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TO THE COUNCIL AND THE EUROPEAN PARLIAMENT

ILLICIT TRAFFICKING IN NUCLEAR MATERIALS
AND RADIOACTIVE SUBSTANCES

Implementation of the guidelines laid down
in the communication from Commission of 7 September 1994
(COM(94)383) and in the conclusions of the Essen European Council

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INTRODUCTION

On 7 September 1994 the Commission adopted a communication to the Council and Parliament on the subject of the illegal trade in radioactive substances and nuclear materials (COM(94)383). In it the Commission proposed that the EU's response focus on:

- (i) improving the operating conditions in the nuclear sectors of the countries concerned (cooperation under the aegis of Tacis, the Moscow-based International Science and Technology Centre and the Euratom Safeguards Directorate);
- (ii) dialogue and cooperation with the countries concerned under the various agreements and in the context of the common external and security policy;
- (iii) greater cooperation within the EU (customs cooperation and tighter checks, cooperation in the context of justice and home affairs policy, and coordination of industrial assistance).

This issue was given high priority under the German Presidency. Five Council working parties plus the embassies of the countries concerned were mobilized to prepare a report for the Essen European Council, which declared its concern about the smuggling of nuclear material and approved a number of measures and guidelines aimed at tackling the problem. It asked the Commission and the Member States to step up cooperation in this field and to give the countries of origin and of transit effective support for their efforts on the ground. It also asked all states that had not yet done so to place sensitive civilian materials (plutonium and enriched uranium) under international control.

The Commission and the Member States have continued work since the summit, liaising with the International Atomic Energy Agency (IAEA) and other relevant bodies. These efforts are spurred by the common interest of the European Union, the Central and Eastern European and former Soviet countries in this issue, and take the form of cooperation based on specific projects within an overall framework.

The European Parliament has displayed an unflinching interest in the issue of illicit trafficking. MEPS have supported the Commission's initiatives by taking part in conferences and making visits. Budgetary resources have been allocated for operations in the Central and Eastern European and former Soviet countries.

This paper describes what has been done by way of follow-up to the Commission's communication of September 1994 and the conclusions of the Essen Summit.

I. NUCLEAR TRAFFICKING IN 1995

Few cases of nuclear trafficking have come to light since publication of the Commission's communication of September 1994 but illegal imports of radioactive steel scrap and of illegally dumped radioactive sources are on the increase, as are cases involving trafficking of radioactive substances, blackmail attempts and hoaxes.

The Commission's data bank currently contains 33 reported nuclear-related cases, most of them in Germany. The Commission has been led to understand, however, through inter-institutional channels, that this list is not exhaustive. A few cases have not yet been formally notified to the Commission, as they should have been under the Euratom Treaty. The probable reasons for this are:

- a lack of awareness of this specific provision of the Treaty on the part of those making seizures;
- a concern to maintain confidentiality so that inquiries still under way will not be jeopardized;

- a desire of judicial authorities to prevent interference by the executive in cases still before the courts.

The Commission has become aware of this state of affairs only recently and, in an attempt to remedy the situation, has embarked on an information campaign among the Member States to encourage them to adopt a procedure for declaring cases in accordance with the requirements and time-limits laid down in the Regulations, while receiving an assurance of the necessary confidentiality.

And while the number of new such cases is apparently dwindling in the EU and Europe generally, the most noteworthy case so far was discovered in December 1994 by the Czech police, who arrested smugglers in possession of nearly three kilos of uranium oxide with an isotope content of high strategic value (uranium 235) close on 87%. Military quality is usually at the 93% mark.

An important distinction must be drawn between the legal frameworks governing the materials in question, namely (simplifying somewhat) between:

- **nuclear materials, which are materials subject to safeguards under the Euratom Treaty, the IAEA or the Nuclear Non-Proliferation Treaty (NPT) because they pose a risk - great or small, depending on the material - of direct or indirect military use: these materials (e.g. plutonium and highly-enriched uranium) are very dangerous and could lead to nuclear proliferation as well as contamination;**
- **radioactive substances, which are not subject to safeguards: the risk of irradiation derives from the radiation emitted by the substance but the substance itself cannot be used as a fuel in its present state.**

II. CONTROL ON NUCLEAR MATERIALS

1. Common foreign and security policy

The EU has sounded out non-member countries on this issue, notably in connection with the implementation of the joint action on the preparation of the 1995 conference on the review and extension of the Non-Proliferation Treaty, including the appeal to all states that had not yet done so to place sensitive materials for civilian use (plutonium and enriched uranium) under international control.

In follow-up to this joint action, the EU is focusing its diplomatic efforts on the objective of achieving universal application of the NPT and strengthening the international system of nuclear safeguards (the IAEA's 93+2 programme).

2. Safeguards Directorate

Since the end of 1994 the Safeguards Directorate has been trying to establish links with other bodies working on the problem with the aim of exchanging information and creating synergy. In practical terms, there have been few confiscations of nuclear materials since the Munich airport case and it has not proved necessary to send inspectors.

Its administrative workload has been heavy, however. The Directorate is responsible for transmitting all information to the national authorities and the Joint Research Centre in good time. Furthermore, in respect of materials seized and stored, it must also ensure that all Chapter VII requirements of the Euratom Treaty, which are incumbent on any holder of nuclear materials, are complied with.

3. Cooperation between non-member countries and the Safeguards Directorate

The September 1994 communication described the programme of cooperation between Safeguards Directorate and the Russian Federation set up at the end of 1992. The short-term aim of this cooperation was to devise, set up and run a modern system of nuclear material accountancy and control. Parliament approved an allocation of ECU 1.8 million under this heading (B4-2001) for 1995. This programme has fitted in very well with other projects run by Community, national and industrial bodies.

The initial phase was successfully completed at the end of 1994 and focused on:

- training Russian experts in accounting, supervision and control of materials for Russians;
- inspection exercises in real on-site conditions;
- courses on the use of measuring instruments and computers.

These basic activities continued in 1995, complemented by intensive training courses (two months) for groups of four or five in Luxembourg.

Larger-scale projects are also being implemented: Russian specialists and Euratom inspectors join forces as a team to achieve a specific goal in respect of selected groups of installations or areas of Russia chosen by the Russians.

These activities and the main projects under way are described in Annex 2. One operation is particularly noteworthy since it was a "first": in November 1995 a team of Euratom inspectors was invited to join a Russian team to carry out, not an exercise, but a real inspection of two installations in the Dimitrovgrad region. It gave rise to an extremely fruitful exchange of know-how.

4. Role of the Joint Research Centre

Since 1994 the JRC in the form of its Institute for Transuranium Elements (ITU) has made a number of contributions to efforts to combat trafficking in nuclear materials:

- (a) It confirmed its role as a laboratory for analysing the materials seized, in particular by:
 - the isotopic analysis of the materials seized at Munich airport;
 - the comparative analysis of highly enriched uranium seized in Prague and Landshut;
 - the analysis of uranium seized at Mannheim;
 - the analysis of suspect radioactive substances for the German authorities and for the Italian authorities.
- (b) A number of courts have called on its expertise, the most significant instances being the Munich, Landshut, Konstanz and Böblingen cases but there were also six others in Germany.
- (c) The German authorities have asked the ITU to organize a seminar to inform the federal and Land authorities about the handling and analysis of substances liable to be smuggled.
- (d) The same authorities (Bundeskriminalamt and the Bundesamt für Strahlenschutz) have called on the ITU's expertise to design preventive measures to deal with the packets of nuclear materials associated with chemical explosives and in particular to study procedures to track these packets. It is currently working on appropriate techniques to do this.
- (e) It is continuing work on setting up a data bank on the characteristics of nuclear materials. With the Commission's help, Russian specialists will come to the ITU to provide information on the fuel cycle and so maximize its effectiveness.
- (f) An international technical working party on nuclear trafficking (set up on the margins of the P8) has decided to launch a round robin test to improve methods of identifying the origin of the materials seized and has drawn up a work programme for stepping up cooperation, especially as regards to the measures to be taken *in situ* when such materials

are found. The Community and some member and non-member countries are involved in the working party, which last met in Karlsruhe on 1 February 1996.

5. Technical assistance cooperation

The Commission explained in its communication of September 1994 that it had decided to use some Phare and Tacis funds to finance technical assistance in support of the efforts of the countries concerned to improve controls on nuclear materials. This decision, confirmed in 1995, won the unanimous support of the Member States at the meeting of the Phare-Tacis Management Committee. Details of the projects can be found in Annex 3.

- (a) In accordance with the conclusions of the Essen Summit, the priority for Community aid has been training in the framework of the Russian Methodological and Training Centre (RMTC) of Obninsk, the setting-up of which was officially announced by the Russian authorities in March 1995.

A detailed study of the RMTC course specifications is being drawn up with financing from the 1994 Tacis budget and terms of reference have been agreed by the JRC, the Ministry of Atomic Energy (MINATOM), the federal inspectorate (Gosatomnadzor) and those in charge of the Tacis programme.

But without waiting for the conclusions of this study the first round of invitations of tender to fill five posts was launched on the basis of a feasibility study and the first courses were given early this year. More ambitious invitations to industry to tender for the instruments needed by the RMTC will be published as soon as the detailed study is concluded. The JRC is acting as overall project leader, in close liaison with the appointed Russian counterparts.

This project is conceived in a very different perspective from the courses and seminars organised in the CIS and Central and Eastern European countries by the EU, the IAEA and other partners to serve more immediate goals. The RMTC should be seen as a longer-term project to set up infrastructure that will enable the Russians, and perhaps other countries, to assume responsibility for nuclear materials accountancy and control themselves.

- (b) If the Russian authorities and operators are to provide effective accountancy and control of nuclear materials at the basic installation level, a great deal of equipment will be needed that can only be designed and produced by Russian industry. To this end, a detailed study of the possibilities will be undertaken shortly. The bulk of the work will be done by the Russians themselves but the study itself will be carried out in the framework of tripartite Russia-EU-US cooperation with a view to drawing on the results of the "Lab to Lab" agreements with the Americans.
- (c) A detailed study will be carried out on the setting-up of a metrology centre for MINATOM and an analysis centre for GOSATOMNADZOR on the lines of the European centres (IRMM, ITU and JRC). These two centres will be housed in the premises of the Moscow Institute of Inorganic Materials.
- (d) The ITU's know-how will be made available to the Phare programme so that the authorities and laboratories of the Central and Eastern European countries can be given advice on the handling, treatment and analysis of errant nuclear materials. Specific requests for such help have been received from the Hungarian and Czech authorities. The terms of reference for technical assistance to these two countries under the Phare programme have been agreed. The Bulgarian, Polish and Ukrainian authorities have also expressed great interest in such assistance. The Phare-Tacis management committee approved it in principle in September 1995.

6. International Science and Technology Center

The Moscow Centre for Science and Technology has been up and running since March 1994. Its purpose is to convert the skills of armament specialists for use in non-military purposes. The Centre draws up, approves, finances and supervises scientific and technical projects for pacific purposes, first and foremost for Russian institutions and installations but also in the former Soviet republics, should these countries express interest. The Centre's projects may concern measures for the physical protection and accounting of fissile materials that draw on the know-how of scientists of the former Soviet Union.

One of the most interesting projects (cf annexe 3) is one to combat illicit trafficking in nuclear materials: the TOMSK/40 project concerns system design for safeguarding nuclear materials utilized at complex nuclear facilities (cost USD 815 000) and involves the development of a new approach to safeguards in a reprocessing plant.

The JRC is working with the Los Alamos National Lab and JAERI of Japan in a group responsible for the technical coordination of the Centre's project 40. This covers:

- appropriate techniques for destructive and non-destructive measures;
- interaction between the accountancy system for installation materials and the regional control authority;
- the planning of inspections and evaluation of their effectiveness.

The JRC is also providing assistance for a project in Kazakhstan to set up a complete prototype storage facility at Baikal 1 that will include surveillance and physical protection and an NMAC system.

A centre similar to the ICST (USTC) has been set up in Ukraine by Canada, Sweden, the US and Ukraine. It began work in May last year. Its Western partners have contributed some USD 14 million (the US 10 million, Canada 5 million and Sweden 1.5 million). The EU is planning to contribute an amount yet to be decided (ECU 3 to 5 million).

7. Cooperation from EU Member States

All operations are the subject of detailed and regular consultations between the Member States and the Commission. The aid provided by some Member States since 1992 has mainly consisted in the organization of seminars and exchanges of experts with the former Soviet countries. More concrete projects are also starting up, examples being the direct cooperation between a reprocessing plant in the UK (BNFL) and one in Russia (Mayak RT-1) and between French (EDF) and Russian (Rosatomenergo) nuclear power stations. Sweden, Finland and Germany have concentrated their efforts in the Ukraine, Kazakhstan and the Baltic states, and in particular the development of a local accountancy system for nuclear materials.

Finland, which has a 1200 km border with Russia, maintains close contacts with Russian federal and regional authorities so that it can constantly monitor the risks and strengthen border controls, both by helping the Russians and by developing its own installations.

8. Cooperation with the United States

A new Euratom-US Department of Energy agreement to cooperate on nuclear guarantees R&D was signed on 6 January 1995 by Mr Contzen of the Commission on behalf of Euratom and Mr Keliher for the DOE. The agreement provides for "scientific coordination of both parties in efforts to transfer nuclear safeguard technologies to other countries, upon their request, in order to improve the effectiveness of their national safeguards systems". Talks with the DOE and representatives of major laboratories showed that the Americans are keen to work closely with the Community and ensure that efforts are complementary, so avoiding overlaps and optimizing the use made of limited financial resources. The study on what can be offered by MINATOM and Russian industry is a good example

of this. Cooperation will now extend to training where there will true interaction between separate projects:

- use of safeguards in a plant converting uranium and producing fuel;
- development of instruments for measuring, identifying and maintaining surveillance of nuclear materials;
- training operators and inspectors;
- close technical cooperation concerning analysis procedures, reference materials and new methods of defining suspect consignments.

III. RADIOPROTECTION ASPECTS

Smuggling and other illegal or uncontrolled activities with radioactive substances or nuclear material imposes considerable danger to the public and the environment. Most of the radioactive contraband that has been confiscated or detected by Member States authorities were radioactive sources, substances for industrial or medical use and contaminated metal scrap. Since the competent authorities of the Member States recognized the seriousness of the dangers arising from illicit nuclear traffic, many efforts are being made in order to attack the problem. Many of these activities are executed in close cooperation with the Commission.

I. Legal initiatives

- **Basic Safety Standards:** the performance of an effective combat against the illicit nuclear trade is much depending on the legal situation in the Union, in Member States as well as in third countries. The Member States subsume trading with radioactive substances in different legislations and consequently violations are prosecuted and punished differently. In the Central European and Eastern countries and countries of the CIS, most of the national legislations are in transitory situations, changing from old soviet-law to individual national legislation. Within the EU, this unequal legal consideration of trading in radioactive substances may change when the new Basic Safety Standards will be in force. It enlarges the field of application of European radiation protection legislation. The new Article 2 includes import and export into and from the EU. It provides the advantage that national regulations in relation to import into the EU of radioactive substances may be harmonized. The Commission has invited Member States authorities to a meeting in July 1996 in order to discuss possibilities to reach this objective. Consequently, it will be more difficult for professional dealers to find pathways through different European legislation in order to establish networks for illegal trading in radioactive substances.

Furthermore, Article 45 of the Basic Safety Standards Directive at present in force provides that Member States shall stipulate measures to be taken by the competent authorities with respect to health of the population and in particular of groups of the population who are liable to receive a dose in excess of the limits.

- **Directive on Information of the Public:** complementary to Article 45 of the Basic Safety Standards, the Council enacted a Directive on the information of the public in the event of a radiological emergency. As defined by Article 2 of this Directive, illicit trade and trafficking in radioactive substances and nuclear material is not directly considered as a situation where a nuclear emergency requires the Member States to take special initiatives and actions in order to safeguard the health of the population. This Directive will undergo revision when the new Basic Safety Standards will be adopted by the Council. The Commission will take this opportunity to discuss to what extent illicit trade should be covered by this Directive.

2. Cooperation with international organizations

The EU cooperates with the IAEA *inter alia* on ways of detecting radioactive substances at borders, and sends information to the IAEA database listing seizures of such substances worldwide. The IAEA has worked well as a clearing house for this purpose, and the Commission for its part has often been instrumental in advancing the work there. Participants have on a number of occasions expressed enthusiasm for the results, which can be summarized as follows:

- exchange of information on initiatives under way in related fields;
- organization of joint activities including seminars, information packages, drafting of procedures to be followed in the event of problems;
- creation of an informal network of contacts accessible at any time.

The last-mentioned is of particular importance given that a notable feature of the discussions and meetings dealing with nuclear trafficking is the sheer range of participants involved, from many different walks of life. Apart from police and other representatives dealing with these issues as a matter of course there may be spokesmen representing corporate interests concerned with protection of employees or of their particular sector. Representatives of the WCO (World Customs Organization), IATA (International Air Transport Association), the ICAO (International Civil Aviation Organization), IFALPA (International Federation of Air Line Pilots Associations), the IMO (International Maritime Organization), INTERPOL, EUROPOL and the UPU (Universal Postal Union) may be seated round a table with the UN, the IAEA and the Commission.

IV. CUSTOMS COOPERATION

1. On 22 November 1994 the Directors-General of Customs approved a twin-track action programme drawn up by the Commission involving tighter controls at the external frontier and measures to combat actual trafficking. A number of steps have subsequently been taken:
 - (a) At a meeting on 9 and 10 February 1995 the Community's Deputy Directors-General of Customs approved a draft paper on general risk analysis guidelines and called for the emphasis to be placed on application of these techniques to nuclear materials. A section on sensitive products, including nuclear materials, is accordingly to be added to the guidelines and the plan is ultimately, in liaison with the other Commission departments concerned, to draw up risk analysis sheets for this among other fields.
 - (b) As part of the MATTHEUS Programme the Commission organized a seminar in Vienna (23-25 October 1995) on the radiological aspects of nuclear trafficking. This was attended by over 90 participants from EU countries, 15 Central and East European countries and the CIS, and provided an opportunity to draw the attention of all concerned to the issue of radioprotection; it is to be followed up by special training courses for customs officials from EU Member States and the Central European countries concerned. These will take place over the next few months in Member States sharing borders with East European countries. Already the Commission has collaborated with the Finnish Centre for Radiation and Nuclear Safety to hold two courses for a total of 50 customs officers, and similar courses are to be run shortly by the Austrian and French authorities. Plans are also being discussed for similar projects in the UK, Denmark and Italy. The aim of these courses, which deal with the use of measuring equipment for the detection of radioactive substances and other nuclear materials, is to upgrade the skills of customs officers responsible for controls at the frontiers.
 - (c) Customs have been invited to make greater use of the SCENT/CIS electronic mail network which links the Commission and 350 terminals throughout the Community and allows the direct real-time exchange of operational information on known or suspected cases of trafficking.

2. The Commission is also preparing a brochure for customs departments which will provide officials directly with practical information for use in suspicious cases.
3. The Commission's technical assistance to CIS countries under the Tacis programme includes measures to control nuclear trafficking. It has already supplied detection equipment (eight radiation testers to Kazakhstan and five to Ukraine) and plans further operations of this type. Under the Phare programme the Commission approved a programme in November to facilitate transit which incorporates technical assistance for the prevention of nuclear trafficking. Requirements in this and other fields are currently being assessed.
4. The customs mutual assistance protocols to the various agreements concluded by the Community (alone or jointly with the Member States) with non-member (e.g. Central/East European and CIS) countries provide the authorities in the contracting parties with a basis for administrative cooperation in the fight against trafficking of nuclear materials and radioactive substances. Since the entry into force of the interim agreements with Russia and Ukraine on 1 February, the protocols can be used for cooperation with those countries on matters covered by the Euratom Treaty.
5. The Commission is negotiating customs cooperation agreements with the Community's main trading partners (the United States and Canada) which include mutual assistance clauses covering the areas governed by Community provisions, including matters coming under the Euratom Treaty. It also cooperates with the United States in this field, *inter alia* on training for relevant officials, in the context of regular bilateral contacts on customs matters.

V. JUSTICE AND HOME AFFAIRS

1. As proposed in the report on illicit traffic in radioactive substances and nuclear material presented to the European Council of Essen in December 1994, the mandate of the Europol Drugs Unit (Europol's forerunner until the ratification of the Europol Convention) was extended to illicit trafficking in radioactive and nuclear substances by a Joint Action of the Council in March 1995. The EDU has held a workshop of law enforcement officials from Member States in which seizures have been made and has organised a European Conference on illicit trafficking with experts from the MS, the Commission and International Organisations on 26/27 October 1995. At this Conference, the experts recommended several projects for the EDU by which the cooperation and exchange of information among Member States can be improved (creation of an immediate notification system on seizures, installation of a EU Law Enforcement Database, updated list of competent national agencies, quarterly EU situation Report, threat assessment analysis, comparative study of national legal instruments, equipment review). When the Europol Convention does come into force, illicit trafficking in nuclear and radioactive substances continues to be one of Europol's important objectives. According to Article 2 § 2 Europol shall initially act to prevent and combat unlawful trafficking in nuclear and radioactive substances. As set out in the annex to the Convention "crime connected with nuclear and/or radioactive materials" means the criminal offences listed in Article 7 (1) of the Convention on the Physical Protection of Nuclear Material of 1980 and relating to the nuclear and/or radioactive materials defined in Article 197 of the Euratom Treaty and Directive 80/836 Euratom of 15 July 1980.

Further work among Member States in the third pillar in 1995 related to a first evaluation of a questionnaire on details about the fight against illicit trafficking which had been distributed by the German Presidency. It shows differences with regard to the threat assessment in general, the existence of permanently installed technical equipment at land borders, seaports and airports as well with regard to bilateral agreements with the CEEC and the CIS. The proposals for possible actions within the EU, as agreed by the Steering Group II and endorsed

by K.4 Committee in November 1994, have partly been examined and endorsed by the European Conference of the Europol Drug Unit.

The Italian Presidency wishes to organize during the first semester of 1996 a seminar on the illicit traffic of nuclear material and radioactive substances in the framework of customs cooperation under Title VI of the TEU.

2. With regard to the cooperation with third States, the Justice and Home Affairs Ministers of the EU and the CEEC met for a Conference on Combatting Drug Crime and organized Crime in Europe in September 1994 in Berlin. They declared to develop the cooperation inter alia in the fight against crimes involving radioactive and nuclear material and agreed to examine certain means of cooperation as preparation of joint situation assessment, cooperation with regard to the protection of radioactive and nuclear stocks, the setting up of coordinated reporting channels and mutual assistance of the prosecuting authorities. In June 1995, a seminar of the EU Member States and the CEEC on police cooperation to combat drugs and organised crime was held as part of the structured dialogue which specified methods of cooperation in different fields of organised crime, including illicit trafficking of radioactive and nuclear material. In the field of judicial cooperation in criminal matters, the Justice and Home Affairs Ministers of the EU and the CEEC agreed at its meeting on 25 September 1995 on an action programme to fight international organised crime which underlines, amongst other things, the need to sign and ratify the 1980 Convention on the Physical protection of Nuclear Material as well as the appropriateness of the criminalization of the theft and trafficking in radioactive and nuclear material not covered by the 1980 Convention.

With regard to the relations of the EU with Russia, combatting illicit trafficking in nuclear and radioactive substances was identified by the K.4 Committee as one of the matters which should be fostered according to the Conclusions of the General Affairs Council of November 1995.

CONCLUSIONS

The Commission considers that the activities described above to a certain extent fulfil the mandate given it by the Essen European Council. In some areas the EU's work and decision-making needs to be taken further and speeded up, in conjunction with non-EC partners. The Commission is ready to present the necessary proposals and will continue the work already well under way. It also considers that these activities represent a substantial degree of implementation by the EU of the programme of action against nuclear trafficking adopted at the Moscow Nuclear Summit, to whose preparation the EU contributed. In the field of cooperation on justice and home affairs the Commission will work closely with the EDU and international organizations to make a constructive contribution to Member State initiatives implementing the Essen conclusions.

COOPERATION WITH THE REPUBLICS OF THE FORMER USSR UNDER THE EXISTING CONTRACTUAL FRAMEWORK

Partnership agreement with Russia

Article 84 of the Agreement signed on 26 June 1994 deals with cooperation on the prevention of illicit activities. This is based on two-way consultations and close interaction; technical and administrative assistance is also provided. Implementation of cooperation activities under this article is determined by specialist Council working parties.

An agreement with Russia covering trade in nuclear materials is expected to be concluded by January next year and this might incorporate provision for measures to prevent nuclear trafficking.

Partnership agreement with Belarus

The agreement signed on 6 March 1995 contains a clause (Article 79) specifically on nuclear trafficking which reads as follows: "The parties agree on the necessity to make efforts to cooperate, within the framework of their respective powers and competences, in order to combat nuclear smuggling. Cooperation in this area should include exchange of information, technical support for analysing and identifying the material, administrative and technical assistance for the installation of efficient customs control. Further cooperation in this field could be identified as need arises."

Agreements have also been concluded with Ukraine, Moldova, Kyrgyzstan and Kazakhstan.

The first three make no mention of the prevention of illicit activities but the agreement with Kazakhstan incorporates a clause providing for cooperation in this field, i.e. the same as Article 84 of the agreement with Russia.

The agreements with **Georgia, Armenia** (initialled 15 December 1995) and with **Azerbaijan** (initialled 18 December 1995) also contain provision for certain aspects of prevention of illicit activities.

All the partnership and cooperation agreements provide:

- either for an agreement on trade in nuclear products (Ukraine, Kazakhstan, Kyrgyzstan and Uzbekistan,
- or for the possibility of such an agreement if necessary, failing which the Euratom Treaty applies (Belarus, Moldova, Georgia, Armenia, Azerbaijan).

CO-OPERATION IN THE FIELD OF SAFEGUARDS

Introduction

1. The co-operation between Euratom and the Russian Federation in the field of safeguards was initiated in 1992 and formalised in 1993. Member States of the European Union, the European Parliament and the Commission realised that immediate efforts were required to cooperate in the field of nuclear safeguards with CIS (Commonwealth of Independent States) republics, including, notably, the Russian Federation. The objectives were:
 - To upgrade the nuclear materials accountancy and control system in CIS republics to the same standards as those maintained in countries which have substantial nuclear programmes.
 - To help to ensure that such a system would comply with the safeguards requirements of the International Atomic Energy Agency (IAEA) and;
 - As a consequence, to contribute to the non-proliferation of nuclear materials and to the minimisation of hazards to the public through the illicit transfer of nuclear materials.
2. Due to the need to make optimum use of the limited resources, a first phase of co-operation with the Russian Federation was carried out during 1993 and 1994, following the provision of funds by the European Parliament under budget line B4-2001. A meticulous co-ordination structure - i.e. project-oriented - was agreed with the Russian authorities that proved efficient in respect of transparency, documentation of the results, project management and resource allocation.
3. The permanent participants in this co-operation are:
 - Gosatomnadzor (GAN) - the Russian federal inspectorate;
 - the Ministry of Atomic Energy of Russia (Minatom) which is the major nuclear operator in Russia;
 - the Euratom Safeguards Directorate (DCS), DG XVII-E, and
 - the Community's Joint Research Centre (JRC).

Moreover, right from the start, participation and support were requested and obtained from Member State authorities and, notably, from operators of nuclear installations in the European Union. Without this support the training activities performed during the first phase would have remained largely academic.
4. A first phase of the co-operation - essentially related to training and the elaboration and discussion of concepts and approaches - was completed at the end of 1994; three application projects (see below) were initiated as a second phase of the co-operation in 1995, in parallel with continuation of seminars and training activities.

Results of the first phase

5. The actions carried out in 1993 and 1994 may be subdivided as follows:
 - Training and familiarisation;
 - Nuclear materials control system design;
 - Seminars;
 - Inspection exercises.

The objectives of these actions were to familiarise the Russian participants with the preparation, execution and evaluation/conclusion of inspections as carried out by Euratom.

In December 1994 the experience gained was evaluated during a workshop. The main conclusions were that inspection activities or exercises provided essential 'on the job' training and that they should be expanded to further types of installations.

6. The cost of the first phase of the Euratom - Russian Federation co-operation in safeguards amounted to 1.5 Mio ECU. This expenditure was financed from the budget line, made available by the European Parliament.

The Second Phase of the Co-operation

7. After completion of the first phase of the Euratom - Russian Federation co-operation in safeguards, the Russian side officially proposed four major projects,⁽¹⁾ all relating to the practical implementation of Nuclear Material Accountancy and Control (NMAC) in Russia, based on the results of the first phase described earlier. One of the projects had to be abandoned. Three are pursued with success. These projects, usually coded MINS, PROCS and CISNER-project, are described in some detail later in the document. The Russian side has outlined on record the vital importance of all these projects, their appreciation of the work performed and the usefulness of the results achieved, which they described as very significant and essential.
8. The idea underlying the applications projects was that the Russian experts would achieve the design of relevant systems, concepts and approaches through day-to-day contacts, discussions and co-operation with the corresponding Euratom staff, while the necessary design tools (e.g. computers, documentation) and infrastructure would be made available by the Commission.
9. Further projects have been added to this list during the meeting of the Joint Co-ordination Group (JCG) in December 1995. Amongst these, it is envisaged to prepare a further "Physical Inventory-Taking and Verification Project (PITV)" in complex nuclear facilities. This project is proposed to include:
 - The utilisation of Euratom experience in methodological aspects for the development of the methods and procedures at the selected installations;
 - The practical execution of physical inventory-takings and verification;
 - Testing of Euratom safeguards equipment and instruments during the practical part of the project;
 - Training in nuclear material accounting and physical inventory-taking of the plant personnel at the research centre.
10. The total cost is evaluated to be some six million ECU, of which the Euratom contribution is estimated at about 3 MECU for 1996 and was about 1.8 Mio ECU for 1995; the Russian side is expected to contribute at least the same amount but mainly in terms of manpower.

Conclusions and Recommendations

11. From the first 3 years of the Euratom - Russian Federation co-operation in the field of safeguards it may be concluded that:
 - The training and design phase was completed by the end of 1994.

⁽¹⁾ Later reduced to 3 due to difficulties of access to data for Gosatomnadzor inspectors.

- The second-project oriented-phase must be encouraged and pursued because it appears to be the best means to introduce effective modern nuclear material accountancy and control by involving a maximum of executive staff from the beginning.
- The results are encouraging and their value has been officially recognised by the Russian partners as significant and essential;
- Some practical problems are, however, impeding faster progress: the language barrier, the obtaining of visas for Russian experts at short notice, problems of logistics such as transport of instruments to Russia, limited manpower resources.
- Euratom safeguards has also benefited from this co-operation, as DCS staff were required to reflect on and to describe Euratom safeguards to outsiders who professionally reviewed its methodology and practices.
- The funds made available by Parliament were sufficient.

DETAILED INFORMATION ON THE ONGOING PROJECTS

1. MINATOM CENTRALISED INFORMATION SYSTEM (the MINS project)

1.1. Project description

The MINS project (MINATOM Computerised NMAC Information System) was established jointly between Minatom, the main operator of the Russian Federation and the Euratom Safeguards Directorate. It comprises the study, design, specification, realisation and implementation of a centralised and computerised information system for Minatom. It was decided that MINS should concentrate at first on a centralised headquarters system, linked to computerised work places at two nuclear power plants, at one Low Enriched Uranium (LEU) fuel fabrication plant and at the controlling operator organisation(s). The outcome of the project should provide Minatom with a solid informatics and accountancy platform, which must enable the various users to gain experience with a computerised system and which the responsible Russian organisations can subsequently extend to a comprehensive computerised NMAC system for the entire fuel cycle in the Russian Federation.

The general **objectives** of the MINS project can be summarised as follows:

- development of a regulatory framework and accompanying document
- improvement of the centralised information (headquarters) system
- improvement of the NMAC system at facility level (computerised work stations)

MINS includes the following features: high system reliability, optimum use of modern technology for fast and secure information transmission and processing, extensive database for storage and management of NMAC data.

Given the scope of the project, the following **organisations** participate:

- MINATOM, the Ministry of Atomic Energy of the Russian Federation, which is the requesting Authority and eventually responsible for the implementation;
- TSNIAtominform, which is a large research and information handling institute depending from Minatom; a specially created section of Atominform has been entrusted to carry out the majority of the work involved in MINS;

- ROSENERGOATOM: a public organisation ('operator organisation') grouping and supervising most of the RF nuclear power plants;
- TVEL, the public organisation ('operator organisation') to which belongs the LEU fuel fabrication plant at Novosibirsk;
- VNIIA, scientific research institute for automation;
- VNIINM, scientific research institute for inorganic materials;
- GOSATOMNADZOR, the RF federal safeguards Authority;
- EURATOM, the partner providing information and expertise.

1.2 Project evolution and status

The MINS project was started officially in September 1994. The period from September 1994 to July 1995 allowed both sides to get to know each other's working methods, to organise fact finding missions and to establish a preliminary work schedule.

The current project team comprises 21 team members (7 from Euratom) plus an additional 10 to 15 specialists on the Russian side who get involved depending on specific tasks to be carried out. The project is expected to be completed by the end of 1999.

As a result of intensive periods of information exchange, the Russian experts issued a substantial number of technical notes including a detailed feasibility report. The system's architecture had been drawn up and relevant documents have been translated and discussed in technical meetings.

Today the project has arrived at a turning point: the nuclear power plants to be included in MINS were chosen to be Kalinin (WWER1000) and Smolensk (RBMK 1000). The fuel fabrication plant will be the LEU plant at Novosibirsk. Each will be equipped with appropriate computerized workstations. Also the operator organisation ROSENERGOATOM, controlling the nuclear power plants and the central MINATOM office itself will receive appropriate workstations.

With the initial analysis and feasibility completed, the focus is now on equipment acquisition and installation, specific training and preparation for the programming of the database management system. A first delivery of equipment is reasonably expected for mid 1996.

2. PHYSICAL INVENTORY TAKING PROCEDURES: the PROC project

2.1. Project description

The PROC project was established between Minatom, Gosatomnadzor and the Euratom Safeguards Directorate for the development of joint recommendations on Physical Inventory Taking (PIT) PROCedures at WWER-1000 Nuclear Power Plants and a LEU Fuel Fabrication Plant.

The intention was to cover the whole range of activities relating to physical inventory taking: accounting system arrangements, records audit, documentation, physical preparation, organisation.

2.2. Project evolution and status

The project work started in July 1994 and was finalised in February 1996.

- The specific plants chosen for the exercise were the Kalinin WWER-1000 Nuclear Power Plant and the NOVOSIBIRSK LEU Fuel Fabrication Plant. Technical information about plant operations, material accounting arrangements and, in particular, on physical inventory

procedures has been provided by the operators. Both plants have been visited by the project team to review the information provided and examine the materials accounting and physical inventory arrangements.

- The second stage was the production of the documents. Euratom provided general recommendations on physical inventory taking and this was translated into Russian, discussed and agreed. Following this Euratom produced two documents providing recommendations on physical inventory taking in Nuclear Power Plants and in LEU Fuel Fabrication Plants. Finally the operator (Minatom), on the basis of the agreed guideline documents, produced specific PIT procedures for the Kalinin and Novosibirsk plants, including operational preparation, inventory methods, evaluation etc.
- It was agreed that the 5 documents produced in the project (each available in English and Russian) would be implemented in the following project (PITV - full PIT exercises followed by physical inventory verification (PIV) by Gosatomnadzor). The documents may then be reviewed in the light of experience.

3. PHYSICAL INVENTORY TAKING AND VERIFICATION; the PITV Project

3.1. Project description

This PITV project is a follow-up project of the PROC project. It will offer the opportunity to apply, test and evaluate in practice the documents produced during the PROC and PITV projects. Therefore all three organisations involved are very interested in the results of this project.

The PITV project was established between Minatom, Gosatomnadzor (GAN) and the Euratom Safeguards Directorate (ESD) for two consecutive Physical Inventory Takings (PIT) with Euratom participation at Kalinin Nuclear Power Plant (NPP) and Novosibirsk LEU fabrication plant based on the recommendations and procedures produced during the above referred to PROC project, and Physical Inventory Verifications (PIV) performed by GAN according to PIV recommendations and procedures to be developed during this project.

The intention is to apply, test and if necessary revise the recommendations and procedures for PITs produced during the previous PROC project and to develop recommendations and procedures for PIVs. To cover a complete Material Balance Period (MBP) two consecutive PITs will be performed at Kalinin NPP and the Novosibirsk LEU fabrication plant followed by PIVs performed by GAN after the second PITs.

3.2. Project evolution and status

- 3.2.1. The project has just started with a preliminary meeting between the three above-mentioned organisations in February 1996 in Luxembourg and is expected to be finalised in 1998.
- 3.2.2. The initial PITs at the two installations chosen will be performed probably towards the end of 1996.
- 3.2.3. The second PITs closing the MBPs are planned for the end of 1997, followed by the PIVs performed by GAN. Use of measurement instrumentation and computers will be considered for PITs and PIVs.

4. COMPUTERISED NUCLEAR MATERIAL ACCOUNTING; the CISNER Project

4.1. Project description

The CISNER project was established jointly between Gosatomnadzor (GAN), the Russian federal control agency, and the Euratom Safeguards Directorate for the development and implementation of a computerised nuclear material accounting and Control Information System for the North-European Region of Gosatomnadzor (GAN).

The system to be developed will be a multi-level nuclear material accounting and control system involving all the levels of information flow from the plant operator, over the local GAN inspector, the GAN field office up to the GAN Regional Headquarters in St. Petersburg. The system will have following features and characteristics : rapid transmission and processing of information, high reliability of the information transmitted and processed, high system reliability, reduction of routine work to a minimum, creation and maintenance of a database for nuclear material accounting and control in the North European Region of GAN and the development of computerised tools to optimise decision making.

4.2. Project evolution and status

The actual project work started in November 1994 and is expected to be finalised in December 1997.

The project started with the analysis of the existing nuclear material accountancy and control systems in the installations which are part of the project. Visits to the installations were made: these have shown that in most of the cases some form of local nuclear material systems existed and in some cases were being updated to include, eventually, requirements for international safeguards.

The visits also revealed that the actual inspection work of Gosatomnadzor is limited to accountancy and consistency checks. Physical verifications are marginal as no safeguards equipment, e.g. NDA instruments, seals or surveillance systems, is available. It was therefore decided to enlarge the CISNER project to include the procurement and installation of the safeguards instrumentation necessary to control the plants and training of the Gosatomnadzor inspectors in the use of the equipment.

In parallel the work on the development of the computerised data handling and treatment system started. The data flow related to nuclear material accountancy and control involve the installations themselves, the local Gosatomnadzor inspector, the Gosatomnadzor field offices in Sosnovy Bor, Murmansk, Severodinsk, Kurchatov and Desnogorsk and the North European District Directorate of St. Petersburg.

In order to divide the project into manageable items, a pilot project was defined involving one nuclear power plant and all levels of communication from the plant operator, via the local and field offices of Gosatomnadzor, to the main regional Gosatomnadzor office of St. Petersburg.

The pilot project has been defined in detail, hardware and software procurement and development is under way. It is expected that the first equipment will be delivered by mid 96. After successful testing of the pilot system, the system will be expanded to the other installations of the project based on a priority list defined by Gosatomnadzor.

**Projects implemented or under preparation
in the framework of Phare and Tacis**

I. Co-operation with the Russian Federation on illicit trafficking

Co-operation in design and development of a data base system for the identification of nuclear material of unknown origin

Partner : Non Organic Chemistry Institute, Moscow

Objective :

- a) definition of characteristic parameters of nuclear material used in the countries of the FSU.
- b) establishment of characteristics of processes and production facilities (reprocessing, fuel fabrication, reactors, enrichment plants) for individual plants in the FSU.
- c) selection of materials which should be further characterized and kept in an archive at ITU for reference purposes.
- d) completion of the ITU data base with general data from the former COMECON states and a more detailed data base at the Non-Organic Chemistry Institute.
- e) elaboration of a consultation scheme to analyse and interpret analytical results by means of the data bases at ITU and the Non-Organic Chemistry Institute.

II. Cooperation with the Russian Federation on the up-grading of the safeguards and Nuclear Material Accountability and Control (NMAC) system

II-1. Review of Needs

As explained in the previous Communication, the knowledge and assessment of the detailed technical needs for the creation of a NMAC system is fundamental for the effectiveness of the co-operation with the Russian Federation in establishing a technical infrastructure.

Therefore, the Commission proceeded with a re-assessment of these needs in close cooperation with the Russian authorities, MINATOM and GAN, taking into account the specificity and the extent of the nuclear fuel cycle to be safeguarded and the type of safeguards system that will be applied:

- a) at the facility level:
 - each nuclear facility must have a detailed nuclear material accountancy system for all the nuclear material that is received, shipped, processed or stored. Accurate measurements and the uncertainty of these measurements are required.
 - Needs: a study defining the specificity of NMAC for the different parts of the fuel cycle has to be performed. Training, regulatory aspects and the establishment of facility specific rules are very important at the initial stage of implementation of the new safeguards system. Furthermore, needs: for each type of facility, appropriate material balance and statistical accountancy evaluation procedures, as well as a list of the most appropriate instruments and measurement systems has to be established. The necessary technical support and training have to be provided for this purpose.
- b) at the authority level:
 - the inspectors have to verify, in an independent way, the declarations made by the individual plant operators.
 - Needs: this implies training of inspectors and facility personnel in charge of accounting and independant analytical capabilities, as well as a computerised data base for the collection, the retrieval and the analysis of the accountancy data and for the collection of the inspectors findings. Measurement techniques adapted to each type of plant and the respective proper instrumentation has to be made available for inspections.

II-2. Education, Training and Development of Safeguards Methodologies

As mentioned in § II.-5.a) of the document, the Russian Federation has decided in March, 1995 to create the "Russian Safeguards Methodological and Training Centre", called RMTC, at the Institute of Physics and Power Engineering (IPPE) at Obninsk in the Kaluga Region, near Moscow. The RMTC will be mainly oriented towards the training of inspectors and of plant operators depending from MINATOM and other organisations.

The Centre will be realized modifying existing premises, already licenced for the use of bulk quantities of nuclear materials (U, Pu). The structures will consist of class rooms for theoretical lessons and of laboratories where hands-on training will be given on nuclear materials measurements. Instruments will be provided through Commission (TACIS) support, as well as nuclear material standards and reference materials.

The education and training programme is made-up of basic courses that will be common for inspectors and plant operators (Principles of NMA&C, verification techniques) as well as specific courses for separately operator or inspectors, regarding NMA or inspection procedures. A study is now being performed by the JRC, IPPE (MINATOM) and GAN to determine the detailed technical specifications for each of the course modules (taking account of the quite new Russian legislation), the required training facilities, the instrumentation, the reference materials and data evaluation capabilities.

For the first phase of the implementation of the training centre, the JRC and IPPE are now co-operating, in the framework of the TACIS programme, to create five training courses, addressing specific evaluation and measurement techniques of interest both to plant operators and inspectors. The first courses for trainers will be organised in the near future at the JRC, Ispra. The first training courses at IPPE, Obninsk, are expected to start in June 1996.

Furthermore, upon special request by GAN, measurement techniques oriented courses and physical inventory verification exercises have been and will be organised at the JRC. These courses will be transferred to Obninsk, when the RMTC will be fully operational.

The RMTC is also very important as a forum and a meeting point between plant operators and inspectors. They would, through discussions and common seminars, understand their respective obligations and how these can be complied with given the present state of the Russian nuclear industry. An R&D programme on safeguards concepts and methodologies is also expected to be put in place as the RMTC develops.

II-3. Generic Scientific and Technical Support

As the Commission stressed in its previous Communication, the setting up of a fully reliable safeguards and NMAC system needs specific installations for operators and/or inspectors. The modalities for the establishment of these installations are still under discussion with the Russian authorities. The main lines, as well as the location have already been agreed and a mission of Commission experts is expected in Russia soon in order to elaborate with Russian specialists the terms of reference for these projects.

The purpose of the proposed cooperation is the provision of consultancy to GAN and MINATOM, the exchange of practical experience. It is also envisaged to provide some instrumentation but this will depend on the availability of relevant equipment in Russian laboratories.

II.3.1. Metrological Centre for Measurements of Nuclear Materials

In co-operation with experts of different laboratories, it should:

- a) define the state of the practice for routine applications of different measurement techniques applied to nuclear materials,
- b) provide a basis for a quality control programme to regularly monitor the measurement capabilities in different facilities and in analytical laboratories.

II.3.2. Safeguards Analytical Capabilities

The samples taken by safeguards inspectors need to be analysed with a high level of accuracy by destructive analysis techniques and in some specific cases also by non-destructive assay methods.

GAN has expressed a great interest in establishing the technical capabilities and required infrastructure to implement various approaches, according to the specific needs. Furthermore, the independent analysis of "vagrabonding" material is also a requirement gaining an increasing interest.

II.3.3. Instrument Development and Procurement

Very few instruments are used at present in Russian nuclear facilities for the implementation of NMAC system. However, several laboratories in the Russian Federation have a large experience in the development of instrumentation for process and quality control in production facilities and nuclear measurements for sensitive equipment in research centres.

The purpose of the co-operation between Russian and European R&D laboratories and industry is to:

- a) review the existing technologies available and evaluate their possible use or adaptation to NMAC purposes,
- b) define specific projects aiming at the development of new instruments suited to the implementation of NMAC.

On the basis of the results obtained, relations should be established between the Russian industry or production laboratories and European industry, in order to develop an industrial production of instrumentation in Russia.

III. Co-operation with Phare countries on illicit trafficking

III-1. FONSAFE (Forensic Nuclear Analysis for Safeguards) Project with Hungary

Partner : Hungarian Atomic Energy Commission

Objective :

- a) improve the capacities for analysis of nuclear material seized in Hungary particularly in the field of NDA measurements of the nuclide concentrations of U and Pu and NDA determination of the matrix.
- b) organise intercomparisons of NDA measurements and equipment.
- c) extend the data base at ITU by all the related data and results of measurements made accessible by the Institute of Isotopes, which is responsible for the identification and measurement of nuclear material seized in Hungary.
- d) establish a procedure to assist Hungary - upon request - in the measurements of the seized nuclear material and in the definition of its origin and intended use including:
 - measurements in ITU on sub samples provided by Hungary or on the seized material itself, in case of Pu, with the understanding that the remaining material will be shipped back to Hungary,
 - common analysis and interpretation of the results based on the ITU database.
- e) receive a Hungarian expert for about a month, who will study the experience acquired in the above field.

III-2. FONSAFE Project with the Czech Republic

Partner : State Office for Nuclear Safety of the Czech Republic

Objective :

A. In the beginning, a supplementary analysis of nuclear material seized in the Czech Republic will be performed at ITU. For efficient transfer of know-how and experience, two Czech experts are to be involved in the following activities for twice three months and once six months:

- 1) shipment of a sample of the highly-enriched uranium (HEU) material seized in Prague from November 1994 to June 1995 to ITU for extended analyses covering radionuclide and chemical impurities;
- 2) evaluation of analytical data for revelation of the possible origin of the material;
- 3) development of selected parts of a relational database system for nuclear material at ITU.

B. In the second phase the contractor and his experts will assist NRI in the following tasks:

- 1) upgrading of laboratory equipment of Central Analytical Laboratory in order to improve the in-house analytical capabilities;
- 2) analysis of HEU reference materials from the former Soviet Union.

C. One or two workshops with Czech and EU representatives are to be organized to exchange experience in the area of treatment and analysis of nuclear material.

III-3. Other FONSAFE Projects

Similar but country - specific projects are in preparation for Bulgaria and Ukraine (more emphasis on assistance in on-site handling and identification of radioactive materials by NDA). Furthermore, the other Phare countries have expressed their interest for similar collaboration.

IV. Co-operation in the framework of the ISTC

IV-1. ISTC project 40

Project Purpose: to develop an upgraded approach for safeguarding complex & sensitive nuclear fuel cycle facilities at Tomsk 7.

Expected Results of the Project will consist of:

- a) development of regulatory criteria applicable for nuclear material accountancy at specific types of fuel cycle facilities, based on feasibility studies for measurement systems development, application of inspectorate field equipment, application of containment and surveillance measures;
- b) development of regulatory requirements for inspection procedures and scope;
- c) development of a model approach for nuclear material data transmission and data treatment in regional supervising office;

The Russian participants are coming from GAN, Minatom, the Tomsk 7 Chemical Plant and several institutes.

IV-2. ISTC project K-57

Creation of system for storage, operative control and physical protection of nuclear materials and ampoule sources of ionizing radiation (ASIR) on "Baikal-1" stand complex meeting the international requirements of radioactive materials control and accounting.

Partner : Institute of Atomic Energy of the National Nuclear Center of the Republic of Kazakhstan

The main objectives of the project are focused on the development of the technology for storing, operative control and physical protection of nuclear materials and ASIR as well as on the development and implementation of systems of control, accounting and physical protection for nuclear materials and ampoule sources of ionizing radiation stored on the "Baikal-1" Stand Complex.