippsburg	—
	KKW RWE-Bayernwerk II, Block B	Gundremmingen	x
	KKW RWE-Bayernwerk II, Block C	Gundremmingen	x
	KKW Stade	Stade	x
	KKW Unterweser	Stadland	x
	KKW Würgassen	Würgassen	x
	KFK-MZFR	Eggenstein-Leopoldshafen	x
	KNK	Eggenstein-Leopoldshafen	x
	Thorium Hochtemperatur Reaktor	Hamm	—
	VEB Bruno Leuschner-1, Unit 1	Greifswald	—
	VEB Bruno Leuschner-1, Unit 2	Greifswald	—
	VEB Bruno Leuschner-2, Unit 3	Greifswald	—
	VEB Bruno Leuschner-2, Unit 4	Greifswald	—
	VEB Bruno Leuschner-3, Unit 5	Greifswald	—
	VEB Rheinsberg	Rheinsberg	—
Hungary	PAKS-I, Unit 1	Paks	x
	PAKS-I, Unit 2	Paks	x
	PAKS-II, Unit 1	Paks	x
	PAKS-II, Unit 2	Paks	x
India	RAPS, Unit 1	Rajasthan	x
	RAPS, Unit 2	Rajasthan	x
	TAPS, Unit 1	Tarapur	x
	TAPS, Unit 2	Tarapur	x
Italy	ENEL	Borgo-Sabatino	x
	C.N. del Garigliano	Sessa Aurunca	x
	C.N. Caorso	Caorso	x
	C.N. Enrico Fermi	Trino-Vercellese	x

SAFEGUARDS

Power reactors (cont.)

State ^a	Abbreviated name of installation	Location	Subsidiary arrangements in force
Japan	Fugen	Tsuruga-Fukui	x
	Fukushima Dai-Ichi-1	Okuma-Fukushima	x
	Fukushima Dai-Ichi-2	Okuma-Fukushima	x
	Fukushima Dai-Ichi-3	Okuma-Fukushima	x
	Fukushima Dai-Ichi-4	Okuma-Fukushima	x
	Fukushima Dai-Ichi-5	Okuma-Fukushima	x
	Fukushima Dai-Ichi-6	Okuma-Fukushima	x
	Fukushima Dai-Ni-1	Naraha-Fukushima	x
	Fukushima Dai-Ni-2	Naraha-Fukushima	x
	Fukushima Dai-Ni-3	Naraha-Fukushima	x
	Fukushima Dai-Ni-4	Naraha-Fukushima	x
	Genkai-1	Kyushu	x
	Genkai-2	Kyushu	x
	Hamaoka-1	Hamaoka-cho	x
	Hamaoka-2	Hamaoka-cho	x
	Hamaoka-3	Hamaoka-cho	x
	Ikata-1	Nishiuwa-gun	x
	Ikata-2	Nishiuwa-gun	x
	Kashiwazaki-1	Niigata	x
	Kashiwazaki-2	Niigata	x
	Kashiwazaki-5	Niigata	x
	Mihama-1	Mihama-Fukui	x
	Mihama-2	Mihama-Fukui	x
	Mihama-3	Mihama-Fukui	x
	Ohi-1	Ohi-cho, Fukui-ken	x
	Ohi-2	Ohi-cho, Fukui-ken	x
	Onagawa-1	Miyaki-ken	x
	Sendai-1	Sendai	x
	Sendai-2	Sendai	x
	Shimane-1	Kashima-cho	x
	Shimane-2	Kashima-cho	x
	Takahama-1	Takahama	x
	Takahama-2	Takahama	x
	Takahama-3	Takahama	x
	Takahama-4	Takahama	x
	Tokai-1	Tokai-Mura	x
	Tokai-2	Tokai-Mura	x
	Tomari-1	Tomari-Mura	x
	Tomari-2	Tomari-Mura	x
	Tsuruga-1	Tsuruga	x
	Tsuruga-2	Tsuruga	x
Korea, Republic of	Kori-1	Pusan	x
	Kori-2	Pusan	x
	Kori-3	Pusan	x
	Kori-4	Pusan	x
	Uljin-1	Uljin	x
	Uljin-2	Uljin	x
	Wolsung-1	Ulsan	x
	Youngwang 1	Pusan	x
	Youngwang 2	Pusan	x

SAFEGUARDS

Power reactors (cont.)

State ^a	Abbreviated name of installation	Location	Subsidiary arrangements in force
Mexico	Laguna Verde 1	Alto Lucero	x
Netherlands	Borssele	Borssele	x
	Dodewaard NPP	Dodewaard	x
Pakistan	KANUPP	Karachi	x
Philippines	PNPP-1	Morong, Bataan	x
South Africa	Koeberg-1	Cape Town	x
	Koeberg-2	Cape Town	x
Spain	Almaraz-1	Almaraz	—
	Almaraz-2	Almaraz	—
	Asco-1	Asco	—
	Asco-2	Asco	—
	Cofrentes	Cofrentes	—
	José Cabrera	Almonazid de Zorita	—
	Santa Maria de Garona	Santa Maria de Garona	—
	Trillo-1	Trillo	—
	Vandellos 1	Vandellos	—
	Vandellos 2	Vandellos	—
Sweden	Barsebäck I	Malmö	x
	Barsebäck II	Malmö	x
	Forsmark I	Uppsala	x
	Forsmark II	Uppsala	x
	Forsmark III	Uppsala	x
	Oskarshamn I	Oskarshamn	x
	Oskarshamn II	Oskarshamn	x
	Oskarshamn III	Oskarshamn	x
	Ringhals I	Göteborg	x
	Ringhals II	Göteborg	x
	Ringhals III	Göteborg	x
	Ringhals IV	Göteborg	x
Switzerland	KKB-I	Beznau	x
	KKB-II	Beznau	x
	KKG	Gösgen-Däniken	x
	KKL	Leibstadt	x
	KKM	Mühleberg	x
Union of Soviet Socialist Republics	Novo Voronezh Unit 5	Novo Voronezh	x
Yugoslavia	Krsko	Krsko	x

SAFEGUARDS

Research reactors and critical assemblies

State ^a	Abbreviated name of installation	Location	Subsidiary arrangements in force
Algeria	NUR Reactor	Wilaya de Tipaza	—
Argentina	RA-1	Constituyentes	x
	RA-2	Constituyentes	x
	RA-3	Ezeiza	x
	RA-4	Rosario	x
	RA-6	Bariloche	x
	RA-O	Cordoba	—
Australia	HIFAR	Lucas Heights	x
	MOATA	Lucas Heights	x
	CF	Lucas Heights	x
Austria	ASTRA	Seibersdorf	x
	SAR	Graz	x
	Triga II	Vienna	x
Bangladesh	Atomic Energy Research Est.	Ganakbari Savar Dhaka	x
Belgium	BRO2	Mol	x
	BR1-CEN	Mol	x
	BR2-CEN	Mol	x
	CEN-Venus	Mol	x
	Thetis	Gent	x
Brazil	IEAR-1	São Paulo	x
	RIEN-1	Rio de Janeiro	x
	Triga-CDTN	Belo Horizonte	x
Bulgaria	IRT-2000	Sofia	x
Canada	McMaster	Hamilton	x
	NRU	Chalk River	x
	NRX	Chalk River	x
	PTR	Chalk River	x
	Slowpoke-AECL	Ottawa	x
	Slowpoke-Dalhousie Univ.	Halifax	x
	Slowpoke-Ecole Polytechnique	Montreal	x
	Slowpoke-Kingston	Kingston	x
	Slowpoke-Saskatchewan	Saskatoon	x
	Slowpoke-Toronto University	Toronto	x
	Slowpoke-Univ. of Alberta	Edmonton	x
	WR-1	Pinawa	x
	ZED-2	Chalk River	x
Chile	La Reina	Santiago	x
	Lo Aguirre	Santiago	x
Colombia	IAN-RI	Bogotá	x
Czechoslovakia	LR-O	Řež	x
	SR-OD	Vochov	x
	Univ. Training Reactor VR-1P	Prague	x
	VVR-S	Řež	x
Democratic People's Republic of Korea	Critical assembly	Nyonphyon	x
	IRT-DPRK	Nyonphyon	x
Denmark	DR-1	Roskilde	x
	DR-3	Roskilde	x

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Research reactors and critical assemblies (cont.)

State ^a	Abbreviated name of installation	Location	Subsidiary arrangements in force
Egypt	Nuclear Research Centre	Inshas	x
Finland	Triga II	Otaniemi	x
Germany, Federal Republic of	BER-2	Berlin	x
	FMRB	Braunschweig	x
	FRF-2	Frankfurt	x
	FRM	Garching	x
	GKSS-FRG1	Geesthacht	x
	GKSS-FRG2	Geesthacht	x
	KFA-FRJ1	Jülich	x
	KFA-FRJ2	Jülich	x
	SUR 100	Bremen	x
	SUR 100	Eggenstein-Leopoldshafen	x
	SUR 100	Hannover	x
	SUR 100	Kiel	x
	SUR 100	Hamburg	x
	SUR 100	Ulm	x
	SUR 100	Stuttgart	x
	SUR 100	Furtwangen	x
	SUR 100	Darmstadt	x
	SUR 100	Berlin	x
	SUR 100	Aachen	x
	Tech. Univ. AKR	Dresden	—
	Tech. Hochschule ZLR	Zittau	—
	Triga	Mainz	x
	Triga	Hannover	x
	Triga II	Heidelberg	x
	ZFK RAKE	Rossendorf	—
	ZFK research reactor	Rossendorf	—
	ZFK RRR	Rossendorf	—
Greece	GRR-1	Attiki	x
Hungary	Training reactor	Budapest	x
	WWR-S M	Budapest	x
	ZR-6	Budapest	x
Indonesia	Gama	Yogyakarta	x
	MPR-30	Serpong	x
	PPTN	Bandung	x
Iran, Islamic Republic of	TSPRR	Teheran	x
Iraq	IRT-5000	Baghdad Tuwaitha	x
	Tamuz-2	Baghdad Tuwaitha	x
Israel	IRR-1	Soreq	x
Italy	AGN-201	Palermo	x
	CESNEF-L54	Milan	x
	ESSOR	Ispra	x
	RB-3	Montecuccolino	x
	RTS-1	San Piero a Grado	x
	TAPIRO	Santa Maria di Galeria	x
	Triga-RC1	Santa Maria di Galeria	x
	Triga-2	Pavia	x

SAFEGUARDS

Research reactors and critical assemblies (cont.)

State ^a	Abbreviated name of installation	Location	Subsidiary arrangements in force
Jamaica	Centre for Nuclear Sciences	Kingston	x
Japan	DCA	Oarai-Machi	x
	FCA	Tokai-Mura	x
	HTR	Kawasaki-shi	x
	JMTR	Oarai-Machi	x
	JMTR-CA	Oarai-Machi	x
	JOYO	Oarai-Machi	x
	JRR-2	Tokai-Mura	x
	JRR-3	Tokai-Mura	x
	JRR-4	Tokai-Mura	x
	Kinki University R.R.	Kowake	x
	KUCA	Kumatori-cho	x
	KUCA	Kumatori-cho	x
	KUCA	Kumatori-cho	x
	KUR	Kumatori-cho	x
	Musashi College R.R.	Kawasaki	x
	N.S. Mutsu	Minato-Machi	x
	NCA	Kawasaki-ku	x
	NSRR	Tokai-Mura	x
	Rikkyo University R.R.	Nagasaka	x
	TCA	Tokai-Mura	x
	TODAI	Tokai-Mura	x
	TTR	Kawasaki-shi	x
	VHTRC	Tokai-Mura	x
Korea, Republic of	Triga II	Seoul	x
	Triga III	Seoul	x
	Kyung-Hee Univ.	Seoul	x
Libyan Arab Jamahiriya	IRT-Tajura	Tajura	x
Malaysia	Puspati	Bangi, Selangor	x
Mexico	Triga III	Ocoyoacac	x
	SUR 100	Mexico City	x
Netherlands	HOR	Delft	x
	HFR	Petten	x
	LFR	Petten	x
Norway	HBWR-Halden	Halden	x
	JEEP-II	Kjeller	x
Pakistan	PARR	Rawalpindi	x
Peru	Centro nucl. de investigaciones	San Borja	x
	RP-O	Lima	x
Philippines	PRR-1	Diliman, Quezon City	x
Poland	Agata	Świerk	x
	Anna	Świerk	x
	Ewa	Świerk	x
	Maria	Świerk	x
Portugal	RPI	Sacavem	x

SAFEGUARDS

Research reactors and critical assemblies (cont.)

State ^a	Abbreviated name of installation	Location	Subsidiary arrangements in force
Romania	RP-01	Magurele	x
	Triga II	Pitești Colibași	x
	VVR-S	Magurele	x
South Africa	SAFARI-1	Pelindaba	x
Spain	ARBI	Bilbao	—
	ARGOS	Barcelona	—
	JEN-1 and JEN-2	Madrid	—
Sweden	R2	Studsvik	x
	R2-O	Studsvik	x
Switzerland	AGN 211P	Basel	x
	Crocus	Lausanne	x
	Proteus	Würenlingen	x
	Saphir	Würenlingen	x
Thailand	TRR-1	Bangkok	x
Turkey	TR-1	Istanbul	x
	ITU-TRR	Istanbul	x
Union of Soviet Socialist Republics	IR-8 Research Reactor	Moscow	x
Uruguay	Lockheed	Montevideo	x
Venezuela	RV-I	Altos de Pipe	x
Viet Nam	Da Lat Research Reactor	Da Lat	—
Yugoslavia	RA	Vinča	x
	RB	Vinča	x
	Triga II	Ljubljana	x
Zaire	Triga-Zaire	Kinshasa	x

Conversion plants, including pilot plants

State ^a	Abbreviated name of installation	Location	Subsidiary arrangements in force
Argentina	UO ₂ Conversion Plant	Cordoba	—
	Uranium Powders Fabrication Plant	Constituyentes	—
Canada	CAMECO	Port Hope	x
Japan	Japan Nuclear Fuel Conversion Co. Ltd.	Tokai-Mura	x
	Ningyo R & D	Ningyo	x
	PCDF	Tokai-Mura	x
Mexico	UO ₂ Conversion Plant	Salazar	—
Romania	UO ₂ powder fab. plant	Feldioara	—

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Fuel fabrication plants, including pilot plants

State ^a	Abbreviated name of installation	Location	Subsidiary arrangements in force
Argentina	Atucha Fuel Fabrication Plant	Ezeiza	—
	Fuel Fabrication Plant (CANDU)	Ezeiza	—
	Pilot Fuel Fabrication Plant (HEU)	Constituyentes	x
	Research Reactor Fuel Fab. Plant	Constituyentes	—
Belgium	Belgonucléaire-BN-MOX	Dessel	x
	FBFC	Dessel	x
	FBFC MOX Assembling Facility	Dessel	—
Brazil	Fuel Fabrication Plant Resende	Resende	x
Canada	GEC	Peterborough	x
	GEC	Toronto	x
	Fuel fabrication facility	Chalk River	—
	CRNL Fuel Fabrication	Chalk River	x
	Zircatec P.I. Ltd.	Port Hope	x
Denmark	Metallurgy	Roskilde	x
Germany, Federal Republic of	Exxon	Lingen	x
	NUKEM	Wolfgang	x
	Siemens Uran	Hanau	x
	Siemens Uran	Karlstein	x
	Siemens MOX	Hanau	x
India	EFFP-NFC	Hyderabad	x
	Ceramic fuel fab. assembly area	Hyderabad	x
Indonesia	Experimental Fuel Element Installation (IEBE)	Serpong	x
	Research Reactor Fuel Element Production Installation (IPEBRR)	Serpong	x
Iraq	ERLFF	Baghdad Tuwaita	x
Italy	COREN	Saluggia	x
	Fabnuc	Bosco Marengo	x
	IFEC	Saluggia	x
Japan	JNF	Yokosuka	x
	MNF	Tokai-Mura	x
	NFI (Kumatori-1)	Kumatori, Osaka	x
	NFI (Kumatori-2)	Kumatori, Osaka	x
	NFI (Tokai) Fuel Fabrication	Tokai-Mura	x
	PFPF	Tokai-Mura	x
	PFPF	Tokai-Mura	x
Korea, Republic of	CFFP	Daejeon	x
	LEU Fuel Fabrication	Daejeon	x
Mexico	Fuel Fabrication Plant	Ocoayacac	—
Romania	Romfuel	Pitești Colibași	x
Spain	CIEMAT Planta Metall.	Madrid	—
	ENUSA Fuel Fabrication Plant	Juzbado	—
Sweden	ASEA-ATOM	Västerås	x
United States of America	General Electric Co.	Wilmington, NC	x
	Babcock & Wilcox Co.	Lynchburg, VA	x

SAFEGUARDS***Chemical reprocessing plants, including pilot plants***

State ^a	Abbreviated name of installation	Location	Subsidiary arrangements in force
Germany, Federal Republic of	WAK	Eggenstein-Leopoldshafen	x
India	PREFRE	Tarapur	x
Italy	EUREX	Saluggia	x
	ITREC-Trisaia	Rotondella	x
Japan	Tokai Reprocessing Plant	Tokai-Mura	x

Enrichment plants, including pilot plants

State ^a	Abbreviated name of installation	Location	Subsidiary arrangements in force
Brazil	Sep. Noz. Enrichment Plant	Resende	x
Germany, Federal Republic of	Uranit*	Jülich	—
	URENCO Deutschland, UTA-1	Gronau	x
Japan	Uranium Enrichment Plant	Ningyo	x
Netherlands	Ultra-Centrifuge*	Almelo	—
	URENCO Nederland	Almelo	x
United Kingdom	BNFL Centrifuge plant and associated storage	Capenhurst	x

^a Location associated with enrichment technology.

SAFEGUARDS

Separate storage facilities

State ^a	Abbreviated name of installation	Location	Subsidiary arrangements in force
Argentina	Storage of zircaloy tubes	Ezeiza	—
	Storage of depleted hexafluoride	Bariloche	—
	Storage of 20% enriched uranium	Cac	—
Belgium	BN UF ₆ store	Dessel	x
	Belgoprocess	Mol	x
Bulgaria	AFRS	Kozloduy	—
Canada	Bruce A	Tiverton	x
	Bruce B	Tiverton	x
	CRNL	Chalk River	x
	CRNL spent fuel dry store	Chalk River	—
	Douglas Point	Tiverton	x
	Gentilly-1	Gentilly	x
	Long term storage at CRNL	Chalk River	—
	Pickering	Pickering	x
	WNRE	Pinawa	x
Chile	Lab. experimental de conversión	Santiago	x
Czechoslovakia	AFRS	Bohunice	x
Denmark	Risø Store	Roskilde	x
	Risø Waste	Roskilde	—
Finland	Long term storage for TVO	Olkilouto	—
France	COGEMA UP2 spent fuel storage ponds	La Hague	x
Germany, Federal Republic of	Bundeslager	Wolfgang	—
	Exxon Nuclear UF ₆ Lageranlage	Lingen	x
	KFK-FR-2	Eggenstein-Leopoldshafen	x
	KFA Jülich Lager (AVR Kugeln)	Jülich	x
	LSG UF ₆ Freilager	Hanau	—
	TNH GesmbH	Landsbergen-Leese	—
	Nuclear Cargo & Services	Hanau	—
	Urananlage	Birkenfeld	x
	VEB Greifswald	Greifswald	—
Iraq	Separate storage facility	Baghdad Tuwaita	x
Italy	Avogadro	Saluggia	x
	Deposito Prodotti Uraniferi	Bosco Marengo	x
	Essor Nuclear Plant	Ispra	—
	Essor Storage Pond	Ispra	—
	Ispra Central Storage	Ispra	x
	Joint Research Centre	Ispra	—
Japan	KUFFS	Kyoto	x
Luxembourg	International Metals S.A.	Luxembourg-Dommeldange	x
Pakistan	Storage at Government depot	Karachi Malir	x
Portugal	Instalação de Armazenagem	Sacavem	x
Sweden	Central long term storage	Oskarshamn	—
Switzerland	Diorit Storage	Würenlingen	x
United Kingdom	BNF PLC Store 9	Sellafield	x
	Sellafield Pu-storage	Sellafield	x
	Oxide Fuel Storage Pond	Sellafield	x

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Other facilities

State ^a	Abbreviated name of installation	Location	Subsidiary arrangements in force
Argentina	Lab. de Calificación	Constituyentes	—
Australia	Research Laboratory	Lucas Heights	x
Belgium	BCMN	Geel	x
	CEN-Labo	Mol	x
	CEN-Waste	Mol	—
	I.R.E.	Fleurus	x
	PULAB	Mol	x
Canada	Physics, Chemistry, Fuel Eng., Health Phys., R & D	Chalk River	x
Czechoslovakia	Nuclear Fuel Inst. (UJP)	Zbraslav	x
	Research Laboratories	Řež	x
Denmark	Hotcell Plant	Roskilde	x
Germany, Federal Republic of	KFA-heisse Zellen	Jülich	x
	Institut für Kernphysik-1	Eggenstein-Leopoldshafen	x
	KFK-heisse Zellen	Eggenstein-Leopoldshafen	x
	KFK/IHCH	Eggenstein-Leopoldshafen	x
	KFK/IMF3	Eggenstein-Leopoldshafen	x
	KWU-heisse Zellen	Karlstein	x
	Lab. d. KFA Jülich	Jülich	x
	Transuran	Eggenstein-Leopoldshafen	x
	Urantechnikum	Rosendorf	—
Hungary	Institute of Isotopes	Budapest	x
Italy	CNEN-LAB. PU.	Santa Maria di Galeria	x
	CNEN-LAB. TEC.	Santa Maria di Galeria	x
Japan	JAERI-Oarai R&D	Oarai-Machi	x
	JAERI-Tokai R&D	Tokai-Mura	x
	NDC Fuel Hot Lab	Tokai-Mura	x
	NERL. University of Tokyo	Tokai-Mura	x
	NFD	Oarai-Machi	x
	NFI Tokai II	Tokai-Mura	x
	NRF Neutron Radiation Facility	Tsukuba	x
	NDC fuel laboratories	Tokai-Mura	x
	PNC FMF	Oarai-Machi	x
	PNC IRAF	Oarai-Machi	x
	PNC-Oarai R&D	Oarai-Machi	x
	PNC Tokai R&D	Tokai-Mura	x
	Uranium material laboratory	Oarai-Machi	x
Korea, Republic of	PIEF	Daejeon	x
Netherlands	ECN & JRC	Petten	x
	Kema Lab.	Arnhem	x
Norway	Research laboratories	Kjeller	x

SAFEGUARDS

Other facilities (cont.)

State ^a	Abbreviated name of installation	Location	Subsidiary arrangements in force
Poland	Institute for nuclear chemistry and engineering	Warsaw	—
	Institute of Nuclear Research	Świerk	x
	Miscellaneous locations combined in one material balance area	Various	x
South Africa	Hot Cell Complex	Pelindaba	x
Spain	CIEMAT Lab-Pu	Madrid	—
Sweden	Central storage fresh fuel	Studsvik	x
Switzerland	Fed. Inst. of Reactor Research	Würenlingen	x

Non-nuclear installations

State ^a	Abbreviated name of installation	Location	Subsidiary arrangements in force
Argentina	Heavy water plant	Arroyito	—
	Heavy water storage	Buenos Aires	x

^a An entry in this column does not imply the expression of any opinion whatsoever on the part of the Secretariat concerning the legal status of any country or territory or of its authorities, or concerning the delimitation of its frontiers.

Note: The Agency also was applying safeguards in Taiwan, China, at six power reactors, six research reactors/critical assemblies, one uranium pilot conversion plant, two fuel fabrication plants and one research and development facility.

SAFEGUARDS

Safeguards support

Safeguards systems for:
— fuel fabrication plants

At a major MOX fuel fabrication plant further work was done on authentication and acceptance testing of major installed equipment. Procedures for verification of in-process, hold-up and scrap materials were introduced.

Design work continued on the safeguards system for a new automated MOX fuel fabrication plant. Agreement in principle has been reached on the safeguards approach to be used for the facility and discussions have begun regarding contractual aspects of the project. Significant contributions to the development work have been provided through Member State support programmes and by facility operators.

**— multi-unit
 nuclear power stations**

The core discharge monitor (CDM) installed at a unit of a multi-unit OLR nuclear power station was tested and preliminary results proved to be excellent. The number of irradiated fuel bundles discharged from the reactor core at full power can readily be determined from the system output and unusual fuel handling events can be verified. In the light of practical experience gained so far and in the interim period before the successful commissioning of the CDMs, the inspection effort for the complementary regime of SNRIs was reduced with account taken of the use of the CDMs at this stage as reactor vault radiation monitors.

**— heavy water
 production plants**

The programme for the preparation, testing and evaluation of equipment and concepts for the implementation of safeguards at a heavy water production plant has continued.

System studies

Work on the implementation and further development of a new safeguards approach for a multi-unit OLR station under construction continued. Interim safeguards measures are under development for the reactor cores of the CANDU-type OLRs already operating.

In consultation with Member States and SAGSI, the Agency has initiated a programme to develop safeguards requirements and methodologies for geological repositories and to formulate a safeguards policy well before such facilities start operation.

The development of technical criteria for the termination of safeguards on nuclear material categorized as measured discards continued.

Work continued on safeguards approaches for new, large scale reprocessing plants. Both generic and facility specific issues relating to spent fuel storage, continuous dissolution head-end systems, advanced accountancy methods and plutonium product storage were addressed.

The Agency continued participation in multinational meetings under the auspices of LASCAR (Large Scale Reprocessing Plant Safeguards). Following the completion of studies on spent fuel storage and head-end dissolution, discussions were focused on the main process area and product storage systems. The LASCAR studies will provide a useful compendium of technical alternatives for safeguarding large reprocessing plants.

A safeguards approach for LEU fuel fabrication plants involving SNRIs was modified and testing is scheduled for 1991. The SNRIs are to be used for the verification of inventory changes at such plants and will necessitate declarations of nuclear transfers by the operators in advance of such inspections.

SAFEGUARDS**System studies (cont.)**

Agency policy on the use of C/S was revised and extended to permit the reduction of remeasurement requirements on all types of nuclear material to which dual C/S systems are successfully applied.

Instrument development

New non-destructive assay methods for measurement of total uranium and elemental ^{235}U quantities or concentrations in different materials, including difficult to analyse heterogeneous scrap, were developed and successfully applied.

A plutonium isotopic measurement technique based on state of the art hardware and software was developed, tested and evaluated. The technique will be introduced into routine use in 1991.

With the help of Member State support programmes, the preparation of standard measurement procedures reached an advanced stage, with six procedures approved in 1990 and nine more in the final stage of preparation. In addition, cadmium telluride gamma detectors that can be used in previously inaccessible locations were developed.

Under the programme for replacement of photographic optical surveillance units, the development of the compact surveillance and monitoring system (COSMOS) continued. Completion of development work and the production of standard units are expected in 1991.

By combining several development activities (tamper resistant television signal transmission link and intermediate signal storage) a new multi-camera video surveillance system (MOS) was developed. Extensive reliability testing is in progress.

A spent fuel attribute tester which does not require movement of the spent fuel reached an advanced stage of development. It is expected to be in routine use in 1991.

The development of a CANDU basket verifier specific to one facility was completed and the equipment commissioned and authorized for routine inspection use.

Neutron coincidence counting electronics and software to permit verification measurement of fuel elements in a scanning mode were developed and successfully tested at a fast reactor facility.

A gamma spectrometry based method for quantitative verification of spent LWR fuel was developed and commissioned for routine inspection use.

The median times required to complete verification by off-site destructive analysis (DA) were 49 days for uranium, 48 days for plutonium and 70 days for spent fuel samples.

SAFEGUARDS

Technical support for safeguards activities

	1988	1989	1990
Twin photo units in use	268	278	261
Photo cameras repaired and tested	301	288	227
Twin photo unit failures related to equipment	0.8%	0.5%	0.8%
Surveillance films developed at Headquarters	1658	1860	1907
Seals issued	15 900	14 618	15 300
Seals verified	15 508	13 543	14 851
Shipments of equipment and supplies	264	354	320
Hand carried equipment and supplies	374	412	425
Shipments of nuclear material and chemicals	113	124	141
Procurement actions	892	1240	1337
Samples analysed by SAL and NWAL	1173	1199	1512
MIVS systems installed in facilities	0	8	43

**Instrument,
equipment
and analytical services**

The Safeguards Analytical Laboratory (SAL) and the Network of Analytical Laboratories (NWAL) performed 3900 measurements for calibration and quality control of NDA techniques, for certification of secondary reference samples, for maintenance and improvement of off-site DA and for testing procedures for on-site DA.

Work continued on the development of methods and procedures for on-site independent DA verification measurements, especially in the following areas:

- The thermal quadrupole mass spectrometric method for plutonium and americium isotopic analysis based on the use of the total evaporation technique.
- The rapid and automatic preparation of bead samples of nuclear fuels in oxide form for on-site X ray analysis.
- The hybrid K edge densitometer technique for the analysis of uranium and plutonium in product material and spent fuel samples. This technique has been tested for possible use as a backup technique for off-site DA and also for technical support and the training of inspectors.
- The field testing of a robotic system for chemical treatment of diluted spent fuel solutions. This work was pursued with the assistance of two Member State support programmes.

**Standardization and
quality assurance activities**

A total of 2286 inspection reports (2289 in 1989) and 2485 inspection statements (2494 in 1989) were reviewed and computerized quality control checks applied. Reports on the quality and timeliness of inspection documentation packages were made routinely.

The average time required between an inspection and the dispatch of the results to the State in which the inspection was performed was 53 days (50 in 1989 and 64 in 1988).

SAFEGUARDS**Statistical analysis**

Major revisions in inspection sample size and material balance evaluation methodologies, along with supporting documentation and training material, were prepared for implementation in 1991. Both revisions will result in more effective utilization of the Agency's constantly improving non-destructive measurement capabilities. Specific verification performance histories have been established for each combination of facility, material type and measurement method.

During 1990, 390 routine data evaluation reports were prepared. The total comprises material balance evaluations (118), operator-inspector pair evaluations (195) and verification performance history analyses (77).

Training

Two introductory courses were conducted for new inspectors. Twenty other training courses for Professional and General Service staff as well as individual training were organized at Headquarters and in the field. Substantial support in the organization and conduct of training courses continued to be provided by Member States.

Data processing

The computerized accounting data system for INFCIRC/66/Rev.2-type agreements was further augmented by additional applications software. The transit accounting process was enhanced by the computerization of data which is received by the Agency pursuant to paragraphs 34(a) and 34(b) of INFCIRC/153.

A version of the IFSS which incorporates all the functional requirements originally envisaged was completed and subsequently authorized for routine use.

In preparation for the introduction of the safeguards criteria to be used for implementation and evaluation in the period 1991-1995, work was started on rewriting computer programs and documenting the computerized inspection report (CIR) system.

With the assistance of a Member State support programme, a pilot office application project was completed to provide a basis for planning the introduction of local area network (LAN) technology.

Training courses and seminars held

Course name	Location	No. of participants	Duration
Course for junior professionals from developing countries	Headquarters. Austria, Germany, Czechoslovakia	4	1 year
Regional course on implementation of State Systems for Accounting and Control of Nuclear Materials	Argentina	22	2.5 weeks
Basic course on implementation of State Systems for Accounting and Control of Nuclear Materials	USSR	26	2 weeks