

**IAEA Regional Seminar on the Protocol Additional
to Nuclear Safeguards Agreements
Lima, Peru
4 - 7 December 2001**

**SESSION 10: Practical Aspects of the Additional Protocol
and Integrated Safeguards**

Dirk Schriefer
Director
Division of Safeguards Operations B
International Atomic Energy Agency

INTRODUCTION

In October 1997, the IAEA General Conference endorsed the Strengthened Safeguards System, which is based on the requirements of the Protocol Additional¹ as approved by the IAEA's Board of Governors in May 1997².

It needs to be remembered that, in 1995, the Agency's programme for "Strengthening the Effectiveness and Improving the Efficiency of the Safeguards System" was split into measures under the existing comprehensive safeguards agreements (Part 1) and measures requiring complementary authority (Part 2). At the time it was unclear how soon States would approve all foreseen and requested measures. The first set of measures was approved in 1995. For the Part 2 measures, a model protocol was developed in 1995, discussed and modified by Committee 24 (a committee established by the Agency's Board of Governors in 1996) and agreed to by the Board in May 1997. Details of the development and the history of the programme have been discussed in the past³. In 1995 the IAEA Department of Safeguards began to implement safeguards including the Part 1 activities through the Divisions of Operations. 1997 was the first year for which the IAEA reported results on the implementation of Part 1 in the annual Safeguards Implementation Report⁴.

THE ADDITIONAL PROTOCOL

The strengthening measures Part 1 (1995-1997) and the earlier measures (1991-1995) being implemented under comprehensive safeguards agreements provide greater IAEA access to information. To better

1 IAEA: Model Protocol Additional to the Agreement(s) between State(s) and the International Atomic Energy Agency for the Application of Safeguards, INFCIRC/540, September 1997

2 IAEA GOV/2914, April 1997

3 D. Schriefer: Implementation of Measures from Programme 93+2, INMM/37 (1996), in the December 1996 issue of the IAEA Bulletin, and Experience with the Implementation of Measures from the Strengthened Safeguards System, INMM/38 (1997)

4 IAEA: The Safeguards Implementation Report for 1997, GOV/1998/18, May 1998

meet the objectives of a strengthened safeguards system, further information and broader access, going beyond the strategic points within declared nuclear facilities, were also required.

The following is a brief summary of the measures provided for in the Protocol Additional to Safeguards Agreements (Additional Protocol) approved by the Board in May 1997 (INFCIRC/540⁵). It includes:

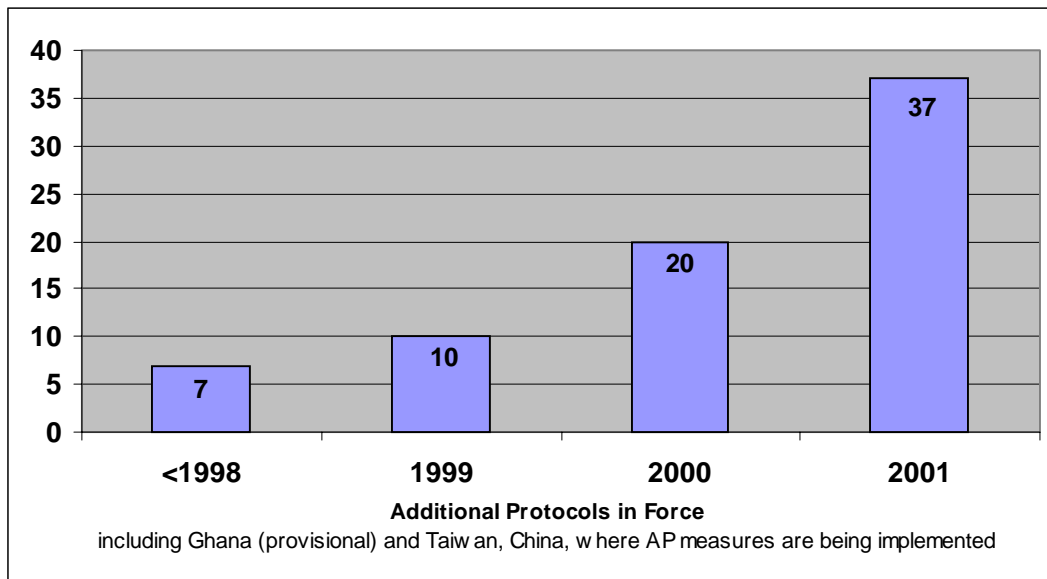
- information about, and inspector access to, all aspects of a State's nuclear fuel cycle from uranium mines to nuclear waste and any other location where nuclear material intended for non-nuclear use is present;
- information on, and short-notice inspector access to, all buildings on a nuclear site;
- information about, and mechanisms for inspector access to, fuel cycle-related research and development;
- information on the manufacture and export of sensitive nuclear-related technologies and mechanisms for inspector access to manufacturing and import locations;
- the collection of environmental samples, when deemed necessary by the IAEA, beyond declared locations (wide-area environmental sampling after approval by the IAEA Board); and
- administrative arrangements that improve the process of designating inspectors, the issuance of multi-entry visas (necessary for unannounced inspections) and IAEA access to modern means of communications.

IMPLEMENTATION STATUS

As of the end of October 2001, the implementation status is as follows:

- The IAEA Board of Governors has approved 58 Additional Protocols (APs), 57 of these have been signed,
 - 53 of these are with non-nuclear-weapon States with comprehensive safeguards agreements;
 - five are with nuclear-weapon States; and
 - one is with a State having INFCIRC/66-type agreements.
- 22 of these Additional Protocols have entered into force: Australia, Azerbaijan (SQP), Bangladesh, Bulgaria, Canada, Croatia (SQP), Ecuador (SQP), Holy See (SQP), Hungary, Indonesia, Japan, Jordan (SQP), Lithuania, Monaco (SQP), New Zealand (SQP), Norway, Peru, Poland, Romania, Slovenia, Turkey and Uzbekistan;
- one is being applied provisionally, pending entry into force: Ghana;
- measures foreseen in the Model Additional Protocol are being implemented in Taiwan, China.
- It is expected that three more States will sign the Additional Protocol this year (Costa Rica, Guatemala and Panama).

⁵ IAEA: INFCIRC/540 (Corr.): Model Protocol Additional to the Agreement(s) between State(s) and the International Atomic Energy Agency for the Application of Safeguards, September 1997



A table summarizing the implementation status is annexed to this report. The Agency is continuing actively to encourage States to conclude Additional Protocols as a contribution to global nuclear non-proliferation objectives.

The actual implementation work consists of

- maintaining, reviewing and evaluating the expanded declarations and the updates thereof provided by Member States under Articles 2 and 3 of the Additional Protocol;
- communicating with States regarding consistency, completeness and clarification;
- applying complementary access (Articles 4, 5, 6) and managed access (Article 7);
- informing the States according to Article 10 on the activities carried out (Articles 10.a.), on the results of activities in respect of any questions and inconsistencies (Articles 10.b.) and on conclusions drawn from its activities;

If requested by the State, or if deemed necessary by the Agency a Subsidiary Arrangements with the State (Article 13) will be negotiated and concluded.

It is evident that the actual implementation of the Additional Protocol includes preparatory work, such as:

- the development of guidelines to be used by States for the preparation and submission of the specific information required pursuant to Articles 2 and 3 of the Additional Protocol (the expanded declaration);
- the development of model language for Subsidiary Arrangements;
- the development of IAEA internal guidelines for complementary access;
- the development of procedures and systems for information collection, storage, and processing; including satellite imagery; and
- the development of operational procedures for protocol implementation on a State-by-State basis.

Information Guidelines

Detailed guidelines⁶ have been developed by the IAEA Secretariat defining the additional, largely qualitative, information to be provided by States to the IAEA under Articles 2 and 3 of the Additional Protocol. The guidelines will help States formulate internal procedures and regulations to ensure that the necessary information can be made available to the Secretariat. The Guidelines document was sent out to States in 1997.

A simplified version of the guidelines has been prepared in April 1999 for SQP States (States whose safeguards agreements have a protocol suspending certain provisions of those agreements due to the small quantities of nuclear material in their territory).

Most of the information sought under Articles 2 and 3 of the Additional Protocol is new to IAEA safeguards. Accordingly, these “Guidelines” documents will be subject to revision on the basis of the experiences of the IAEA and the State.

Subsidiary Arrangements

Under the Additional Protocol, subsidiary arrangements may be requested by the State or by the IAEA to incorporate additional details about implementation.

The Agency has developed model language which can be drawn upon, as required, to address such matters as communication channels between the State and the IAEA, general modalities relating to complementary access, modalities relating to locations where the State anticipates a continuing need for managed access and the implementation of measures relating to communications systems.

Complementary Access Guidelines

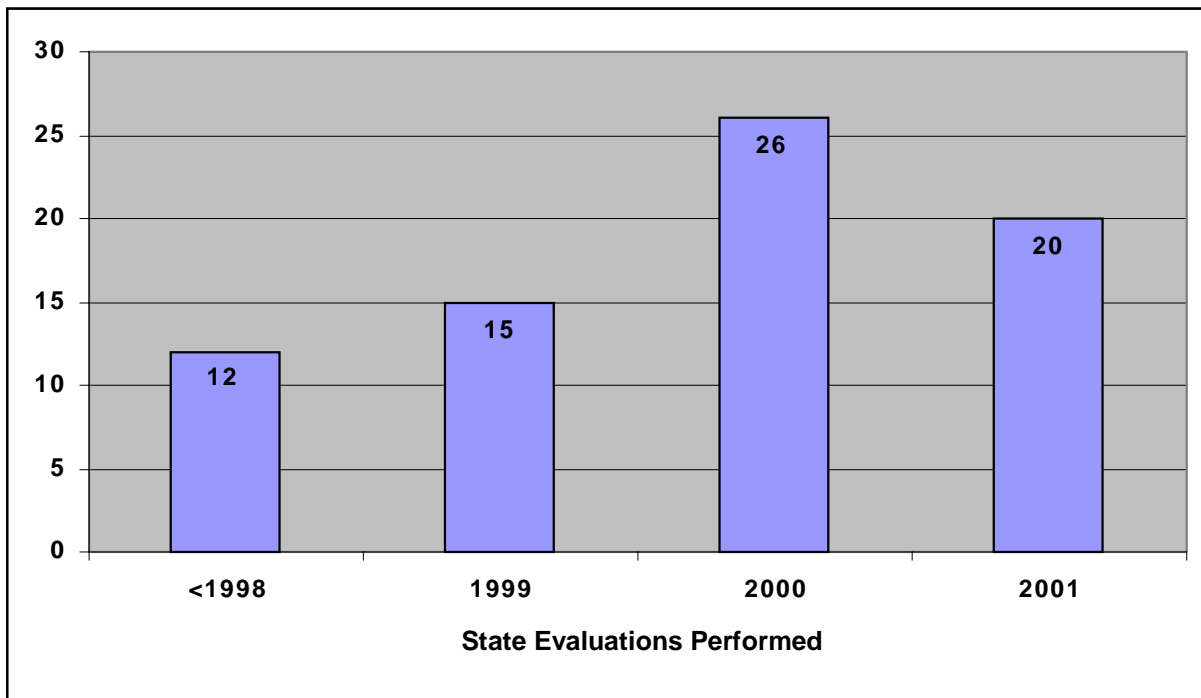
Internal guidelines have been developed for performing complementary access, both for access to buildings at sites and for access to locations where nuclear material is situated or nuclear fuel cycle-related activities are performed. These guidelines will ensure that complementary access is carried out in an efficient, technically effective and non-discriminatory manner. It must be noted that these guidelines are IAEA internal documents and will be changed as necessary without any special or official notification.

The use of managed access is an important provision of the Additional Protocol; guidelines for managed access are also being prepared.

State Evaluation Reports and Information Review

Under the strengthened safeguards system the Agency began with the systematic collection of information regarding States’ nuclear fuel cycles and related activities. In anticipation for a comprehensive analysis of all information available to the Agency prior to being able of drawing conclusions regarding the completeness of a State’s declaration, work was begun on the preparation of States’ files. Over the last five years the Agency has performed 73 States’ evaluation. The development over these five years can be seen from the following chart.

⁶ IAEA: Guidelines and Format for Preparation and Submission of Declarations Pursuant to Articles 2 and 3 of the Model Protocol Additional to Safeguards Agreements, August 1997; „blue“ version for States with and „yellow“ version for States without nuclear activities



Information Processing

Under the Additional Protocol the Secretariat will receive much more information than previously about States' nuclear programmes and there is a need to handle the receipt, quality control, storage and use of that information for evaluation purposes in an effective and efficient manner.

A computerised Protocol Data Information System (PDIS) has been developed to meet this need. Specific features are included to ensure the confidentiality of information. The PDIS is being used to process declarations by States pursuant to Articles 2 and 3 of the Additional Protocol.

In addition, a stand-alone system has been developed for State use, known as the Protocol Reporter, which will enable the input of information under Articles 2 and 3 of the Additional Protocol, the merging of such data from various sources within the State and the preparation of computerized declarations for submission to the Agency. The use of this system by States will benefit the States, as well as the Agency, as it will allow the consolidated collection of data in the State, its maintenance and the direct import of quality-controlled information into the PDIS. The Protocol Reporter was developed at the Agency but has been tested together with a number of Member States, which resulted in software improvements. The software is available to all States upon request.

In support of safeguards evaluations of States' nuclear and nuclear-related activities, the Secretariat introduced software for effectively searching voluminous open source information. The software includes a programme for gaining access to information stored on the Internet, and for analysing and displaying large sets of data obtained from other sources. The Department of Safeguards regularly refers to over a hundred open sources of information. To support the analysis and evaluation of States' nuclear information, approximately 500,000 documents are kept (at the end of 2000) in the Agency's databases.

Satellite Imagery

Satellite imagery is used as a complementary information source available to the Agency regarding States' nuclear and nuclear-related activities. Seven Member State Support Programmes have provided the Agency with technical advice on the potential benefits and related costs of using commercial satellite imagery for providing safeguards relevant information. The Agency is currently evaluating the possibility of registering changes to facilities and locations using satellite imagery on a more frequent and regular basis.

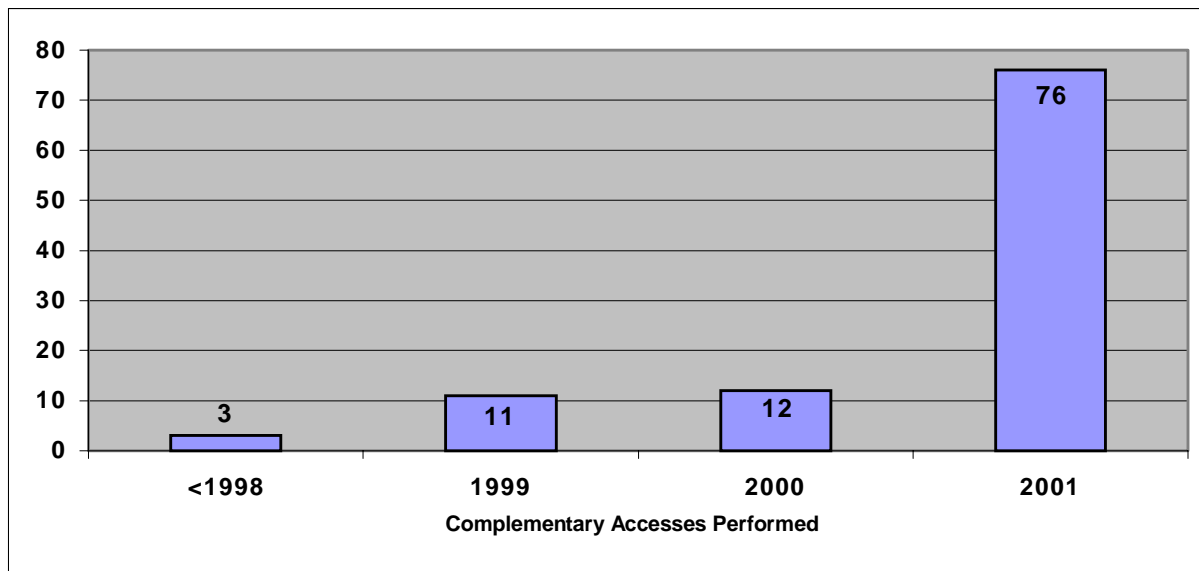
Implementation Procedures

Progress has been made in preparing the procedures necessary for the initial implementation of the Additional Protocol in the relevant States. Such preparations include defining procedures for evaluating Article 2 declarations, for planning and carrying out complementary access under the Additional Protocol and for the issuance of reports by the Agency under Article 10.

Implementation Status

As noted above, 22 States have so far brought the Additional Protocols into force, one State is applying the Additional Protocol provisionally, and in Taiwan, China, all measures are also applied.

Article 2 declarations ("expanded declarations") have been received from eighteen States. Five more are expected to arrive within the foreseen 180 days permitted (from the date of entry into force of the Additional Protocol). The received declarations have either been or are in the process of being evaluated and, subsequently, any necessary amplifications or clarifications have been or will be sought.



Complementary access has been conducted in a number of States. It is generally expected that such access is requested after the expanded declaration has been provided and analysed. However, the Protocol gives the Agency's inspectors the right to request complementary access before receipt of the declaration. This has happened this year. The number of complementary accesses performed by the Agency in recent years is given in the enclosed chart.

Extensive implementation trials were completed in Canada and at two large nuclear sites in Japan, both States with a large nuclear fuel cycle. It provided practical experience in complementary access on complex nuclear sites, including logistical aspects, managed access and environmental sampling. Two additional trials are currently being carried out in two Member States in the European Union (Finland and the Netherlands), prior to the beginning of the implementation there.

INTEGRATED SAFEGUARDS

When fully implemented in a State, the measures provided by a CSA and an Additional Protocol will enable the Agency to draw safeguards conclusions and thereby provide credible assurance of both the

- non-diversion of declared nuclear material and of the
- absence of undeclared nuclear material and activities in a State as a whole.

The Agency's ability to draw such conclusions creates the potential for eventual reductions in the current levels of nuclear material verification effort, particularly in respect of less sensitive nuclear material (i.e., depleted, natural and low enriched uranium and irradiated fuel) and a corresponding reduction in the costs associated with such activities.

In this regard, in December 1998, the IAEA Secretariat embarked on a programme for the development and implementation of "integrated safeguards". The term refers to the optimum combination of all safeguards measures available to the Agency under CSAs and Additional Protocols to achieve maximum effectiveness and efficiency within available resources in meeting the Agency's safeguards obligations. In its effort, the Department of Safeguards is receiving

- assistance from a small group of outside technical experts,
- advice from the Standing Advisory Group on Safeguards Implementation (SAGSI) and
- support from a number of Member States Support Programmes.

Basic Principles

The basic principles which govern the development of integrated safeguards are that:

- they be non-discriminatory, i.e., although the measures actually used in individual States may differ, the same technical objectives must be pursued in all States with comparable safeguards obligations;
- they be based on State-wide considerations; i.e.,
 - (a) comprehensive information evaluation for the State as a whole should play a key role in establishing and planning the activities implemented in that State, and
 - (b) integrated safeguards approaches should be designed to provide coverage of all plausible acquisition paths by which a State might seek to acquire nuclear material for a nuclear explosive device; and
- nuclear material accountancy remains a safeguards measure of fundamental importance.

Development Work for Integrated Safeguards

Work on integrated safeguards is currently focused on the development of guidelines, safeguards

approaches and implementation criteria, and includes

- specifying the process by which a conclusion of the absence of undeclared nuclear material and activities in a State can be drawn and maintained; and
- having drawn this conclusion, considering what measures would subsequently be appropriate to apply to declared nuclear material in specific types of facilities in order to continue to provide a conclusion of its non-diversion.

Implementation of Integrated Safeguards

The first State, for which the pre-requisites for integrated safeguards were met, was Australia in 2000; and Australia was the only State for which the Agency's activities had sufficiently progressed to implement this new safeguards regime in 2001. It is expected that, for a small number of additional States, the Agency will be able to implement integrated safeguards in 2002. It should be kept in mind that integrated safeguards will be implemented only in States that have a safeguards agreement operational, for SQP States the Additional Protocol will be implemented.

It is important to note that the entry into force of an Additional Protocol is not in itself a sufficient basis for the Agency to modify safeguards measures currently implemented in a particular State with a comprehensive safeguards agreement. To reduce certain traditional verification measures on declared nuclear material, positive conclusions on the non-diversion of such material and on the absence of undeclared nuclear material and activities in the State as a whole are required. The conditions for such conclusions, after entry into force of an Additional Protocol, include the following:

- the State has complied in a timely manner with the requirements of its Safeguards Agreement and Additional Protocol;
- the Agency has implemented the necessary measures for verifying declared nuclear material;
- the Agency has drawn a conclusion of non-diversion of all declared nuclear material and,
- under the Additional Protocol, the Agency has:
 - (a) conducted a broad-based State evaluation based on all information available, including the declarations submitted by the State under Article 2 of the Additional Protocol;
 - (b) satisfactorily resolved any inconsistencies;
 - (c) received timely responses to all questions from the State; and
 - (d) implemented complementary access, as necessary, in accordance with the Additional Protocol.

Once positive conclusions on the non-diversion of declared nuclear material and on the absence of undeclared nuclear material and activities can be drawn for a State as a whole, the implementation of integrated safeguards can proceed. However, the ability of the Agency to continue to draw such conclusions must be maintained under integrated safeguards by continuing to implement measures to verify the non-diversion of declared nuclear material, by continuous information review and evaluation, by continuing to take all actions necessary to resolve questions and inconsistencies and by conducting complementary access as necessary.

If, following the implementation of integrated safeguards, the Agency were not able to reaffirm the conclusion on non-diversion of declared nuclear material or on the absence of undeclared nuclear material and activities for a State as a whole, corrective actions would have to be taken which, depending on the circumstances, could include restoring traditional safeguards activities in the State, while continuing to implement the measures of the Additional Protocol.

Under integrated safeguards, the verification of declared nuclear material will remain of fundamental importance. In accordance with the principle of non-discrimination, the generic safeguards approach for facilities of a given type will be the same in any State where integrated safeguards is being applied. However, the measures used in a specific approach may differ according to individual facility characteristics and any State-specific considerations.

Integrated Safeguards at Nuclear Facility Types

The first facility type to be considered in the development of generic safeguards approaches was light water reactors (without mixed oxide fuel), since these facilities currently absorb approximately 20% of inspection effort. Considerable work has been done on developing this first integrated safeguards approach in sufficient detail and specificity to permit its review and evaluation. The Agency's work plan for the immediate future is to continue the development of integrated safeguards approaches for various types of facilities in the nuclear fuel cycle, specifically for research reactors, spent fuel storage facilities, on-load reactors and light-enriched uranium (LEU) fuel fabrication plants.

Work on changes to the relevant criteria that guide the planning and implementation of safeguards will proceed in parallel. Work will also be conducted on specific state-level approaches involving the combination of integrated safeguards regimes for specific facility types, taking into account the interaction between facilities, the implementation of the measures of the Additional Protocol and other State-specific features so as to maximise effectiveness and efficiency.

Outlook

It is expected that the conceptual framework for the implementation of integrated safeguards in all types of nuclear fuel cycle will be largely completed by the end of this year.

Work will proceed on the implementation of integrated safeguards in specific States when the necessary conclusions have been drawn and the relevant facility-type approaches have been developed. As more Additional Protocols enter into force, and subsequently more States meet the conditions for the implementation of integrated safeguards, the focus of the work post-2001 will move towards implementation support. As experience is gained with the implementation of integrated safeguards, adjustments to the system can be made in an evolutionary manner.

ANNEX: IMPLEMENTATION STATUS OF THE ADDITIONAL PROTOCOL
as of 2001-11-15

No.	State	Board Approval	Date signed	In Force	“Tlatelolco”	SQP
1.	Andorra	7 Dec 2000	9 Jan 2001			SQP
2.	Armenia	23 Sept 1997	29 Sept 1997			
3.	Australia	23 Sept 1997	23 Sept 1997	12 Dec 1997		
4.	Austria ¹	11 June 1998	22 Sept 1998	*		
5.	Azerbaijan	7 June 2000	5 July 2000	29 Nov 2000		SQP
6.	Bangladesh	25 Sept 2000	30 Mar 2001	30 Mar 2001		
7.	Belgium ¹	11 June 1998	22 Sept 1998			
8.	Bulgaria	14 Sept 1998	24 Sept 1998	10 Oct 2000		
9.	Canada	11 June 1998	24 Sept 1998	8 Sept 2000		
10.	China	25 Nov 1998	31 Dec 1998		Protocol	
11.	Croatia	14 Sept 1998	22 Sept 1998	6 July 2000		SQP
12.	Cuba	20 Sept 1999	15 Oct 1999		Signed	
13.	Cyprus	25 Nov 1998	29 July 1999			SQP
14.	Czech Republic	20 Sept 1999	28 Sept 1999			
15.	Denmark ¹	11 June 1998	22 Sept 1998			
16.	Ecuador	20 Sept 1999	1 Oct 1999	24 Oct 2001	Contracting Party	SQP
17.	Estonia	21 March 2000	13 April 2000			
18.	Finland ¹	11 June 1998	22 Sept 1998	*		
19.	France ¹	11 June 1998	22 Sept 1998		Protocol	
20.	Georgia	23 Sept 1997	29 Sept 1997			SQP
21.	Germany ¹	11 June 1998	22 Sept 1998	*		
22.	Ghana	11 June 1998	12 June 1998	<i>provisional</i>		
23.	Greece ¹	11 June 1998	22 Sept 1998	*		
24.	Holy See	14 Sept 1998	24 Sept 1998	24 Sept 1998		SQP
25.	Hungary	25 Nov 1998	26 Nov 1998	4 April 2000		
26.	Indonesia	20 Sept 1999	29 Sept 1999	29 Sept 1999		
27.	Ireland ¹	11 June 1998	22 Sept 1998			
28.	Italy ¹	11 June 1998	22 Sept 1998			
29.	Japan	25 Nov 1998	4 Dec 1998	16 Dec 1999		
30.	Jordan	18 March 1998	28 July 1998	28 July 1998		SQP
31.	Latvia	7 Dec 2000	12 July 2001			
32.	Lithuania	8 Dec 1997	11 March 1998	5 July 2000		
33.	Luxembourg ¹	11 June 1998	22 Sept 1998			
34.	Monaco	25 Nov 1998	30 Sept 1999	30 Sept 1999		SQP
35.	Mongolia	11 Sept 2001				SQP
36.	Namibia	21 March 2000	22 March 2000			SQP
37.	Netherlands ¹	11 June 1998	22 Sept 1998	*	Protocol	
38.	New Zealand	14 Sept 1998	24 Sept 1998	24 Sept 1998		SQP

39.	Norway	24 March 1999	29 Sept 1999	16 May 2000		
40.	Nigeria	7 June 2000	20.Sep.01			
41.	Peru	10 Dec 1999	22 March 2000	23 July 2001	Contracting Party	
42.	Philippines	23 Sept 1997	30 Sept 1997			
43.	Poland	23 Sept 1997	30 Sept 1997	5 May 2000		
44.	Portugal ¹	11 June 1998	22 Sept 1998	*		
45.	Republic of Korea	24 March 1999	21 June 1999			
46.	Romania	9 June 1999	11 June 1999	7 July 2000		
47.	Russia	21 March 2000	22 March 2000		Protocol	
48.	Slovakia	14 Sept 1998	27 Sept 1999			
49.	Slovenia	25 Nov 1998	26 Nov 1998	22 Aug 2000		
50.	Spain ¹	11 June 1998	22 Sept 1998	*		
51.	Sweden ¹	11 June 1998	22 Sept 1998	*		
52.	Switzerland	7 June 2000	16 June 2000			
53.	Turkey	7 June 2000	6 July 2000	17 July 2001		
54.	Ukraine	7 June 2000	15 Aug 2000			
55.	UK ¹	11 June 1998	22 Sept 1998	*	Protocol	
56.	USA	11 June 1998	12 June 1998		Protocol	
57.	Uruguay	23 Sept 1997	29 Sept 1997		Contracting Party	
58.	Uzbekistan	14 Sept 1998	22 Sept 1998	21 Dec 1998		
TOTAL		58	57	22		