EURATOM SUPPLY AGENCY

Annual Report 2002

Contents

OVERVIEW

In 2002, about 34 % of the electricity of the EU was produced from nuclear fuel. Supply of nuclear fuels to the EU utilities remained stable. The situation of the market was similar to that observed in 2001. Supply of natural uranium and services throughout the fuel cycle satisfied the demand. However, with rationalisation and concentration of production in a small number of suppliers as well as buyers, following mergers and acquisitions over the last few years, the nuclear fuels market tended towards a delicate balance.

Worldwide primary production of natural uranium dropped slightly relative to 2001. As has been the case for several years now, it amounts to just over half of the world requirements. Secondary sources, essentially stockpiles of uranium, re-enrichment of tails and, to a lesser extent, recycling of uranium and plutonium have made up the difference between requirements and production. Although shortage of uranium is not anticipated in the medium term, this fact continues to give cause for concern.

In the long term supply of uranium will have to come from primary production. Present levels will not be increased, however, until producers see an adequate price and return on their investment. That does not appear to be the case at the moment. Known world reserves of uranium are more than enough to cover the requirements of existing reactors and are likely to continue to increase as exploration progresses, but, as it takes many years from exploration to actual production, it cannot be excluded that there will be periods of instability with shortages of uranium and sudden price increases.

Further to USEC's action against Eurodif and Urenco, enriched uranium originating from these companies became subject to dumping and/or countervailing duties upon import into the United States. The cases went to appeal in the Court of International Trade in New York. The application of duties and the uncertainty surrounding the cases continued to create a distortion in the enrichment market and an increase in the enrichment prices particularly in the United States.

The European Commission adopted its final report on the Green Paper 'Towards a European strategy for security of energy supply', which was published at the end of 2000. It reiterated the need to guide and steer energy consumption, the need for a Europe-wide security of supply concept, the role of nuclear energy in avoiding emission of greenhouse gases and that nuclear energy remains an option to those EU Member States which decide in its favour.

The European Commission proposed also a package of measures on safety of nuclear installations, management of radioactive waste and security of supply. It includes two proposals for directives on nuclear safety and waste management, respectively, and a proposal for a decision on a nuclear trade agreement between Euratom and the Russian Federation.

The Supply Agency participated in the work of the Commission's services in the negotiations on the enlargement of the EU. The accession of new Member States will lead to an increase in the Agency's capital and in the number of members of its Advisory Committee. Enlargement of the Community will have an impact on the supply and demand for nuclear fuels which will have to be taken into account.

Decisions were taken on the closure of two of the older nuclear plants in the United Kingdom and on one in Spain, and about a nuclear phase out of plants in Belgium once they have operated for 40 years. In contrast the Finnish parliament ratified the decision on TVO's application to build a new nuclear plant to start operation by the end of the present decade. Outside the EU in many countries decisions were taken to restart power plants that were not in operation or to recommence construction that had been halted, while also in several countries there were decisions to construct or to start the planning of new power plants.

CHAPTER 1 — GENERAL DEVELOPMENTS

POLICY DECISIONS IN THE MEMBER STATES

The Belgian Government decided to enact the gradual phase out of its nuclear reactors, against the advice from scientific expert committees it had set up. New legislation requires the closure of the existing reactors at the end of their 40 years' lifetime and precludes the construction of new ones. The phase out of the existing plants should take place between 2015 and 2025 unless the decision is revised or reversed by future governments.

Following the application by Teollisuuden Voima Oy (TVO) for a decision in principle by the Council of State for the construction of a new nuclear power plant in Finland and its positive reply in January 2001, the Finnish parliament ratified the Council of State's decision in May 2002. According to the decision in principle the new plant will have an output capacity of 1 000–1 600 MWe and will be located at one of the existing plant sites (Loviisa or Olkiluoto). The total cost of the new plant is estimated at EUR 1.7 billion to EUR 2.5 billion depending on the alternative selected. TVO has called for bids from a number of vendors. The type of plant and its location will be decided after the bid evaluation process. According to TVO's plans the new plant would start commercial operation by the end of the current decade.

In Germany the agreement between the government and the utilities concerning the phasing out of nuclear energy for electricity production came into force with the amendment of the Nuclear Energy Act in April 2002. The amounts of electricity still to be produced by the German plants on the basis of a 32-year lifetime were defined.

In the Netherlands a court ruling confirmed that there was no arrangement concluded between the utility and the government to close the Borssele nuclear power plant (450 MWe) by the end of 2003. The new government, which took office in 2002, agreed to postpone the closure of the plant.

Nuclear generation in Spain is to be maintained at the current level according to the indicative energy plan approved by the government. The José Cabrera (Zorita) plant (153 MWe), which is the oldest Spanish plant, is to be closed in April 2006. The generation loss will be compensated, as far as is feasible, by power upgrades at the remaining plants.

In Sweden the final decision on the decommissioning of Barsebäck 2 remained pending. It is recalled that the Swedish Government decided in 1997 to close the plant, but the Parliament said that the closure should not have a negative effect on electricity prices, the supply of power to the industry, the energy balance or the environment and climate.

In the United Kingdom a review of the longer term strategic issues surrounding energy, with the aim of setting the objectives for an energy policy to 2050 was published in February 2002. The report was positive to the concept of keeping the nuclear option open on security of supply and environmental grounds ([1]).

The above and further developments in the Member States are described in more detail in Annex 1.

([1]) Following public consultation, the ensuing analysis was reported in a White Paper published in February 2003, which sets out future government energy policy. The White Paper puts the priority on renewables and energy efficiency but does not rule out nuclear energy, which is currently an important source of carbon-free electricity.

INITIATIVES OF THE EU COMMISSION IN THE NUCLEAR FIELD ([2])

On 6 November 2002 the Commission proposed a package of measures (the so-called 'nuclear package') with a view to producing a Community approach to nuclear safety and security of supply. These proposals cover the safety of nuclear installations during operation and decommissioning, management of radioactive waste and trade in nuclear materials with Russia. Their objective is to introduce common standards and monitoring mechanisms, which will guarantee uniform application of the same safety criteria with legal force throughout the EU.

The communication adopted by the Commission contains a series of complementary measures, under the Euratom Treaty, designed to put into action a Community approach to nuclear safety and improve security of supply. The communication included two proposals for EU Council directives, one on safety, the other on waste management ([3]), plus a proposal for a Council decision for the Commission to enter into negotiations on an agreement on trade in nuclear materials between Euratom and the Russian Federation.

In the context of the discussions on the above 'package' the Commission decided also that it was opportune to launch a wider debate on the energy supply sources, including nuclear energy.

SAFETY OF NUCLEAR INSTALLATIONS

The first proposal for a framework directive lays down the basic obligations and general principles concerning the safety of nuclear installations during operation and decommissioning. This proposal will introduce common safety standards and monitoring mechanisms to guarantee that common methods and criteria will be applied throughout the enlarged Union. A common framework of reference for these safety standards will be based on internationally recognised principles and will give them legal force. The Community will monitor how the safety authorities perform their task.

In order that nuclear safety be guaranteed, sufficient funds must be set aside. For the decommissioning of nuclear installations in particular, the proposal defines Community rules for the constitution, management and use of decommissioning funds to ensure that sufficient funds will be available to carry out decommissioning operations under conditions protecting the general public and the environment from ionizing radiation. These funds could be substantial and must be organised in a way so as to ensure that they will be available under all circumstances.

([2]) Cf. Commission press release of 6 November 2002.

([3]) Formally the two proposals for directives are based on Article 31 of the Euratom Treaty. At the beginning of 2003 the Commission approved the two proposals for directives and authorised their transmittal to the EU Council and the European Parliament as soon as the European Economic and Social Committee has given its opinion.

RADIOACTIVE WASTE

The second proposal for a directive concerns radioactive waste. This proposal gives priority to geological burial of waste as the safest method of disposal known at present. Member States will have to adopt, according to a pre-set timetable, national programmes for the disposal of radioactive wastes including, in particular, deep burial of highly radioactive wastes. They will have to select suitable burial sites (whether national or regional) for highly radioactive wastes by 2008 at the latest and have the sites operational at the latest by 2018. For low-activity, short-lived waste sites must be available at the latest by 2013.

TRADE IN NUCLEAR MATERIALS WITH THE RUSSIAN FEDERATION

The Commission decided also to put before the Council a draft decision authorising the Commission to negotiate an agreement between Euratom and the Russian Federation on trade in nuclear materials. Since 1992 the Euratom Supply Agency has pursued a policy of diversification of sources of supply in order to avoid over-dependence on any single source, in particular on the Russian Federation, which in recent years has been the largest external supplier. Enlargement will add to the number of nuclear power stations in the EU. Many of the power stations in the accession countries have traditionally been supplied by Russia; therefore the supply policy pursued up until now will have to accommodate this new situation.

The agreement to be negotiated between Euratom and Russia will have to take account of the new conditions on the market in the enlarged EU and of the special relations between the candidate countries and the Russian Federation in this field. The agreement must also take account of the interests of European consumers and maintain the viability of the EU industries, in particular the enrichment industry. This position is supported by the Advisory Committee of the Supply Agency, which the Agency consulted in order to be able to advise the Commission. At the EU-Russia summit in Moscow on 29 May 2002, the two parties agreed 'in accordance with Article 22 of the Partnership and Cooperation Agreement and in the context of the EU enlargement, to reach a mutually acceptable solution'.

MEMORANDUM OF UNDERSTANDING (MOU) BETWEEN THE COMMISSION AND FRANCE

In order to resolve long-lasting differences of interpretation between France and the Supply Agency and the Commission concerning the applicability of Chapter 6 of the Euratom Treaty to some categories of transactions, a memorandum of understanding was concluded between the Commission and France and implemented on a trial basis for two years starting in June 2000. This followed an exchange of letters between the French Secretary of State for Industry and the EU Commissioner responsible for Energy and Transport.

At the end of the trial period a draft of an evaluation report was produced by the Supply Agency and transmitted to the French authorities. Decisions have now to be taken by the parties on the follow-up and by the Commission on the possible extension of the procedures foreseen under the MOU.

SECURITY OF SUPPLY

The problems with electricity supply in recent years, particularly in California, demonstrated the need to secure energy sources. Energy security is considered, by the Commission, a key priority for the EU.

The first consideration on security of supply is the provision of an uninterrupted service. However, price stability and sustainability are also very important factors to be taken into account. The Commission indicated to the Council, that *it intends to propose political guidelines on security of energy policy, accompanied by an Action Plan including concrete initiatives, following the presentation of a synthesis of the public debate around the Green Paper 'Towards a European strategy for the security of energy supply' in December 2001. Indigenous production should be encouraged.* In this context *the role of nuclear energy in the energy balance should be examined, considering its contribution to supply security, greenhouse gas emission reductions and sustainable development. Nuclear safety and the treatment of nuclear waste are of fundamental importance and new actions were proposed,* as referred to here above.

On the fuels supply side, dependency must be managed to minimise the risks of disruption. On this aspect the Commission went on to say that *externally, supply infrastructure should be diversified and relations with producer and transit countries should be strengthened. The EU-Russia energy partnership being developed out of the EU-Russia energy dialogue is of strategic importance.*

The Supply Agency has a well-established policy of diversification of sources of supply, at the level of each EU utility, and intends to review the situation concerning minimum stocks of natural uranium and/or enriched uranium. It intends also to carry out an in-depth review of the different steps of the front end of the nuclear fuel cycle, including conversion, fabrication and transportation, in order to assess the overall security of supply of nuclear fuels. These actions are fully endorsed by the Agency's Advisory Committee.

DEBATE ON THE EUROPEAN COMMISSION'S GREEN PAPER

In 2000 the European Commission adopted a Green Paper 'Towards a European strategy for security of energy supply'. This paper was intended to open a large debate on the geopolitical, economic and environmental aspects involved in securing the European Union's energy supply and to promote a discussion on the role of each energy source, including nuclear energy.

The Green Paper generated a great interest as illustrated by the number of visits to the web site, debates and conferences, as well as 236 formal written contributions. In June 2002 the Commission adopted the final report on the Green Paper and sent a communication to the Council and the European Parliament on the matter.

The Green Paper *offers a clear strategy based on demand management. It has the merit of pointing out that the EU has little room for manoeuvre with regard to energy supply.* The discussions showed that *there was virtually a unanimous agreement that energy consumption must be guided and steered. It showed also the need to develop a Europe-wide security of supply concept to enable Europe to control its energy future. Such a policy calls for a long-term anticipation effort, market surveillance mechanisms, policy tools and reinforced relations with third countries.*

The Green Paper made it possible to hold a frank and open exchange of views on nuclear energy, which arouses diverging views within the Union. It noted that *concerns about global warming have changed the perception of energy supply constraints* and that *this was particularly pertinent for nuclear energy as its use for electricity generation together with renewable energies and energy efficiency makes it possible to avoid emissions of greenhouse gases that result from burning fossil fuels*. Furthermore, the report states *that the range of choices available to the Member States has to be as wide as possible, without prejudice to their sovereignty in these matters.* The nuclear option remains open to those EU Member States who would like it.

INTERNATIONAL RELATIONS

BILATERAL NUCLEAR COOPERATION AGREEMENTS

Euratom's nuclear cooperation agreements with three major suppliers — Australia, Canada and the United States — continued to be implemented normally. Cooperation under these agreements, which have been running for many years, functions well, and supplies made under them continue satisfactorily.

Under all three agreements certain conditions are applicable to retransfers to countries outside the EU of nuclear material subject to these agreements. In most cases generic consent given in advance covers such retransfers. In a few cases it is necessary to seek consent from the supplier country for the retransfer. Applications for such consent are handled by the Supply Agency. In 2002 prior consent from the US Government was sought for two retransfers.

New developments in 2002 concerned Japan, Uzbekistan and Russia.

The text of a new nuclear cooperation agreement between the Community and Japan was initialled by the negotiators. As soon as the text has undergone final scrutiny by both sides, it will be submitted for the relevant approval procedures of both parties.

Negotiations on a new agreement with Uzbekistan were concluded. This agreement will, *inter alia*, cover transfers of nuclear material. The agreement is now subject to approval according to the processes on each side.

In November, as part of its nuclear package (see above) the Commission announced its intention to propose to the Council the negotiation of an agreement on trade in nuclear materials between Euratom and the Russian Federation. This proposal, if approved, will authorise the Commission, in accordance with the Euratom Treaty, to undertake the negotiation of the agreement.

ENLARGEMENT OF THE EU

Throughout the negotiations on enlargement the Supply Agency has participated in the work of the services of the Commission. At the time of writing this report with the negotiations having been completed, it is now known that, subject to the Accession Treaty being signed and ratified by the new Member States, there will be a certain impact for the Supply Agency. Specifically from 2004 the number of members of its Advisory Committee will increase from 51 to 69; also its capital will be raised to EUR 5 440 000. The Supply Agency looks forward to working with the authorities and the nuclear industries in the new Member States.

The Supply Agency has made arrangements for a seminar with representatives from the governments and nuclear industry of the new Member States. The seminar will take place in June 2003 and will provide the opportunity to discuss the future role of the Supply Agency, its procedures, legislation and policy regarding supply of nuclear fuels.

LEGAL DEVELOPMENTS

USEC ANTIDUMPING AND COUNTERVAILING DUTY PROCEEDINGS AGAINST EURODIF AND URENCO

In December 2000, the United States Enrichment Corporation (USEC) filed petitions with the US Commerce Department's International Trade Administration (ITA) and the International Trade Commission (ITC) against Eurodif SA and Urenco Ltd. It was alleged that the imports of low enriched uranium from France, Germany, the Netherlands and the United Kingdom were being sold at less than their fair value in the United States and benefited from unfair subsidies in their home markets, which materially injured or threatened with material injury the US domestic enrichment industry.

At the end of 2001, the ITA announced its decision on the cases. It determined that there was a final subsidy rate of 2.23 % for imports of LEU from Germany, the Netherlands and the United Kingdom and a rate of 13.21 % for imports of LEU from France. ITA also made final affirmative determinations in the antidumping investigation of LEU from France with an antidumping margin of 19.57 % ([4]). However the ITA determined that sales of LEU from Germany, the Netherlands and the United Kingdom were not dumped in the United States.

In January 2002 the ITC issued a final affirmative finding of injury or threat of injury to USEC by imports of LEU from the four EU Member States. ITC's determinations were transmitted to the US-Department of Commerce (DOC) which subsequently issued an antidumping order against LEU from France and countervailing duty orders against LEU from France, Germany, the Netherlands and the United Kingdom.

Urenco and Eurodif have requested administrative reviews of duties, if any, to be imposed on imports into the US of LEU subject to those orders.

([4]) It should be noted that the above duties apply to the value of the LEU. The effective duty in terms of the value of the separative work contained in the LEU is therefore practically doubled.

The Parties have also filed appeals in the Court of International Trade (CIT) in New York to challenge the validity of the ITA's determination and orders, as well as the ITC's decision that injury was caused to USEC by imports from Eurodif and Urenco. As further appeals are possible after the CIT ruling, the uncertainty surrounding the case may remain for some time.

CLAIM AGAINST THE US-DOE FOR SWU OVERCHARGING

In 2001 the Supply Agency joined with other plaintiffs in filing an action against the US Department of Energy (DOE) in the US Court of Federal Claims for recovery of environmental restoration charges, imputed interest on DOE's cancelled gas centrifuge enrichment project, and high assay costs that were improperly included in the charges of SWU for two EU utilities. The involvement of the Supply Agency was due to the fact that it was, at the time, the formal party to the utility services contract (USC) for one of these EU utilities. The court case continued throughout the year, but it remained uncertain when a final ruling would be made or a settlement would take place.

OTHER DEVELOPMENTS

STORAGE OF SPENT NUCLEAR FUEL IN RUSSIA

Russia's ambitious project to take foreign spent fuel for processing and long-term storage continued to draw interest from the nuclear industry in view of its potential to solve the problems relating to the back end of the fuel cycle. The Russian authorities continued to develop a regulatory framework for the import of nuclear spent fuel. It is understood that the major legislation is already in place, but there are a number of regulatory and practical issues still to be addressed.

A major conference on the matter took place in Moscow in September 2002, but a great deal of scepticism remained among many observers in view of the scale of the project, obstacles such as arrangements already in place in some nuclear countries, existing legislation and public opinion. Although these considerations may not stop the project from going ahead, they may well limit new business to countries that have not yet committed themselves to a final solution for the disposal of their spent fuel or countries with very small nuclear programmes such as those with only research reactors. In the meanwhile it is expected that Russia will continue to take back spent fuel from some countries with which it has special arrangements, such as Ukraine and Bulgaria.

NEW NUCLEAR GENERATION AND POWER PLANT PROJECTS OUTSIDE THE EU

The signs for a revival of nuclear power generation in the short term, which received considerable political attention and press coverage during last year, did not materialise on a large scale. However, the need to meet the targets of the Kyoto Protocol on the reduction of the greenhouse gas emissions, the need to avoid power shortages such as those experienced in California, the instability of oil prices, may lead some countries to reconsider the nuclear option.

Nuclear generation continued to make steady progress. Utilities continued to upgrade their plants and to improve capacity factors. In the United States alone the increased output has been reported to be equivalent to 25 new nuclear reactors entering into operation since 1990. The Tennessee Valley Authority (TVA) in the United States announced its intention to restart the Browns Ferry 1 reactor (1 065 MWe BWR) which was stopped in the mid-1980s, and seek re-licensing for all three units at the Browns Ferry nuclear plant (the plants will be operating for an additional 20 years, until 2033-36). A few US utilities announced plans to submit applications under the early site permit programme. China has five new reactors already operating or about to start operations. Russia has several new power plants under construction or planned; it also has export orders for deliveries of nuclear power plants to China, India and Iran. Ukraine also has nuclear power plants under construction. Many other countries (Brazil, Bulgaria, Canada, Egypt, India, Iran, Vietnam…) considered reviving or finishing old projects as well as starting new ones.

INTERNATIONAL THERMONUCLEAR EXPERIMENTAL RESEARCH (ITER)

Nuclear fusion is an important field in European research. Its continuation requires a large experimental device, ITER, the engineering design of which was carried out in the 1990s in the framework of an international agreement of the EU, with whom Canada, Japan, the Russian Federation and, until 1998, the United States were associated. The United States announced its return in 2003 and China also joined the negotiating table.

The specific programme (Euratom) decision 2002-06 indicates a possible EU decision by 2003–04 and a start to its implementation by 2005-06.

Currently four sites are proposed for the project, one by Canada, another in Japan and two in Europe — Cadarache in France and Vandellos in Spain.

CLIMATE CHANGE

EMISSIONS TRADING

The ratification of the Kyoto Protocol resulted in an agreement between the Member States to share the burden of reducing their greenhouse gas emissions by 8 % for the whole EU relative to the 1990 level. The quantified emission limitation and reduction commitments agreed by the European Community and its Member States, for the purpose of determining the respective emission levels allocated to each of them for the first quantified emission limitation and reduction commitment period, from 2008 to 2012, are set out in a Council decision of 20 April 2002 ([5]).

In October 2001 the Commission made a proposal to establish a EU-wide scheme for trading greenhouse gases emission allowances. The European Parliament concluded its first reading of this proposal at the end of October 2002. On 9 December 2002 the Environmental Council agreed a common position on the text.

([5]) 2002/358/EC (http://europa.eu.int/eur-lex/pri/en/oj/dat/2002/l_130/l_13020020515en00010020.pdf)

The Commission's proposal for the EU emissions trading directive 'Establishing a scheme for greenhouse gas emission allowance trading within the Community' ([6]) is based on a system called 'cap and trade'. In addition to establishing a system for emissions trading, it obliges Member States to plan in concrete terms how to meet their Kyoto commitments. In practice, this means that they have to set an upper limit to CO_2 emissions for selected industrial activities, electricity production being the sector most concerned. The 'cap' introduces scarcity in the allowed emissions, and 'trade' softens the impact by allowing buying and selling of allowances.

THE EU SUSTAINABLE DEVELOPMENT STRATEGY AND THE JOHANNESBURG SUMMIT

Energy is an essential part of sustainable development: on the one hand all energy measures should have sustainability as one of their targets, and on the other hand energy policy measures are a major instrument for the implementation of sustainable development.

Concerning the concrete outcomes of Johannesburg, one of the main Commission's actions was the EU energy initiative. This initiative on energy cooperation with developing countries was first launched in a Commission communication of February 2002 and further developed in a second communication in July, before being officially presented and launched at the World Summit on Sustainable Development (WSSD) in Johannesburg. The initiative aims at improving access to adequate sustainable energy services in developing countries, through actions like rural electrification, introduction of decentralised energy systems, increased use of renewable energy, and enhanced energy efficiency. Implementation takes place through cooperation programmes developed by Member States as well as the Commission. Actions should be demand-led, leaving ownership to the beneficiaries, and making full use of instruments like institutional capacity building, transfer of knowledge, market development and private-public partnerships. The energy administrations of the Member States are invited to contribute to the development of this initiative.

Furthermore, the Commission wants to highlight the fact that several actions and policy measures contributing to sustainable development have been proposed recently and are either still in the decision-making phase or have come into force recently. Measures and actions to increase energy efficiency and the use of renewable energy include e.g. the promotion of energy efficiency of buildings, the introduction of energy efficiency standards, the directive on renewable energy in electricity production, the biofuels directive, the proposals on combined heat/power generation, etc. In the broader scope of strategies and target setting, policy guidelines have been formulated in the Green Paper on energy. Finally, the Commission has provided a synthesis report to the Spring Council on sustainable development.

([6]) COM(2001)581 (http://europa.eu.int/comm/environment/climat/emission.htm)

CONVENTION ON THE FUTURE OF EUROPE

The Convention on the future of Europe renewed the interest in the Euratom Treaty and its future. In contrast with the European Coal and Steel Community (ECSC) Treaty signed in 1951, which expired after 50 years, the Euratom Treaty has no expiry date. The abolition of the Euratom Treaty would leave the EU unable to deal with the particular circumstances of the nuclear sector. For over 45 years the Euratom Treaty has served as a basis for the safe development of the nuclear industry, contributing to the Community well-being and security of supply and reducing greenhouse gas emissions. It has also provided a basis for Community legislation and the national regulations in force.

The Euratom Treaty provides a framework for development and coordination of research activities, e.g. on nuclear waste management, and has enabled the development of European research centres and the Joint European Torus (JET) at Culham in the United Kingdom. It also contains provisions controlling civil nuclear activities, whether linked to energy generation, industrial or medical use. Member States have entrusted to the Commission important responsibilities for the control of nuclear materials regarding both nuclear safeguards and supply.

In the framework of the Convention, ideas have been put forward on the future of the Euratom Treaty ranging from its maintenance in its present form, as advocated by Commission Vice-President Mrs Loyola De Palacio, to complete abolition ([7]).

([7]) The Praesidium of the Convention said in March 2003 that it 'believes that there is no basis for the Convention to become involved in an operation to amend the Euratom Treaty substantially …'. Other than necessary changes to the institutional and financial provisions, the Praesidium does not propose changes which would change the nature of the Euratom Treaty.

CHAPTER 2 — NUCLEAR FUEL, POLICIES AND MARKETS

NUCLEAR ELECTRICITY GENERATION AND FUEL REQUIREMENTS

In 2002, 143 nuclear power reactors with a total net capacity of 123 GWe were in operation in the European Union. The nuclear electricity generated in the Community ([8]) continued to increase and amounted to 849.7 TWh or 34.14 % of the total (compared with 846 TWh in 2001). If fossil sources had been used instead, some 300–600 million tonnes of CO_2 would have been emitted to the atmosphere for the same energy production (depending on the substitution mix).

The world reactor requirements for nuclear fuels amount to some 65 000 tU/year (natural uranium equivalent) and 35 000 tSW/year (for uranium enrichment) ([9]). The requirements of the EU reactors represent just under one third of the world total.

NUCLEAR FUEL CYCLE

NATURAL URANIUM

Supply of natural uranium to the EU utilities remained steady, with most deliveries taking place under long-term contracts. The Supply Agency's average price in euro for deliveries under multiannual contracts decreased by some 10 % relative to 2001. In US dollars the Supply Agency's price has shown a steady decline since 1987. The euro prices showed also a decline but there were fluctuations for some years due to variations in the exchange rates (see Annex 5).

The amount of uranium delivered under spot contracts increased relative to 2001 but remained below 10 % of total deliveries. The Supply Agency average price for deliveries under spot contracts was slightly lower than published price indicators, which increased some 5 % during the year to around USD 10 /lb U3O8.

Although the trade press has practically stopped publishing different prices for NIS and non-NIS natural uranium, the Supply Agency continued to observe that, on average, NIS prices remained somewhat lower than non-NIS.

Exchange rates continued to play a significant role, the fluctuations of the euro against the US dollar and the currencies of the producing countries, made price comparisons difficult at times.

In 2002, preliminary figures indicate that worldwide natural uranium production amounted to some 35 000 tU, a decrease relative to 37 000 tU in 2002. Production dropped in Canada and Australia, but it was compensated to some extent by increases in other countries such as Kazakhstan, Niger and Namibia.

Canada maintained its status as the world major primary producer, with some 11 600 tU reported to have been produced during the year (7 % less than in 2002). Australia produced 6 950 tU (11 % less than in 2001). These two countries together continued to supply more than half of the total world primary production of natural uranium.

([8]) Source: International Energy Agency – Monthly Electricity Survey – December 2002.
([9]) Source: World Nuclear Association Report on the Global Nuclear Fuel Market for 2001.

Russia's primary production and direct sales of natural uranium remained relatively small. EU imports represented only a few hundred tonnes. However, it remained the largest supplier of uranium if one takes into account the downblended HEU material and the re-enrichment of depleted uranium ('tails').

EU indigenous supply continued to decrease. In 2002, Community domestic supply to the EU utilities represented 4 %, most of it associated with existing stocks or uranium recovered as a result of the clean-up operations of mines which have been closed.

Table 1: Natural uranium production in 2002 (*)

Country	TU	% share
Canada	11 600	33.1
Australia	6 950	19.9
Niger	3 100	8.9
Kazakhstan	2 800	8.0
Namibia	2 350	6.7
Uzbekistan	1 850	5.3
Russia	1 500	4.3
South Africa	800	2.3
Others	4 050	11.6
TOTAL	35 000	100.0

Note: (*)Preliminary production figures published by the producers or estimated.
Final figures for uranium resources and production will be published by OECD(NEA)-IAEA by May/June 2003.

The overall supply and demand situation remained practically unchanged relative to the last few years. Compared to the total worldwide needs of some 65 000 tU/year, primary production remains well below consumption. Current production covers just over half of requirements, and the balance continues to be made up by stockpiles and recycling.

CONVERSION

Supply of conversion services to the utilities continued steadily during the year. Capacity, worldwide and in the Community in particular, continued to exceed requirements, but the closure of the BNFL conversion plant in 2006 could create a shortage of conversion capacity in Europe which, over time, could raise significantly material transports between Europe and North America.

The withdrawal of BNFL represents a capacity loss of 6 000 tU as UF6/year, leaving only three major western producers (Comurhex, ConverDyn, Cameco) and Russia. Although no major difficulties are expected in the near term, it gives greater importance to the conversion component of secondary sources of supply such as the re-enriched tails and the Russian downblended HEU.

Published prices for conversion services increased substantially in 2001 but tended to stabilise in North America in 2002. European prices continued to increase slightly and it is estimated that there is now a difference of about USD 1/kgU between the two regions, which is roughly equivalent to the cost of transportation.

ENRICHMENT

Supply of enrichment (separative work) to the utilities continued also unhindered. Enrichment capacity worldwide and in the Community, in particular, exceeds current requirements. However some utilities have experienced some difficulty in contracting for new near-term deliveries. As for natural uranium, most of the supply to the EU utilities continued to take place under long-term contracts.

Enrichment remained the most prominent aspect of the fuel cycle due to the trade disputes and restrictions, court cases, decisions on technology for new plants and agreements being made by the main players.

The USEC action against Urenco and Eurodif, resulting in the US DOC imposing duties on the LEU imports from the four Member States where these companies are located, and the uncertainties surrounding the case, combined with the recognition that prices should cover costs, are believed to be the main causes for the increase in the published SWU prices over the last two to three years. Spot price indicators increased from some USD 80/SWU in 1999–2000 to over USD 100 in 2001 and up to USD 107 to USD 108 at the end of 2002. Although new contracts in the EU may command somewhat higher prices than those seen in 1999-2000, the Supply Agency observed that the prices were much more stable and remained significantly lower than in the United States.

Centrifuge is now established as the technology chosen by all major enrichers. In October 2002, Urenco and Areva signed a memorandum of understanding with the aim of establishing a joint venture in the field of centrifuge technology for uranium enrichment.

Cameco Corporation ([10]) and Westinghouse Electric Company joined the consortium led by Urenco, normally referred to as Louisiana Energy Services (LES), to build a new centrifuge enrichment plant. In July 2002 a memorandum of agreement was signed to restructure the LES partnership with a view to design, construct and operate an enrichment facility based on Urenco technology. The partnership maintained its intention to submit a licence application in 2003.

USEC announced its plans for a new centrifuge enrichment plant with a lead cascade to be built at Portsmouth, Ohio. USEC reached an agreement with the US DOE whereby the DOE undertakes to work with USEC in the development and deployment of an advanced centrifuge uranium enrichment plant by the end of this decade. The DOE spent many years researching and developing an advance centrifuge, but the programme was abandoned in 1985 after considerable expenditure. USEC intends now to resurrect the US centrifuge design, taking advantage of earlier government development work, and incorporate recent technological advances.

([10]) Editors note: in March 2003 Cameco Corporation announced that it no longer planned to join the LES.

The global enrichment market remained distorted due to the restrictions on the sales of Russian enrichment and the trade disputes in the United States; the latter created uncertainties on the imports into the United States of enriched uranium from Europe and thus left USEC in a privileged position. The Supply Agency continued to monitor the situation with a view to ensuring the viability of the EU industry and the long-term security of supply of the EU users.

Over the last 10 years the nuclear fuels market and the enrichment market in particular changed substantially. The events that brought about the change include the break-up of the Soviet Union and the push of Russia's Tenex to expand its sales; the transfer of the enrichment business from the US-DOE to USEC and later its privatisation; the suspension agreements between the United States and Russia; trade restrictions; the HEU deal between the United States and Russia; the USEC action against Eurodif and Urenco and the tendency for negotiating transactions 'off market' rendered the market much less transparent and predictable.

FABRICATION

Fabrication facilities continued also to provide adequate coverage of the utilities' needs.

Mixed oxide (MOX) fuel fabrication continued steadily in Belgium and France and the United Kingdom.

BNFL reports that MOX fuel manufacture in the Sellafield MOX Plant (SMP) is progressing well. The company brought MOX materials into the plant in December 2001 and these have been sequentially introduced into the process to validate safe, quality-manufacturing capability.

Siemens has started dismantling its MOX fabrication plant at Hanau. The plant was estimated to be 90 % complete when the decision was taken to mothball it in 1995. The German authorities subsequently granted authorisation for dismantling the plant in 2001.

REPROCESSING

Reprocessing of irradiated fuel continued at the plants at La Hague in France and Sellafield in the United Kingdom. Germany stepped up its shipments of spent fuel to both plants.

SECURITY OF SUPPLY

Current supply is sufficient to meet the requirements at all stages of the nuclear fuel cycle. There have been no shortages and they are not anticipated, at least in the short to medium term. However, the situation in the long term continues to give some cause for concern and does not permit a complacent attitude.

The natural uranium market remained characterised by the large gap between world consumption and production, which is compensated by secondary sources of supply. These are mainly the downblending of surplus military HEU, which provides up to approximately 9 000 tU/year as natural uranium feed equivalent, the re-enrichment of tails which currently provides an additional 3 000 to 4 000 tU/year, the drawdown of other inventories and the recycling of reprocessed uranium and plutonium. The downblending of HEU is planned to go on for another 10 years with the possibility that the quantities may be increased. The supply from re-enrichment of tails and other inventories may fall considerably in the long term.

Known uranium resources are more than enough to cover the requirements of existing reactors during their lifetime, but new production takes many years to be brought on line and is not encouraged by the current low prices of uranium. In reality the low prices have caused the closure of mines, reduction of production and postponement of new mine projects. In these circumstances periods of imbalance between supply and demand causing shortages and considerable price increases cannot be excluded.

World conversion capacity continues to exceed requirements, but following the closure of the BNFL plant in the United Kingdom, foreseen for 2006, there will be a geographic imbalance. The EU will be reduced to one supplier, most of the capacity will be available in North America which may require the transportation of large quantities of UF6 to the enrichers in Europe. Transportation becomes an even more important aspect affecting the nuclear fuel cycle.

The situation with enrichment is considerably better from an EU standpoint. There are two enrichers with four plants in the Community with a capacity largely exceeding requirements. In the United States both the LES partnership and USEC are likely to build new plants before the end of the present decade.

After the closure of the BNFL conversion plant the industry will be reduced to only four major converters and as many enrichers. Problems with any one of them could seriously affect the capacity to meet demand.

Although secondary supplies will continue to represent a very important source, which may be stepped up to cover unexpected circumstances, and the industry may adjust parameters to compensate for shortages at one or other stage of the fuel cycle, ultimately demand will have to be covered by primary supply. As this may not always be guaranteed, the Supply Agency continues to stress the importance for utilities of maintaining an adequate level of the strategic inventory, at all stages of the fuel cycle, consistent with their circumstances. Furthermore it is recommended that utilities cover most of their needs under long-term contracts with diversified primary production sources at equitable prices.

THE POLICY OF DIVERSIFICATION OF SOURCES OF SUPPLY

The Supply Agency continued to implement a policy of diversification of sources of supply in order to ensure that the EU does not become over-dependent on any single source, as described in previous annual reports.

The Supply Agency continued to monitor all sources of supply and, in particular, the total supply of natural uranium or feed from the NIS; this is by far the largest source as a regional group of countries. As the imports and supply to the EU utilities from NIS sources tended to stabilise, there was no need to apply specific restrictions on material originating from NIS countries during the year.

In the case of enrichment the policy concerning Russian supply remained unchanged.

SUPPLIES DERIVED FROM DISARMAMENT OF NUCLEAR WEAPONS

ENRICHMENT

USEC was confirmed, under certain conditions, as sole executive agent for the disposal of the enrichment component of LEU resulting from the downblending of Russian HEU according to the US-Russia HEU agreement. Under this agreement USEC purchases the enrichment component and transfers to Tenex a quantity of natural uranium equivalent to the LEU feed component. Up to 879 tLEU derived from 30 tHEU were reported to have been delivered in 2002, as scheduled, bringing the total deliveries since the beginning of the programme to 5 027 tLEU derived from 171 tHEU (out of the 500 tHEU foreseen).

USEC and Minatom reached an agreement with respect to the remaining deliveries under the downblended HEU contract which provides for the supply to USEC of LEU containing some 5.5 million SWU/year until 2013. The amendment to the contract was subsequently approved by the US and Russian governments, thus eliminating the uncertainties over the deal.

On the US side the government had declared 174 tHEU of its inventory as surplus to national security and other needs. However, 21 tonnes were unsuitable for reactor use and were to be disposed of as waste. Most of the remainder has already been or will be downblended to be used as reactor fuel through USEC (some 64 tHEU) and the Tennessee Valley Authority (TVA) (some 33 tHEU off specification); it is understood that up to 10 tHEU were reserved to produce LEU research reactor fuel; the balance is yet to be allocated.

During a summit in May 2002 the US and Russian presidents agreed to establish a joint experts group to support nuclear non-proliferation. The group investigated near and long-term bilateral and multilateral solutions to reduce the HEU and plutonium inventories and accelerate its downblending and use as reactor fuel.

NATURAL URANIUM FEED

The sale of the natural uranium feed corresponding to the LEU delivered to USEC is subject to a commercial agreement concluded in 1999 between Cameco, Cogema and RWE Nukem on one side and Minatom and Tenex on the other. This agreement gave the western companies the right to purchase from Tenex part of the natural uranium feed component derived from the downblended Russian HEU. The option may be exercised for total annual deliveries up to 9 200 tU. However sales to end users in the United States are limited by US legislation to an annual quota ([11]).

([11]) The quota started at 769 tU equivalent in 1998, reached 3 846 tU in 2001 and will continue to increase up to 7 690 tU p.a. in 2009 and will remains at this level until 2012. In 2013, the last year of the agreement, it will be limited to 6 000 tU.

In 2001 an amendment was made to the commercial agreement whereby the three western companies effectively agreed to convert the annual purchase options into minimum purchasing commitments for the period 2002 through 2013. It is understood that during 2002 the three companies purchased significant amounts of uranium from Tenex in accordance with the agreement.

MOX FROM MILITARY PLUTONIUM

Progress was reported on arrangements for the disposition of American and Russian surplus military plutonium. The United States decided in favour of the fabrication of MOX fuel, instead of the immobilisation of the plutonium as such, and the building of a fabrication plant, using Cogema technology, by a consortium comprising Cogema, Duke Power and Stone & Webster. The MOX fuel fabricated with US plutonium should be used in US power plants. The same scheme should be adopted for the Russian plutonium. As no agreement was reached on the utilisation of equipment from the mothballed Siemens MOX fabrication plant at Hanau, a new proposal was made based on the construction of a fabrication plant in Russia replicating the one to be built in the United States. This route could significantly reduce the time and cost to design and build a MOX fabrication plant in Russia.

The disposal of the 34 tonnes of weapons plutonium by the Russians would take place at a rate of 2-4 tPu/year. As in the US case, this MOX fuel should be used in reactors in the Russian Federation itself, although Russia has proposed a possibility of using a limited quantity of MOX containing Russian plutonium in some European power reactors.

Although there is a strong political will to advance the military plutonium disposition project, uncertainties concerning the cost, financing and possible revenue are still to be resolved.

RESEARCH REACTORS FUEL CYCLE

Research reactors continued to be supplied regularly with fresh fuel during the year.

The Supply Agency negotiated a contract with the US-DOE for the supply of HEU for the Joint Research Centre high flux reactor (JRC HFR) until its conversion to LEU.

The new German research reactor FRM-2 in Garching continued to wait for the third and final partial licence to start operations. The licence was withheld partly due to the fact that in the view of the authorities the back end of the fuel cycle had not been resolved adequately.

International cooperation continued in order to find new processes, which would allow the fabrication of fuels and targets with LEU to replace HEU without major penalties to the operators. Work continued in preparation of the conversion of the JRC HFR in the Netherlands and the CEN-SCK BR2 in Belgium to low enriched uranium.

Cogema continued to offer to reprocess HEU fuels by diluting them with commercial LEU fuels at its plant in La Hague. It implemented an agreement with the CEN-SCK for the reprocessing of the spent BR2 fuel.

CHAPTER 3 — EU SUPPLY AND DEMAND IN 2002

This chapter aims at presenting an overview of supply and demand for nuclear fuels in the European Union. As in previous years this is based on information provided by the EU utilities or their procurement organisations concerning the amounts of fuel loaded into reactors, estimates of future fuel requirements, and on quantities, origins and prices of acquisitions of natural uranium and separative work.

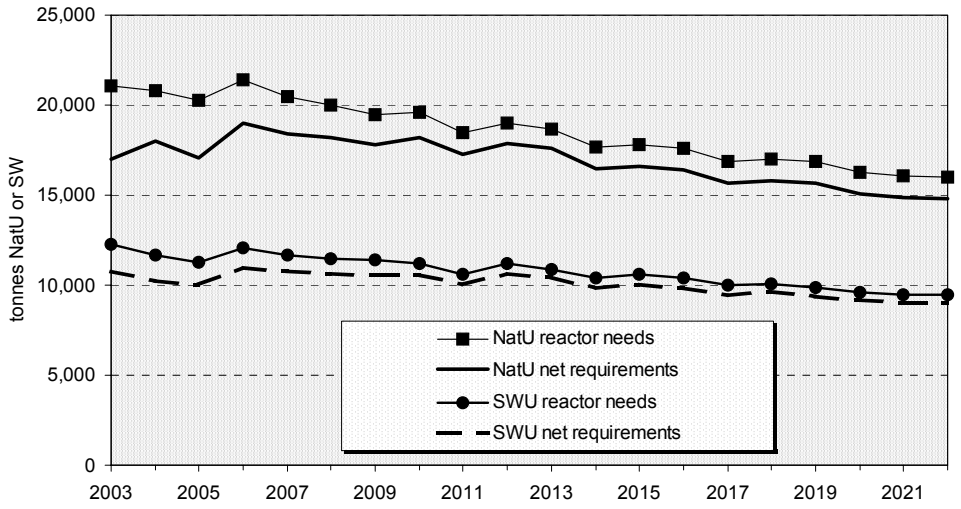
FUEL LOADED INTO REACTORS

During 2002, about 2 900 tU of fresh fuel were loaded in EU reactors (including Magnox reactors) containing the equivalent of 20 900 tU as natural uranium and 11 600 tSW; most tails assays were in the range of 0.25-0.35 %. This represents an increase of some 3 % relative to last year.

REACTOR NEEDS / NET REQUIREMENTS

Estimates of future EU reactor needs and net requirements for uranium and separative work, based on data supplied by EU utilities, are shown in Graph 1 (see Annex 3 for the corresponding table). Net requirements are calculated on the basis of reactor needs less the contributions from currently planned uranium/plutonium recycling, and taking account of inventory management as communicated to the Agency by utilities.

Graph 1: Reactor needs and net requirements for uranium and separative work



Average reactor needs for natural uranium over the next 10 years will be 20 100 tU/year, while average net requirements will be about 17 900 tU/year. Relative to 2001, average future reactor requirements increased by some 400 tU/year on average.

Average reactor needs for enrichment over the next 10 years will be 11 500 tSW/year, while average net requirements will be in the order of 10 600 tSW/year. Relative to 2001, future enrichment needs decreased by some 100 tSW/year.

NATURAL URANIUM

CONCLUSION OF CONTRACTS

The number of contracts and amendments relating to ores and source materials (essentially natural uranium) which were dealt with in accordance with the Supply Agency's procedures during 2002 is shown in Table 2. Transactions totalled approximately 17 600 tU, some 9 200 tU of which were the subject of new purchase contracts by EU utilities (spot and multiannual). Amendments to existing contracts resulted in an increase of some 2 000 tU of the total quantities contracted.

Table 2: Natural uranium contracts concluded by or notified to the Supply Agency (including feed contained in EUP purchases)

Contract type	Number	Quantity (tU)([1])
Purchase-sale (by a EU utility/user)		
— multiannual ([2])	5	7 200
— spot ([2])	16	2 000
Purchase-sale		4 300
- between EU utilities (Multiannual)	2	
- between intermediaries ([3]) (Multiannual)	2	
- between intermediaries ([3]) (Spot)	4	
Exchanges and loans ([4])	17	4 000
Total ([5])	46	17 600
Amendments to purchasing contracts ([6])	12	2 000

Notes:
([1]) In order to maintain confidentiality the quantity has been indicated only when there were at least three contracts of each type, but all quantities have been included in the total.
([2]) Multiannual contracts are defined as those providing for deliveries extending over more than 12 months, whereas spot contracts are those providing for either only one delivery or deliveries extending over a period of a maximum of 12 months, whatever the time between the conclusion of the contract and the first delivery.
([3]) Purchases/sales contracts between intermediaries — both buyer and seller are not EU utilities/end users.
([4]) This category includes exchanges of ownership and U_3O_8 against UF_6. Exchanges of safeguards obligation codes and international exchanges of safeguards obligations are not included.
([5]) The total includes 16 contracts of less than 10 tU each.
([6]) The quantity represents the net increase (or decrease) in material contracted for.

Some 4 300 tU transacted related to purchases between producers, intermediaries or between EU utilities. An additional 4 000 tU have been transacted under exchanges and loans. In comparison with last year, the total amounts contracted have decreased but the quantity under new purchasing contracts by utilities was higher than in 2001 but still amounted to roughly only half of the Community's yearly net requirements.

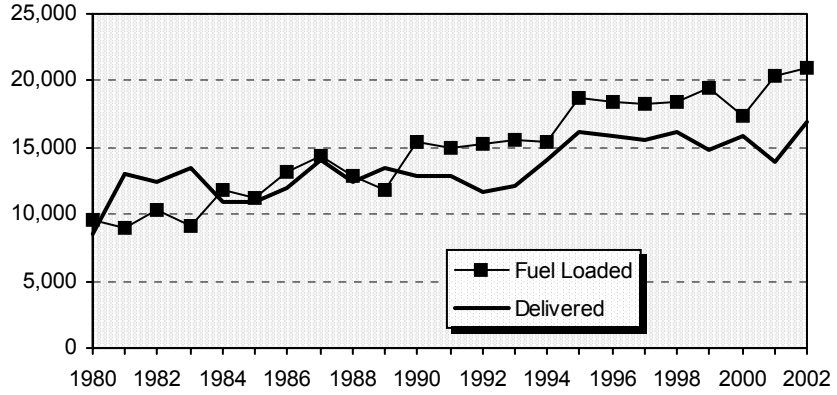
VOLUME OF DELIVERIES

During 2002, natural uranium deliveries to EU utilities amounted to approximately 16 900 tU compared with 13 900 tU in 2001. Deliveries under spot contracts represented 8 % of the total (4 % in 2001).

The deliveries taken into account are those made to the EU utilities or their procurement organisations (excluding research reactors); they include also the natural uranium equivalent contained in enriched uranium purchases. During the year, utilities sold some 200 tU under spot contracts.

Deliveries and fuel loaded into reactors by EU utilities since 1980 are shown in Graph 2. The corresponding table is in Annex 4. The difference between deliveries and the amount of fuel loaded can be partly explained by the use of reprocessed uranium and drawing down of inventories.

Graph 2: Natural uranium feed contained in fuel loaded into EU reactors and natural uranium delivered to utilities under purchasing contracts (tU)



AVERAGE PRICES OF DELIVERIES

The deliveries taken into account in the average price calculations are those made to the EU utilities or their procurement organisations under purchasing contracts; they include also the natural uranium equivalent contained in enriched uranium purchases. Excluded from the calculations are a number of contracts where it was not possible to establish reliably the price of the natural uranium component (e.g. some cases of enriched uranium deliveries priced per kg EUP). To calculate the average price, the original contract prices are converted (using the average annual exchange rates as published by Eurostat) into euro per kgU in U_3O_8 and then weighted by quantity. To establish a price excluding conversion cost when it was not specified, the Supply Agency applied, in 2002, an estimated average conversion price of EUR 5.50/kgU (USD 5.20/kgU).

Prices for deliveries under multiannual contracts (i.e. providing for deliveries extending over more than 12 months) were expressed in three different currencies (euro, US dollars and Canadian dollars).

The average price of such deliveries in 2002, rounded to the nearest ¼ euro was:

EUR 34.00 /kgU contained in U_3O_8 (EUR 38.25/kgU in 2001).

Spot contracts are those providing for either only one delivery or deliveries extending over a period of a maximum of 12 months, whatever the time between the conclusion of the contract and the first delivery.

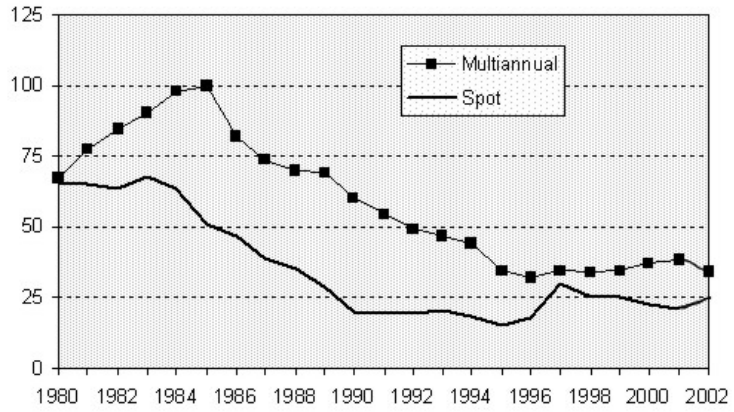
The average price of material delivered in 2002 under spot contracts was as follows:

EUR 25.50 /kgU contained in U_3O_8 (EUR 21.00/kgU in 2001)

PRICE HISTORY

Graph 3 shows the ESA average prices for natural uranium since 1980; the corresponding data are presented in Annex 5 (note: the euro replaced the ecu on 1 January 1999 with a conversion rate of 1:1).

Graph 3: Average prices for natural uranium delivered under spot and multiannual contracts, 1980-2002 (euro/kgU)



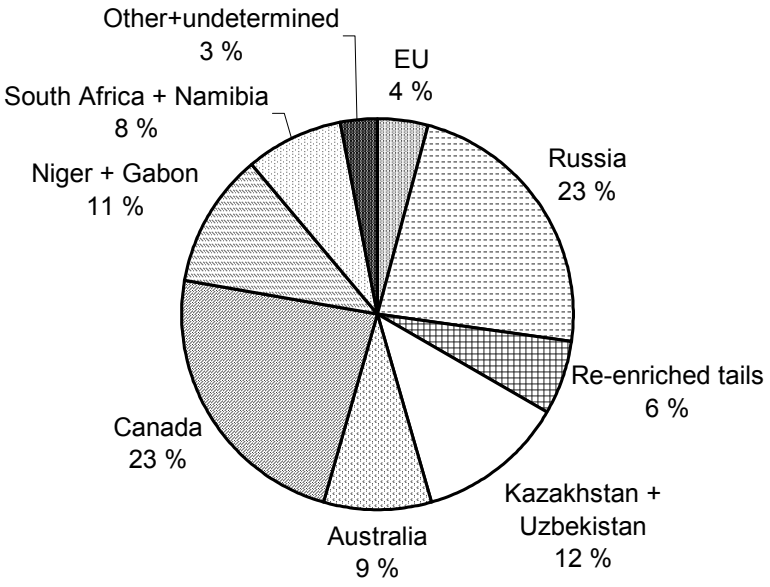
ORIGINS

EU utilities or their procurement organisations obtained in 2002 the vast majority of their supplies from 12 countries outside the EU. Supply from within the EU represented only some 4 %.

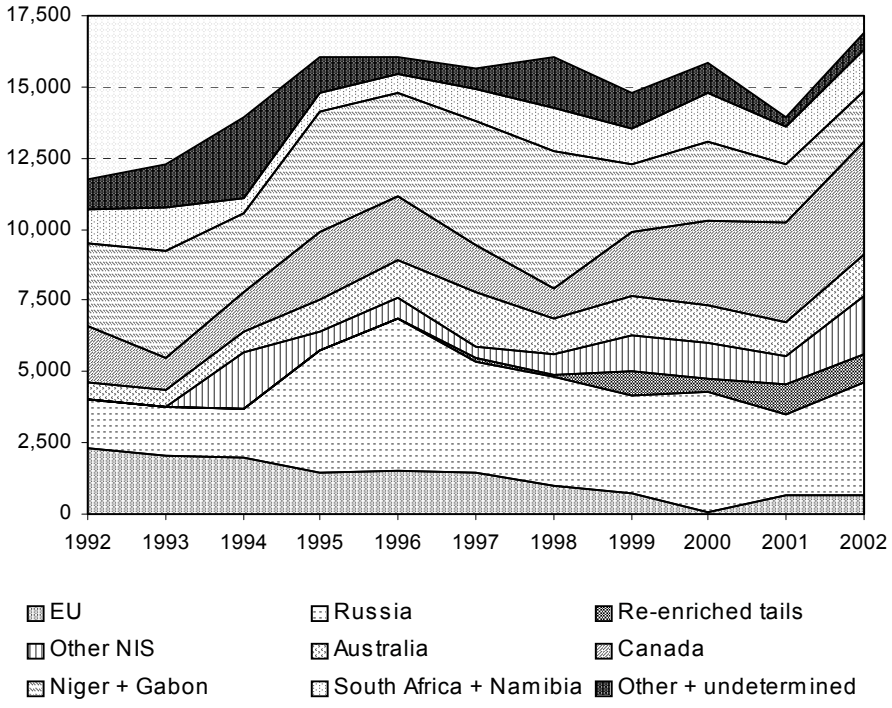
Russia remained the largest overall supplier to the EU utilities in 2002, with deliveries in the order of 3 900 tU, plus 1 000 tU in the form of re-enriched tails (RET) through the EU enrichers. Most transactions for the supply of Russian natural uranium were linked to enrichment contracts.

Canada was the second largest supplier to the EU utilities with deliveries in the order of 3 950 tU, and was followed by Niger, Uzbekistan and Australia (see Graph 4).

Graph 4: Origins of natural uranium delivered to EU utilities in 2002 (% share)



Graph 5: Purchases of natural uranium by EU utilities by origin, 1992-2002 (tU)



The NIS countries remained the largest regional source of supply of natural uranium to the EU with their share increasing relative to the deliveries in 2001. EU utilities took delivery from this source of about 6 000 tU as natural uranium or feed contained in EUP, excluding re-enriched tails (see Annex 2).

PHYSICAL IMPORTS OF NIS ORIGIN MATERIAL

Total physical imports from the NIS of natural uranium, re-enriched tails and feed contained in EUP remained stable at some 8 600 tU in 2002 (practically the same level as 2000 and 2001).

As mentioned above, physical imports of Russian material continued to be essentially in the form of feed contained in EUP or re-enriched tails (natural UF6 equivalent) for western enrichers, imports of fresh natural uranium represented only a few hundred tonnes. Total NIS natural uranium imports reduced from some 4 000 tU in 2000 to about 3 200 tU in 2001 to some 2 700 tU in 2002. For the period 1992-2002, imports of natural uranium and feed contained in the EUP from the NIS as well as tails re-enriched in Russia for EU enrichers amounted to a cumulative total of 122 600 tU. From these, 54 400 tU were aquired by EU utilities during the same period (see Annex 2).

SPECIAL FISSILE MATERIALS

CONCLUSION OF CONTRACTS

The number of contracts and amendments relating to special fissile materials (enrichment, enriched uranium and plutonium for power and research reactors) which were dealt with during 2002 in accordance with the Supply Agency's procedures is shown in Table 3.

Table 3: Special fissile material contracts concluded by or notified to the Supply Agency

Contract type ([1])	Number
A. Special fissile materials	
Purchase (by a EU utility/user)	
— multiannual	5
— spot	13
Sale (by a EU utility/user)	
— multiannual	-
— spot	18
Purchase-sale (between two EU utilities/end users)	
— multiannual	-
— spot	17
Purchase-sale (intermediaries)	
— multiannual	2
— spot	32
Exchanges	4
Loans	15
Total, including ([2])	106
— Low enriched uranium	58
— High enriched uranium	17
— Plutonium	38
Contract amendments	7
B. Enrichment contracts ([3])	
Multiannual	13
Spot	4
Contract amendments	**27**

Notes:
([1]) See explanations under Table 2, as appropriate.
([2]) Some contracts may involve both LEU and plutonium or HEU and plutonium. In addition there were 46 transactions for small quantities (Article 74 of the Euratom Treaty) which are not included here.
([3]) Contracts with primary enrichers only.

DELIVERIES OF LOW ENRICHED URANIUM (LEU)

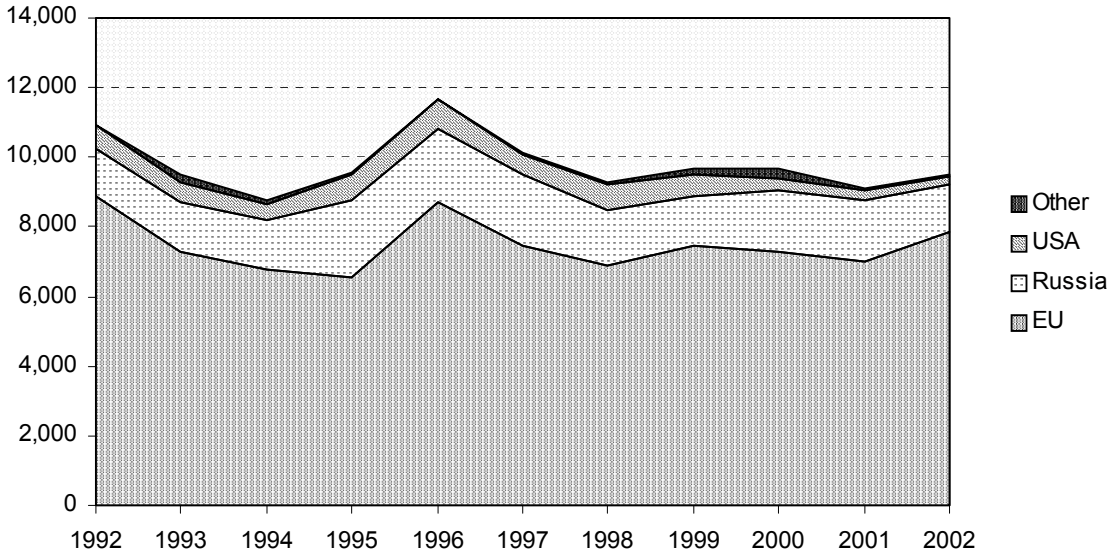
In 2002, supply of enrichment (separative work) to EU utilities totalled approximately 9 500 tSW, delivered in 1 900 tLEU which contained the equivalent of some 15 900 tonnes of natural uranium feed ([12]). Some 83 % of this separative work was provided by EU companies (Eurodif and Urenco).

Deliveries of Russian separative work to the EU utilities under purchasing contracts represented 1 350 tSW or 14 % of the total. However, taking into account the re-enrichment of tails for Eurodif and Urenco, the total imports of Russian enrichment by the EU, and therefore the volume of trade with Russia, amounted to more than double this figure.

Supplies from the United States accounted only for some 2.5 % of the total.

Supply of enrichment to EU utilities by origin since 1992 is shown below.

Graph 6: Supply of enrichment to EU utilities by origin, 1992-2002



([12]) The tails assay used for the calculation of the natural uranium feed and separative work components has a significative impact on the values of these components. An increase in the tails assay increases the amount of natural uranium and reduces the amount of separative work required to produce the same amount of EUP. The optimal tails assay is dictated by the prices of natural uranium and separative work. For its calculations the Supply Agency used the contractual tails assay declared by the utilities or, when this was not available, a standard 0.30 %, although it is recognised that in recent years the trend has been for higher values. It should also be noted that enrichers do not always use the contractual tails assay at their plants. As a result they may become major users or 'producers' of natural uranium according to the circumstances. The real figures for supply and demand of natural uranium and separative work may be influenced in one or the other direction by the real tails assay.

ENRICHED URANIUM FOR RESEARCH REACTORS

Enriched uranium for research reactors is normally supplied in two enrichment assays: just under 20 % (LEU) and about 90 % (HEU). Although the quantities involved represent a minor amount in terms of EU needs for enriched uranium, LEU and HEU supply is very important to the scientific community and for the production of isotopes for medical and industrial applications.

Supply of LEU to research reactors continued unhindered. Reactor requirements for HEU were met, but the source of future supplies continued to be the object of considerable attention. The Supply Agency continued to provide support to reactor operators in the procurement of fuels.

PLUTONIUM AND MIXED-OXIDE FUEL

In 2002, transactions involving plutonium were again mainly related to its use for MOX fuel fabrication, and the Supply Agency concluded 38 such contracts.

The use of MOX has contributed to a significant reduction in requirements for natural uranium and separative work in recent years. However, reprocessing and the use of MOX fuels continue to face difficulties because of the political decisions in some countries to postpone or to abandon this solution for the management of irradiated fuels.

The quantities loaded into EU reactors and the estimated savings from the use of MOX fuel are shown in Table 4. It should be noted that published figures on natural uranium and separative work savings vary considerably; here, it was assumed that 1 tPu saves the equivalent of 120 tU as natural uranium and 80 tSW.

Table 4: Utilisation of plutonium in MOX in the EU and estimated natural uranium and separative work savings

Year	kg Pu	Savings	
		t NatU	t SW
1996	4 050	490	320
1997	5 770	690	460
1998	9 210	1 110	740
1999	7 230	870	580
2000	9 130	1 100	730
2001	9 070	1 090	725
2002	9 890	1 190	790
	54 350	6 540	4 345

COMMISSION AUTHORISATIONS FOR EXPORT

The authorisation of the Commission is required for the export of nuclear materials produced in the Community, according to the provisions of Article 59(b) of the Euratom Treaty (and Article 62.1 (c) in the case of special fissile materials). Requests for these authorisations are submitted to the Commission by the Supply Agency.

During 2002, three authorisations were granted by the Commission for the export of enriched uranium.

CHAPTER 4 — ADMINISTRATIVE REPORT

PERSONNEL

The staff establishment of the Supply Agency at the end of 2002 was 18.

FINANCE

The Supply Agency is financed principally by a subvention from the budget of the Commission, as a result of a Council decision of 1960 to postpone the introduction of a charge on transactions to defray the operating expenses of the Supply Agency as provided by the Euratom Treaty.

The Supply Agency's expenditure in 2002 amounted to EUR 134 378.77.

Costs relating directly to the Supply Agency's staff and its office are borne by the European Commission.

ACTIVITIES OF THE SUPPLY AGENCY

During 2002 the Supply Agency underwent important organisational changes. In February, 2002 a new Head of Unit for 'Contracts and studies in the supply of nuclear fuel' was appointed by the Commission.

At the same time, the Advisory Committee approved a working paper on the 'Role of the Euratom Supply Agency and the Advisory Committee', with the idea of defining, in the scenario of the 21st Century, new tasks for the Supply Agency in the implementation of Chapter 6 of the Euratom Treaty. In this respect the paper proposed 22 recommendations to be implemented by the Supply Agency, in order to orientate the Supply Agency towards a future role, mainly concerned with security of supply in the nuclear fuel cycle, in line with the conclusions of the debate of the Green Paper 'Towards a European strategy for security of energy supply'.

During the year intensive contacts took place between the Supply Agency and the Advisory Committee, to define the best way to carry out the challenge described in the abovementioned report.

One of the first actions taken, as a consequence, was to reorganise the Supply Agency. A new organisational chart was adopted in July 2002, defining as principal tasks for the Supply Agency, the continuation of activities under Chapter 6 of the Euratom Treaty and, as a second pillar, putting emphasis on forward looking market studies. The result of this reorganisation is shown on page 34; it has led to changes in the duties of staff and the recruitment of new staff members.

The Supply Agency also made considerable efforts during 2002 to achieve administrative integration with the Energy and Transport DG, according to the decision taken by the Commission in December 1999 at the moment of the creation of the Energy and Transport DG.

Meetings between the Supply Agency and Energy and Transport DG have taken place in three main areas: human resources management, information technology and training, in order to obtain a solution to the problems posed by this integration, while respecting, at the same time, the particularities of the tasks carried out by the Supply Agency, which require a significant level of confidentiality to keep secure the commercial information it holds. By the end of 2002 the administrative integration of the Supply Agency became a reality, and it is intended to take advantage of existing synergies to make savings for both organisations.

On 15 October 2002, the Supply Agency organised an internal seminar to discuss the future role to be played by the Supply Agency and the ways and procedures to put into effect the new organisational chart. Also the implementation of some of the most relevant recommendations made by the Advisory Committee were analysed. Strong interest was put in the increase of Supply Agency visibility. The internal seminar was animated by the presence of some guest speakers. Of special importance for the Supply Agency was the presence of the Vice-President of the European Commission, Ms De Palacio. She underlined the relevance of the work carried out by the Supply Agency over the last 42 years and endorsed the future role of the Supply Agency.

The President of the Advisory Committee, who also participated in the seminar, confirmed the importance of the tasks carried out up to now by the Supply Agency, but he also stressed the need for a new orientation towards forward looking market studies, taking into account the new liberalised market scenario and the growing importance of security of supply considerations for the European Union.

As a conclusion of the seminar and after further discussions with the Bureau of the Advisory Committee on the ways to implement the 22 recommendations of its report on the future role of the Supply Agency, the latter has proposed to the Advisory Committee the creation of a new instrument of collaboration, in order to carry out together the work of implementation of those recommendations, defining, as a first step, four priorities.

It is expected that the Advisory Committee, at its meeting of March 2003 will establish and define the composition of a task force to be set up, with the objective of tackling these first four priorities.

Between August and November, the Security Directorate of the Commission (Administration DG) carried out, at the request of the Supply Agency, a security audit, to analyse and check in a comprehensive manner the security conditions of the premises and working methods at the Supply Agency. In November the Audit team submitted a final report proposing a set of actions to strengthen further the Agency's security measures, which will be carried out in 2003 in close collaboration with the Security Directorate.

Measures to upgrade the central documentary archives if the Supply Agency were examined, in particular through the use of IT tools. Implementation of these improvements will take place progressively during 2003.

During 2002, the Director-General and the new Head of Unit paid special attention to the need to increase the visibility of the Supply Agency not only outside, but also inside the European institutions. The Supply Agency was associated with Energy and Transport DG at the internal group created by the Director-General of Energy and Transport, Mr Lamoureux, with the aim of preparing the proposals included in the so-called 'nuclear package', and finally adopted by the Commission on 6 November 2002 (see Chapter 1). The main contribution made by the Supply Agency was assistance in the preparation of the proposal of decision of the Council to give to the Commission directives for the negotiation of an agreement between Euratom and the Russian Federation on nuclear trade.

In this regard, during 2002 some meetings took place with the Russian counterpart (Atomic Energy Ministry and TENEX company), in order to prepare for discussions on a future agreement on trade in nuclear materials. Talks were mainly focused on reaching a consensus on the current volume of EU-Russia nuclear trade and its evolution in the last decade.

ACTIVITIES OF THE ADVISORY COMMITTEE

The Advisory Committee held three meetings in 2002.

In the context of a reorganisation of the nuclear services of the Commission, the Committee in February considered it opportune to review the role of the Supply Agency and the role of the Committee with particular regard to the future.

Key to the Supply Agency's future activities is security of supply. Given the Supply Agency's unique status under the Euratom Treaty, which enables it to be an authoritative, independent source of information and monitoring, the Committee would like to see the Supply Agency expand its activities in support of long term security of supply. Specifically it would like the Supply Agency *inter alia*, to identify and monitor market trends and facilitate free and fair trade in nuclear materials, to envisage supply and demand scenarios and to assess the impact of all steps of the fuel cycle on security of supply. The Committee wishes also that the Supply Agency make recommendations to the Commission so that it can be adequately informed of its responsibilities relating to nuclear trade. It considers that the Supply Agency should be well informed and be involved in the negotiation and implementation of international agreements relative to nuclear trade.

The Committee recommends also that the Supply Agency should increase its visibility, and it sees a role for the Supply Agency to act as a bridge between the European institutions and the industry on nuclear trade.

In all, the Committee's advice amounts to some 22 recommendations. Some relate to and support continuation of the Supply Agency's current situation and activities. Others, as indicated above, look to the future, and on these the Supply Agency is in dialogue with the Committee on how it might best proceed, given the resources available.

At its March meeting the Committee, in fulfilment of its statutory duties, examined and gave opinions on the Supply Agency's annual report for 2001, its balance sheet and accounts for the same year and its budget for 2003.

At the end of April the Committee contributed to work being undertaken by the Commission's Directorate-General for Energy and Transport in the context of the energy dialogue between the EU and Russia to deal with Russia's concerns about limitations on nuclear trade with the EU, the possible consequences of enlargement and a possible review of policy guidelines.

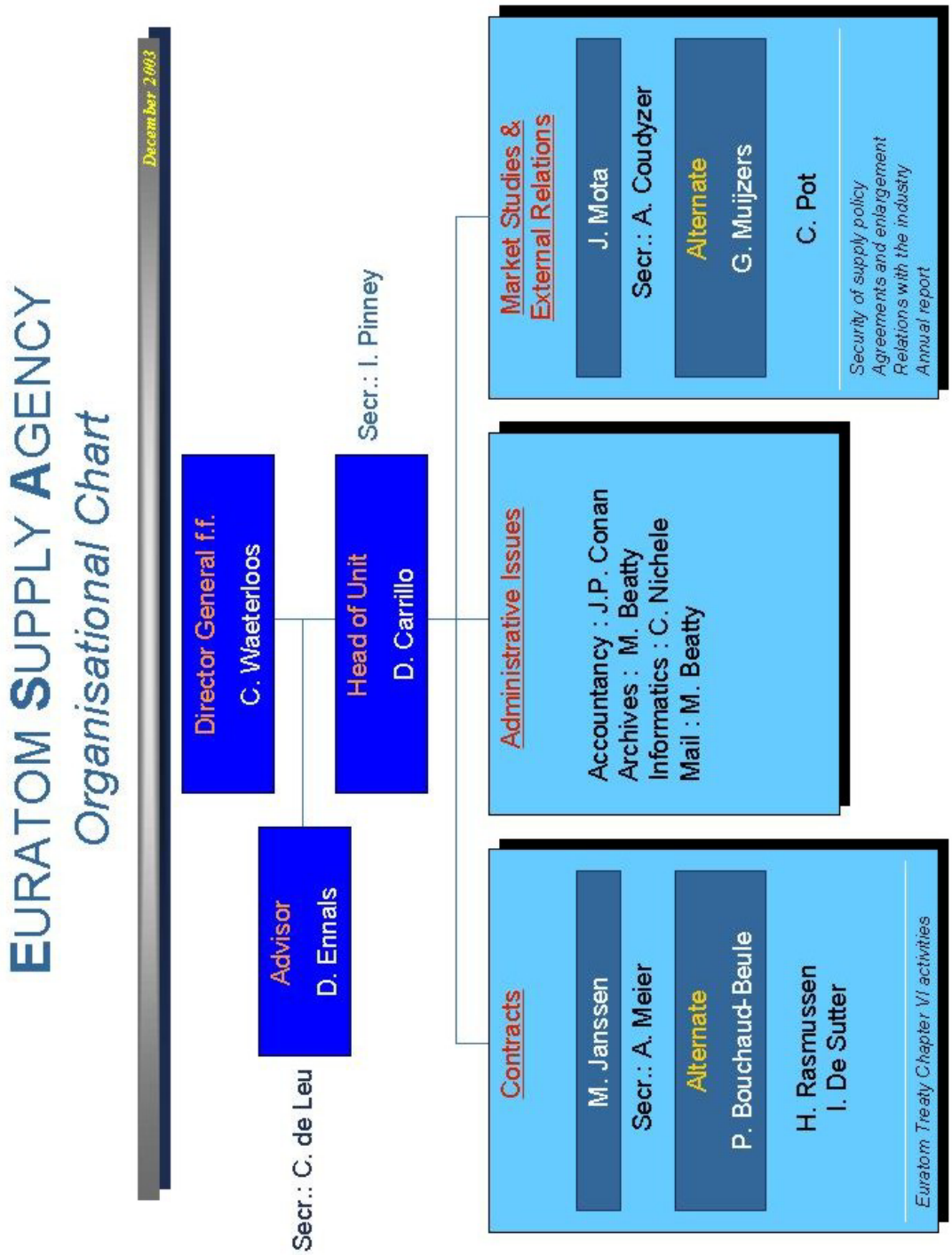
The Committee provided an overview of current trade between Russia and the EU market and drew attention to the situation of the EU enrichment industry both in the global context and its importance for the EU's security of supply. In the view of the Committee it is necessary to maintain the viability of the European industry and a reasonable level of diversification. This objective will be assisted by the monitoring by the Supply Agency of acquisitions of enrichment services, enriched uranium product and natural uranium on a utility by utility basis.

In addressing Russia's concerns, the EU should, in the view of the Committee, ensure that consideration is given to greater transparency being shown by Russia, particularly on production, capacities, stockpiles and environmental matters, as well as to a reciprocal and true opening of markets in comparable conditions, not only in the EU but also in Russia and the accession countries.

At the same time the Committee is in favour of encouraging industrial cooperation with Russia in order to guarantee long-term security of supply while making the best use of the existing Russian production facilities in compliance with high environmental and safety standards.

The Supply Agency expresses its appreciation to the Committee and its enlarged Bureau (officers of the Committee and its standing Working Party) for its excellent cooperation and assistance during the year.

ORGANISATIONAL CHART



Advisory Committee of the Supply Agency

Chairman	L.-F. DURRET (Areva, France)
Vice-Chairmen	G. PAULUIS (Synatom, Belgium)
	J.-L. DE GUZMAN MATAIX (Permanent Representation of Spain to the EU)

WORKING PARTY

Chairman	I. MIKKOLA (TVO, Finland)
Vice-Chairmen	M. S. TRAVIS (Rio Tinto Mineral Services, United Kingdom)
	W. SANDTNER (Ministry of Economic Affairs and Technology, Germany)

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This report and previous editions are available from the Supply Agency's web site:

http://europa.eu.int/comm/euratom/index_en.html

A limited number of paper copies of this report may be obtained, subject to availability, from the above address.

FURTHER INFORMATION

Additional information may be found at Europa, the European Union server at http://europa.eu.int/index_en.htm giving access to the web sites of all European institutions and other bodies.

The address of the European Commission's Directorate-General for Energy and Transport is http://europa.eu.int/comm/energy/index_en.html, where information can be found on e.g. the Green Paper on the security of energy supply, and on electricity and gas market liberalisation.

The climate change site is to be found at http://unfccc.int/index.html

LIST OF ABBREVIATIONS

EU	European Union
Euratom	European Atomic Energy Community
EBRD	European Bank for Reconstruction and Development
IAEA	International Atomic Energy Authority
JRC	European Commission Joint Research Centre
NIS	New Independent States
US(A)	United States of America
(US-) DOC	United States Department of Commerce
(US-) DOE	United States Department of Energy
(US-)-NRC	US Nuclear Regulatory Commission
USEC	United States Enrichment Corporation
EUP	Enriched uranium product
LEU	Low-enriched uranium
HEU	Highly enriched uranium
MOX	Mixed oxide fuel (fuel of uranium and plutonium oxide)
RET	Re-enriched tails
SWU	Separative work unit
tSW	tonne Separative work (= 1 000 SWU)
tU	tonne U (= 1 000 kg uranium)
LLW, ILW, HLW	Low-, Intermediate-, High-level waste
NPP	Nuclear power plant
BWR	Boiling water reactor
HFR	High flux reactor
LWR	Light water reactor
PBMR	Pebble bed modular reactor
PWR	Pressurised water reactor
AVLIS / SILVA	Atomic vapour laser isotopic separation
kWh	kilowatt-hour
MWh	Megawatt-hour = 10^3 kWh
GWh	Gigawatt-hour = 10^6 kWh
TWh	Terawatt-hour = 10^9 kWh

ANNEXES

ANNEX 1. DEVELOPMENTS IN MEMBER STATES ([13])

BELGIË/BELGIQUE — BELGIUM

ENERGY POLICY

In the framework of the liberalisation of the electricity market, the grid manager has been appointed and a new technical regulation for the management of the transport grid and its access has been promulgated. At federal level, consumers up to 10 GWh/year have been allowed to freely choose their producer.

A draft law on the gradual phase out of commercial power plants after 40 years of operation has been approved by the Chamber of Representatives. At the end of 2002, it was under discussion in the Senate.

A draft law on the management of the provisions for the dismantling of the nuclear power plants and for the management of the spent fuel has been approved by the government. At the end of 2002 it was ready for submission to Parliament. The draft law places the provisions under the supervision of a committee of high government representatives. It must guarantee the availability of the provisions in all possible circumstances at the moment they are needed.

The financing of old nuclear facilities has been completely changed by the government. A law has been promulgated which stipulates that from 2003 onwards the restoration of the old Eurochemical plant and the old waste department of the CEN•SCK must be covered by an extra charge on the electricity consumed in Belgium.

NUCLEAR ELECTRICITY GENERATION

In Belgium, seven reactors of the PWR-type are in operation. Their total net capacity equals 5 761 MWe. In 2002 these reactors (including the French share of Tihange 1) produced about 44.7 TWh. This is 1.7 % higher than in 2001. It represents a share of 57.3 % of total electricity production. At the beginning of the year 2002, the capacity of Tihange 2 was increased to 1 008 MWe, following official acceptance of the replacement of the steam generators. The load factor of Belgium's nuclear power plants reached 88.6 %.

FUEL CYCLE DEVELOPMENTS

The production of MOX fuel by Belgonucleaire in its Dessel plant amounted to 37 tonnes in 2002, which will be used in German and Swiss nuclear power plants. Eight fresh MOX fuel elements were loaded in 2002 in Doel 3, bringing the cumulative total of loaded fresh MOX elements for the whole of Belgium to 112.

([13]) This Annex comprises contributions made by the Member States.

Belgium continued to recycle the uranium recovered from the reprocessing of its spent fuel. In total eight reloads have been manufactured with re-enriched reprocessed uranium of the Doel 1 unit.

In the course of 2002, a fourth shipment of vitrified high-level waste took place from La Hague to the temporary storage building of the Belgoprocess site at Dessel.

The R & D programme on geological disposal of conditioned spent fuel and high-level, medium-level and long-lived waste has been continued. As part of the extension of the underground research laboratory the connecting gallery between the existing laboratory and the second access shaft has been realised. In the future experimental gallery perpendicular to this gallery, the feasibility of the underground disposal concept for high-level waste will be demonstrated. The disposal concept to be tested is under thorough review.

The SAFIR 2 report, giving an overview of the scientific results obtained so far and indicating future R & D orientations has been submitted for an international peer review by the Nuclear Energy Agency. The results are awaited in the beginning of 2003.

During 2002, 116 spent fuel elements were placed in four dry storage containers in the interim storage building at Doel. This brings the total to 1 154 spent fuel elements placed in 41 containers. At Tihange, 180 spent fuel elements were placed in the wet storage building, which brings their total to 995. At the Dessel site, the equivalent of 205 spent fuel elements coming from the BR3 reactor were placed in dry storage containers.

With respect to the disposal of low-level and short-lived waste, the local partnerships at Mol and Dessel actively continued their work. They examined the disposal concepts and their safety aspects, and they are preparing integrated projects, incorporating the disposal facility in a broader development of the region. At Fleurus-Farciennes the site investigations concluded positively on the possibility of near surface disposal, following which a decision to create a local partnership was taken. An overview report of the ongoing activities was submitted to the government at the beginning of 2002.

RESEARCH

In Belgium, one materials-testing reactor, known as BR2, is in operation. This reactor is used for scientific programmes relating to the testing of materials for fission and fusion and fuels. It is also used for the production of radio-elements and for silicon doping.

The BR2 reactor uses highly enriched uranium. An agreement has been concluded with the United States to convert it to low enriched uranium. The necessary studies to prepare for this conversion are under way. In exchange for this conversion, the United States has agreed to deliver the highly enriched uranium needed by BR2 until its conversion takes place. An agreement has been concluded between CEN•SCK and Cogema for the reprocessing of the spent BR2 fuel. In the last few years, regular shipments to La Hague (of which there were three in 2003) have taken place. The agreement covers both the past and the present production. In the reprocessing process, the uranium is diluted to about 1 % enrichment.

The CEN•SCK is working on an accelerator driven system (ADS), called Myrrha, for multiple purposes (amongst which is research on transmutation of minor actinides). There are no new elements to record beyond those mentioned in the previous annual report.

DANMARK — DENMARK

The Danish energy policy has the following main objectives:

- high security of energy supply through stable and internationally coordinated framework conditions for the energy markets;

- increased competition and efficiency in the electricity and gas markets through liberalisation and unbundling of system operation and transmission from generation and trade of energy;

- cost-effectiveness in achieving environmental goals, including use of the flexible mechanisms of the Kyoto Protocol for CO_2 reductions and promotion of renewable energy on market conditions;

- high level of consumer protection through efficient and transparent energy markets.

Denmark has no nuclear power plants, and nuclear power is not an option in Danish energy policy. The existing relatively small amount of Danish radioactive waste arises mainly from the operation of research reactors and from post-irradiation characterisation of experimentally produced fuel elements in the period 1970 to 1990 at Risø National Laboratory. In 2002 there were no reactors in operation at Risø National Laboratory. A 10 MW heavy water moderated reactor, DR3, used for basic research, silicon doping, and isotope production, and a small homogenous reactor, DR1, used for educational purposes were stopped permanently as was the fuel element fabrication plant in 2002. Another research reactor, DR2, was decommissioned to stage 2, just as the Risø hot cells used in the post irradiation studies were too. The only nuclear facility in operation is the waste treatment plant.

Responsibility for the nuclear facilities, is planned to be transferred to a new organisation: Danish Decommissioning, established under the Ministry of Science, Technology and Innovation. The organisation will take care of planning and practical work in connection with future removal of the nuclear facilities. A Danish repository for low-and intermediate-level waste will be needed in this context, but at the end of 2002 there were no concrete plans for such a facility.

The remaining spent fuel from DR3 has been sent by ship to the United States according to the US policy for research reactor fuel of US origin. There are no plans for disposal of high-level waste in Denmark.

Low-level waste (LLW) and intermediate-level waste (ILW) are collected, treated and stored in intermediate storage facilities situated at Risø.

Solid LLW is compacted in drums and liquid ILW is treated in an evaporator and a bituminisation plant. Between 1/2 and 2/3 of the LLW is produced by Risø National Laboratory, the rest comes from hospitals, industry, laboratories and other users of radioactive isotopes in Denmark. At the end of 2002 about 4 800 drums were stored in the facility for LLW. The facility has a capacity of about 5 000 drums. Decommissioning waste is expected to dominate future waste generation.

The storage facility for ILW is also used for long-lived LLW. At the end of 2002 about 160 m^3 long-lived ILW and LLW were stored in the facility.

DEUTSCHLAND — GERMANY

Germany's 19 nuclear power plants produced about 164.8 TWh of electricity (gross) in 2002. Compared with the record level of 2001, this equates to a fall of 3.8 %, which is essentially due to technical outages at the Brunsbüttel and Unterweser nuclear power plants (for almost 11 months and almost four months respectively). As in the past, the level of availability at the other nuclear power plants was high. Nuclear power's share in the public electricity supply is about one-third, but over 50 % in the case of the base load.

The agreement between the German Federal Government and the energy supply undertakings on the phasing-out of the use of nuclear energy for electricity production purposes, which was initialled on 14 June 2000, was implemented to a large extent in April 2002 when the amended Nuclear Energy Act entered into force. The most significant provision concerns the definition of the amounts of electricity still to be produced, calculated on the basis of a total lifetime of 32 years per plant. Another provision, namely the building of intermediate storage facilities for spent fuel elements at reactor sites, is also in the process of being implemented. The on-site intermediate storage facility at Lingen has been completed and licensed in accordance with nuclear energy legislation. It entered into service in December 2002, when a fuel element cask (Castor V/19) was placed into storage. The licence for the on-site storage facility at Grohnde has also been granted; it is expected that licences for a further 10 intermediate storage facilities and five interim storage facilities will be granted in 2003. The aim is to ensure that all on-site intermediate/interim storage facilities are ready for operation by the time the ban on the transportation of spent fuel elements for reprocessing comes into force in mid-2005.

The industry made further progress, without public funding, on the development of a European pressurised water reactor (EPR), jointly with French partners, and of an innovative boiling water reactor incorporating passive safety features to control failures (SWR 1 000).

Compared with the previous year, there was a substantial increase in shipments of spent fuel elements sent for reprocessing in France and the UK, a total of 93 casks being transported without technical problems.

In 2002, departing from what was the normal practice of transporting six casks per train, a shipment of 12 casks (double pack) of vitrified highly-radioactive waste was transported after reprocessing in France to the intermediate storage facility for fuel elements at Gorleben. There are thus currently 32 casks at the storage facility. The capacity at which the central intermediate storage facility for fuel elements at Ahaus operated remained unchanged in 2002.

The ANF fuel element fabrication plant at Lingen, a subsidiary of Framatome ANP GmbH, operated at full capacity as it had done the previous year.

In 2002, the URENCO uranium enrichment plant at Gronau achieved a capacity of 1 500 tonnes of uranium separation. The plant continues to operate at almost 100 % capacity. In the antidumping and countervailing duty proceedings against URENCO in the United States initiated by USEC in respect of imports of low-enriched uranium from Germany, the Netherlands and the UK, the International Trade Commission (ITC) decided that the imports in question had caused USEC injury, or threatened to do so, and fixed the rate of duty at 2.23 %. URENCO has appealed against the ITC ruling.

On 19 July 2002, URENCO signed a memorandum of agreement (MOA) with the Cameco Corporation, the Westinghouse Electric Company, Fluor Daniel and the affiliates of three US energy companies, Exelon, Entergy and Duke, as an initial move towards restructuring the LES partnership. The MOA marks the first step towards formal cooperation on designing, building and operating a new uranium enrichment plant in the United States on the basis of URENCO centrifuge technology.

On 6 October 2002, URENCO and AREVA signed a memorandum of understanding aimed at establishing a joint venture in the field of centrifuge technology for uranium enrichment.

The pilot conditioning installation at Gorleben was ready for operation during 2002. However, in accordance with the agreement of 14 June 2000, the operating licence restricts the use of the installation to the repair of defective casks.

On 5 July 2002, following a procedure which took more than 20 years to complete, the decision was taken to grant official approval for the Schacht Konrad final waste storage project. In order to give possible objectors an opportunity to appeal, the decision was not enforced with immediate effect, as was originally intended. Several actions have since been brought against the decision. Until a final decision is taken on them, they will have a suspensory effect as regards the conversion of the mine for use as a final storage facility for low- and medium-level radioactive waste. The mine will be maintained in operational order until then.

The situation as regards the Gorleben final waste storage facility project remains unchanged. Underground exploratory work was suspended on 1 October 2000 for at least three years, but for no more than 10 years, until safety and design problems are resolved. In the meantime, the exploratory mine has been kept in operational order.

Plans for the decommissioning of the Morsleben final waste storage facility are still being drawn up, and preparations for the planning procedure required for this are still in progress.

The dismantling of the MOX plant and the uranium processing plant at Hanau is progressing according to plan. The dismantling work at the Karlsruhe reprocessing plant, which was suspended owing to the theft of radioactive material, was resumed after the incident had been cleared up. Construction of the vitrification plant at Karlsruhe for the solidification of highly active liquid waste is proceeding according to schedule.

The decommissioning of research reactors which use fuel of US origin continued without complications in line with the agreements made with the US DOE. It was still not possible for the spent fuel elements of Russian origin temporarily stored in the shipment preparation chamber at the VKTA at Rossendorf in CASTOR MTR 2 casks to go into intermediate storage at the Ahaus intermediate storage facility as planned and contractually agreed with the operator.

It has not yet been possible to grant a definitive operating licence for the FRM 2 research reactor at the Technical University of Munich, partly because the application did not adequately describe how spent fuel was to be handled and disposed of.

Non-plant-specific, application-oriented and institutionally supported basic research on nuclear waste management and reactor safety research was successfully continued, despite a slight reduction in funding. The involvement of German R & D establishments in EU, bilateral and multilateral collaborative projects again increased considerably. It is gratifying to report that, thanks to the mutual respect that exists in the scientific field, cooperation with western European countries and the United States developed further. Scientific and technical cooperation with Russia and the countries of central and eastern Europe, especially the prospective EU Member States, has been given fresh impetus now that application-oriented research is also possible there.

The federal undertaking Wismut GmbH continued the decommissioning and remedial measures in the former uranium-mining areas of Thuringia and Saxony which began in 1990. The aim is to ensure that remediation is both environmentally sound and economically efficient. The extensive decommissioning and remedial measures have led to a significant reduction in contamination by radioactive and conventional pollutants in these regions. Well over half of the work has now been completed. The Wismut project has become an internationally significant reference project as regards the remediation of former industrial sites contaminated by radioactive substances and toxic chemicals.

ESPAÑA — SPAIN

ENERGY POLICY

In September 2002, the government approved a 'Documento de Planification y Desarrollo de las Redes de Transporte Electricio y Gasista 2002-11', in which it is considered that the participation of nuclear energy in Spain will be kept at the present level for the period 2002-11. In consequence, its weight in the general structure of energy supply will fall.

Since the useful life of the plants in operation has been established at 40 years and that the period covered by the energy plan culminates in 2011, the potential incidence of the closing down of the nuclear power plant Jose Cabrera in April 2006 will be compensated by activities intended to increase the power generated in other plants in which this will be feasible, either by optimising the thermal return from large components of the plant, or increasing the thermal power generated from the fuel. In consequence, from the planning point of view, the installed nuclear power will be kept constant during the period 2002-11.

NUCLEAR POWER AND ELECTRICITY GENERATION

Electricity production reached 245 28 GWh, an increase of 3.3 % from 2001. Nuclear power plants produced 63 026 GWh (25.7 %) with an installed capacity of 7 875 MW (15.8 %) and nine reactors. The overall capacity factor reached 91.2 %.

NUCLEAR FUEL CYCLE

Front end of the cycle

Since at the end of the year 2000 the mining activities have been brought to an end. During 2002 there was only a residual production at the Quercus Plant, of ENUSA Industrias Avanzadas, SA, amounting to 44 tonnes of U_3O_8. At the end of 2002, ENUSA declared the residual production activities of concentrates of uranium to be definitively terminated.

The Juzbado nuclear fuel factory (Salamanca), also the property of ENUSA, continued in 2002 to manufacture fuel elements for nuclear power reactors in Spain and other European countries. Up to 788 elements were fabricated, containing 240 tonnes of uranium. Up to 379 elements were produced for reactors of the PWR type, 307 for the BWR type and 102 for the VVER type. More than half of the fuel elements produced were exported to Sweden, Germany, Belgium and Finland.

Back end of the cycle

During 2002, the medium and low solid radioactive waste storage installation at Sierra Albarrana (el Cabril), owned by Empresa Nacional de Residuos Radiactivos, SA (ENRESA), received 229 expeditions placing 308 containers in storage. By 31 December 2002 there were 3 954 containers in storage, and the use of the installation's capacity amounted to 45 %. Saturation will occur around 2016. In May 2002 at the Trillo nuclear power station the facility for temporary storage of the plant's spent fuel in metallic containers started operation. By mid 2002 two containers with spent fuel were already in storage.

The dual use metallic containers, for the storage and transport of spent fuel elements, used in the storage installation of the Trillo nuclear power station, are manufactured in the facilities of Equipos Nucleares SA of Cantabria, Spain. In 2002 one container was manufactured and at the end of the year another five were in various phases of manufacturing and tests. The delivery of four containers is scheduled for 2003.

DISMANTLING

By 31 December 2002 the work of decommissioning of the nuclear power station Vandellós I, authorised at the beginning of 1998, was 98 % complete. The ending of the authorised activities is foreseen for the first quarter of 2003. At that moment the so-called level 2 will be launched and the period of latency whose length is estimated at 30 years will begin. The most important tasks carried out during 2002 were: dismantling of active components, declassification of materials, decontamination of walls, declassification of active areas, demolition of conventional buildings, assembly of the new reactor building protection and construction of infrastructures for the latency phase.

RESEARCH REACTORS

In Spain there are no research reactors in operation; those previously in operation are in various phases of dismantling and the spent fuel of the reactor has already been returned abroad. The work of decommissioning of the experimental reactor ARGOS at the Universidad Politécnica de Barcelona, authorised in April 1989, was terminated in 2002. In May 2002 the decommissioning of the experimental reactor ARBI, from the Labein Foundation in Bilbao, was authorised.

The experimental reactor Jen-1 is located at the Centro de Investigaciones Energéticas, Medioambentales y Tecnológicas (CIEMAT) of Madrid. Its fuel was removed and returned abroad during the last decade. The programme for the improvement of the facilities of the CIEMAT (PIMIC) is currently under way. It covers the dismantling of this reactor as well as other closed down and obsolete facilities, the modernisation of buildings and facilities, and the cleaning-up of infrastructures in the centre. There are no plans for the construction of new research reactors.

FRANCE

HIGHLIGHTS

At 31 December 2002, the French nuclear facilities numbered 58 pressurised water reactors in operation (34 of 900 MW, 20 of 1 300 MW and four of 1 450 MW) and one fast breeder reactor (Phénix, 250 MW).

In a major reorganisation of the French nuclear industry, the AREVA group was founded in September 2001 as a holding concern, incorporating two divisions: one grouping the activities dealing with the front end and back end of the fuel cycle under COGEMA, the other handling the supply of fuel assemblies and activities concerning reactors under Framatome ANP.

Corporate governance measures for this new organisation were put in place in 2002. The function of directing and managing the group was entrusted to the Executive Board, comprising five members, and the supervisory function is being undertaken by the Supervisory Board, which represents the shareholders, in order to regularly and effectively monitor the management of group business. Three special committees, which report to the Supervisory Board, have also been established, namely: the Strategy Committee, the Audit Committee and the Nominating Committee.

Research on nuclear waste management continued in 2002.

Concerning studies in deep geological layers, the drilling of an underground laboratory shaft in a clay formation in eastern France by ANDRA, the National Radwaste Agency, had to be suspended after a fatal accident occurred in May 2002. This unfortunate delay has led ANDRA to review its programme in order to be able to draw priorities and key elements for its final report to the government now expected in 2005.

From a scientific point of view, the publication of an initial subsoil report was a significant milestone, and a series of complementary bores has already been programmed for 2003. Ten partnership agreements have also been signed with French and overseas scientists.

NUCLEAR POWER AND ELECTRICITY GENERATION

Gross national consumption of electricity in 2002 rose to 448.7 TWh, approximately the same value as in the year 2001. The export balance amounted to 76.8 TWh (2001: 68.4 TWh).

Total net production of electricity rose to 532.9 TWh, i.e. 1.9 % more than in 2001.

Up to 416.5 TWh were produced by nuclear power stations, representing 78 % of domestic production. Thermal production from fossil fuels was 52.9 TWh, representing an increase of 15.3 % compared with 2001. Hydroelectric production decreased by 16.6 % compared with 2001 and amounted to 64.5 TWh.

The nuclear plant mix has been completely in operation since April 2002.

As regards nuclear operation, 2002 showed an increase in the availability factor, which was 82 % compared with 81.1 % in 2001.

The peak of domestic consumption of 76 GW was reached on 10 December 2002

At the end of 2002, 20 reactors were operating with MOX fuel.

URANIUM MINING

In 2002, there was no national commercial production of uranium, all national mines having been closed by mid-2001.

Production managed by COGEMA in Canada amounted to about 5 413 tU. The Cluff Lake mine was closed by mid-2002. Mc Lean Mill performed at nominal capacity throughout the year. COGEMA's share of McArthur River and Key Lake production was 2 174 tU.

In Niger, the production was 3 076 tU, close to the 2001 figure.

URANIUM CONVERSION

In 2002, the two COMURHEX plants of Malvesi and Pierrelatte operated satisfactorily, and produced a little less than 12 500 t. The conversion market and price indicators are recovering, and COMURHEX is preparing an increase of the production capacity in 2003.

URANIUM ENRICHMENT

A comprehensive life-extension maintenance programme, started a few years ago, was completed in 2002 on the Georges-Besse plant, reinforcing its excellent condition and its sustainability for the coming decade.

The plant was operated at three quarters capacity and EURODIF provided more than one fifth of the world enrichment needs, serving more than 30 customers, in a market of about 37 million SWU/year, slightly increasing.

Electricity was provided to the plant by an increasing number of European suppliers, some of which used the possibility offered by their contract to supply EURODIF with both natural uranium and electricity for their enrichment services.

REPROCESSING

The UP2 and UP3 plants operated very satisfactorily during 2002: 550 tonnes of oxide fuel were reprocessed in UP2 and 510 t in UP3. The cumulative quantity of spent fuel reprocessed in the La Hague plants has been 18 307 tonnes since 1976.

During the year 2002, the return of residues to the foreign customers (Japan, Germany, Switzerland, and Belgium) rose to 448 canisters.

MOX FUEL FABRICATION

The Cadarache and Melox plants operated at full capacity. Cadarache production amounted to 36.8 tHM (tonnes of heavy metal) and Melox production amounted to 96.5 tHM

Commercial production of MOX fuel in Cadarache will cease by 31 July 2003 due to evolution of the anti-seismic requirements.

In September 2002, the French Government approved the opening of a public enquiry concerning the increase of the authorised capacity of the Melox plant from 101 tHM to 145 tHM, corresponding to the transfer of the Cadarache plant capacity to Melox.

NEDERLAND — THE NETHERLANDS

ENERGY POLICY CONSIDERATIONS

On 26 February 2002 the Minister of Economic Affairs sent a so-called 'Energy report' to Parliament with the title: 'Investing in energy, choices for the future'. This report emphasises the importance of investment for continuing to safeguard the security and environmental quality of the energy supply in the future. It is primarily a forward-looking document (for the period 2002-06), but also reviews past developments in the area of energy conservation, renewable energy and experience with the operation of the Electricity and Gas Act.

In the debate about the role of nuclear energy in the energy supply, the Dutch Government has adopted the position that nuclear energy can only be an option on condition that the safety of the storage of nuclear waste and of nuclear power plants can be sufficiently guaranteed. Given the potential of nuclear energy to limit the volume of CO_2 emissions the Netherlands takes part in the international debate on this subject, follows developments in other countries and monitors international research in this area.

NUCLEAR ELECTRICITY AND CONSUMPTION

The Borssele NPP (450 MWe) was in base load operation during the year. The plant load factor was 93.5 %. In 2002 the national consumption of electricity reached 104.3 TWh. Some 88 % was produced by domestic electricity generation; the difference was covered by imports. Borssele NPP contributed 4 % to the domestic electricity generation.

The Borssele NPP was ordered by two successive governments to shut down, earlier than originally foreseen, by December 2003. However, the new government, which took office in the beginning of August, has agreed to postpone closure of this plant, as it said 'taking into account the Kyoto obligations, it would not be sensible to close Borssele prematurely'. The new Cabinet will consult with the owner of the plant in order to seek an agreement on continuing the operation of the plant taking into account its economic and technical lifetime.

Simultaneously, in a civil procedure launched in December 2000 by the previous government — aimed at forcing the owner EPZ to shut down Borssele NPP — the Court ruled on 25 September 2002 that there was no arrangement concluded in the past between the government and EPZ to close down the NPP at the end of 2003.

ENRICHMENT

In the antidumping and countervailing duty investigations initiated by USEC for imports of low enriched uranium from the Netherlands, Germany and the United Kingdom, the International Trade Commission found that these imports had caused, or threatened to cause injury to USEC and imposed a definitive duty of 2.23 %. Urenco has appealed the ITC decision.

On 19 July Urenco signed a memorandum of agreement (MOA) together with Cameco Corporation, Westinghouse Electric Company, Fluor Daniel and the affiliates of three US energy companies, Exelon, Entergy and Duke, as an initial step towards restructuring the LES partnership ([14])

On 6 October Urenco and Areva signed a memorandum of understanding with the aim of establishing a joint venture in the field of centrifuge technology for uranium enrichment.

The current capacity of Urenco Nederland is 1 850 t SW/a. However in 1999 the company obtained a licence to expand its capacity to 2 500 t SW/a for which a fifth enrichment plant at the Almelo site has been built. In early 2003 a new nuclear licence was granted to increase the capacity to 2 800 t SW/a.

NUCLEAR RESEARCH

There are three nuclear research reactors:

— interfacultair reactor institute (pool) 2 MW in Delft;

— high flux reactor (HFR) (tank) 45 MW in Petten (owned by EC/JRC and)

— low flux reactor in Petten.

The HFR went critical on 9 November 1961 and is one of the most powerful multipurpose materials testing reactors in the world.

The network created around high temperature reactor technology (HTR-TN) has been a success and has led to new European developments and several new technical projects in the HFR.

In the medical field, the HFR, the European leader for radioisotope production, continues to assure the production necessary for treatment and diagnosis of several millions of European citizens each year.

In 1999 the European Commission decided to convert the reactor to low enriched uranium. Diplomatic notes were signed in January 2000 with the US authorities to accept this commitment. Following this exchange of notes the option to return spent fuel of US origin to the United States also became available and shipments have already taken place.

NUCLEAR WASTE POLICY

The COVRA organisation for the management of radioactive waste is presently building an intermediate storage facility (HABOG) for highly radioactive materials. This facility will contain irradiated fuel from all Dutch nuclear facilities (Delft university reactor, the Petten high flux reactor, and residues from the reprocessing of the Dodewaard and Borssele fuel in Sellafield and La Hague) and should be available in 2003.

In April 2002, all shares of COVRA were transferred from the Dutch utilities to the government. The utility EPZ, the major shareholder, paid the government a sum of EUR 45 million to transfer the residual responsibility of future radwaste disposal to the State.

ÖSTERREICH — AUSTRIA

1. ENERGY POLICY

The Austrian energy policy goals, laid down by the Federal Government in 1996 and declared to the International Energy Agency, have remained unchanged since then.

Austria's energy supply is based on the following four goals: security, cost-efficiency, environmental compatibility, and social acceptability.

These energy policy goals align with those of the EU and the principles of the International Energy Agency. In order to achieve these objectives, the Federal Government uses the strategies of promoting the rational use of energy (improvements in energy efficiency) and of renewable sources of energy.

These strategies are complemented by a number of activities in various energy policy action fields such as the liberalisation of energy markets, diversification of energy sources, diversification of suppliers, IEA crisis-mechanisms, mandatory oil stocks, prohibition of nuclear energy and price monitoring.

1.1. AUSTRIA AND THE EUROPEAN UNION

For Austria, among all international fora, the EU is certainly the dominating driving force for intensified international cooperation. Due to this cooperation a large number of activities in many fields of energy policy have been carried out.

Examples include:

a directive on energy efficiency (SAVE II-programme);

renewable sources of energy (the Altener II-programme);

a directive on the promotion of electricity from renewable energy sources in the internal electricity market;

minimum stocks of crude oil and/or petroleum products;

the directive on the single market in natural gas;

(14)

coal: the promotion of clean solid fuel technologies (the CARNOT0-programme);

the directive on the single market in electricity;

the energy programmes within the framework-programme for research, technological development and demonstration (ENERGY);

cooperation with non-member countries in the energy sector (the SYNERGY-programme).

2. NUCLEAR POLICY

Austria does not operate any nuclear power plant. The underlying policy dates back to November 1978, when a referendum on the putting-into-operation of a nuclear power plant in the village of Zwentendorf (Lower Austria) yielded a negative result. As a consequence, on 15 December 1978, the Austrian parliament promulgated a law on the prohibition of the use of nuclear fission for energy supply in Austria (BGBl No 676/1978, „Bundesgesetz über das Verbot der Nutzung der Kernspaltung für die Energieversorgung in Österreich'). This Austrian position vis-à-vis nuclear power was strengthened by the Chernobyl accident in 1986, which substantially increased the opposition of all political parties and the public at large against nuclear power. In 1999 this ban of nuclear power was further strengthened by elevating it to the level of constitutional legislation (BGBl. I No 149/1999, „Bundesverfassungsgesetz für ein atomfreies Österreich').

3. RESEARCH REACTORS

3.1. ATOMINSTITUT (ATOMIC INSTITUTE)

The 'Atominstitut' of the Austrian Universities, belonging administratively to the Technical University Vienna, operates a TRIGA Mark II research reactor. It has a maximum steady state thermal output of 250 kW and pulsing capabilities of up to 250 MW. In operation since March 1962, the reactor has been used exclusively for basic and applied academic research and teaching purposes. Being the closest research reactor to the IAEA headquarters, it is also frequently used by IAEA staff for development and calibration of safeguards instruments. The total number of fuel elements in the core is presently 81, the estimated total activity of these fuel elements after one year of cooling time is 2.85 E15 and after 10 years approx. 1.81 E14 Bq. The Atominstitut has a total spent fuel storage capacity of 168 fuel elements.

3.2. REAKTORINSTITUT GRAZ (REACTOR INSTITUTE)

The Graz Reactor Institute has operated a nominal 10 kW Siemens ARGONAUT reactor since 1965. The uranium fuel enrichment levels are 20 and 90 %. The reactor is mainly used for training purposes within the framework of the Graz Universities' education programme. The available fuel reserves will last until 2005.

4. DECOMMISSIONING

The ASTRA research reactor at the Austrian Research Centre Seibersdorf (ARCS), a 10 MW thermal water-cooled and moderated swimming-pool type reactor, was in operation from 1960 until its final shut down in July 1999. All the remaining spent fuel from this reactor was transferred to Savannah River (United States) in May 2001 for final storage. Respective information regarding the decommissioning procedure and the impact on the environment and other EU-Member States has been sent to the EU-Commission and has been accepted by the Commission. Required environmental impact assessment was successfully finished at the end of 2002. Currently the reactor is in the process of decommissioning. All radioactive material will be removed from the reactor building. Thereafter the non-contaminated reactor building will be used as an intermediate storage for conditioned radioactive waste.

5. RADIOACTIVE WASTE IN AUSTRIA

5.1. GENERAL ASPECTS

In general, radioactive waste generated in Austria is collected by and treated at the ARCS. According to the Austrian Radiation Protection Act the costs of radioactive waste management have to be borne by the producer. That means that each producer of radioactive waste has to pay a fee for the treatment of the waste at the time of delivery to ARCS including costs for intermediate storage as well as an additional fee to a fund, established for the subsequent final storage. With regard to the final storage of radioactive waste the Radiation Protection Act in line with the IAEA Joint Convention on the Safety of Spent Fuel Management and the Safety of Radioactive Waste Management stipulates that European as well as international cooperation should be taken into consideration.

Since Austria does not operate nuclear power plants, there is no major production of high level radioactive waste (HLW). Consequently, there is no need for intermediate or final storage capacities in Austria for HLW, e.g. for spent fuel. The relatively small quantities of HLW resulting from the Austrian research reactors are covered by a framework contract for „US-origin nuclear fuel' and will be returned to the United States.

5.2. FACILITIES FOR RADIOACTIVE WASTE MANAGEMENT

Low and medium level waste from hospitals, industry and research laboratories (20 tonnes/year) is collected by and treated at ARCS. The research centre is equipped with suitable facilities to process and condition low and medium level waste, e.g. incinerator, super-compactor and wastewater evaporator. As a conditioning process, cementing is predominantly used. On the basis of the current Joint Agreement between the Republic of Austria, the community of Seibersdorf and ARCS, the intermediate storage facility is scheduled to be operated until 2012 on the site of the research centre with a capacity of 15 000 drums of conditioned waste. A new joint agreement is under negotiation with the aim of using the decontaminated reactor building for intermediate storage and of extending the time for intermediate storage for a longer period beyond 2012 to allow for careful scrutiny and decision-making for a solution on the final storage of radioactive waste.

PORTUGAL

ENERGY POLICY CONSIDERATIONS

With the aim of reducing the overdependence on imports and the energy intensity of the GDP as well as the level of greenhouse gas emissions, Portugal is implementing the so-called ' E_4 programme on efficiency of energy and domestic sources of energy' already mentioned in last year's report. As regards the electricity sector and within the programme of the EU to build the internal energy market Portugal and Spain are implementing a protocol of cooperation to develop and consolidate the Iberian electricity market.

ELECTRICITY CAPACITY AND PRODUCTION

As far as the electricity system is concerned, total installed capacity in 2002 remained at the level of 10.9 GW_e with a moderate increase in the contribution of renewables. 'Net domestic production was in the order of 42TWh'

NUCLEAR ELECTRICITY GENERATION

Portugal has no plans to implement a nuclear power programme.

FUEL CYCLE DEVELOPMENTS

Yellow cake production has ceased and no production took place in 2002.

RESEARCH REACTOR

The RPI, a 1 MW_{th} open core swimming pool, owned and operated by the Instituto Tecnológico e Nuclear (ITN) under the Ministry of Science and Higher Education, is the only reactor existing in Portugal and the only one in the Iberian Peninsula.

The reactor, which is currently running on a two shift per day basis by totally renewed staff, uses fuel the disposal of which is covered by the 'US foreign research reactor spent nuclear fuel receipt programme'. The existing fuel is sufficient to run the reactor at the present usage level until the end of the period presently covered by that programme.

The reactor usage, of which 20 % is by organisations external to ITN and, in most cases, to the country, has been increasing in recent years. It is expected that the reactor operation will continue beyond the period presently covered by that programme and the reactor would then revert to using 20 % enriched fuel. Procurement and final destination of that fuel are coupled and have yet to be determined.

The reactor utilisation is dominated by research work requiring neutron activation analysis which contributes now to about 50 % of the irradiation time, but significant increases of neutron beams, now five beam tubes and the thermal column in regular use, will give further impetus to the reactor utilisation.

SUOMI — FINLAND

In 2002 the Parliament made a decision that was significant for the energy policy in Finland. Two years earlier, in 2000, an electricity generation company, Teollisuuden Voima Oy (TVO) had submitted an application for a decision-in-principle to the Council of State, concerning the construction of a new nuclear power unit. A decision-in-principle is a necessary prerequisite for obtaining a construction licence. According to the application, the 1 000-1 600 MWe LWR unit will be built on one of the two existing nuclear power plant sites (Olkiluoto or Loviisa). In January 2002 the government made a favourable decision-in-principle on the fifth nuclear power plant unit, and the Parliament ratified the decision on 24 May 2002 with effect from this date. The decision-in-principle will remain in force for five years.

In September 2002 TVO launched a competitive bidding. The company has estimated that it will make a decision on the plant supplier and the site in late 2003. Even if TVO's basis for filing the application was the company's own interest, the government, according to the Nuclear Energy Act, has to consider whether the use of nuclear energy is in line with the overall good of society. The decision ratified in 2002 supports the implementation of the national climate strategy adopted in 2001. It will help Finland meet its international emissions reduction commitments. The decision-in-principle, now ratified, is based on the view that the nuclear power option is the most cost-effective alternative, both in terms of central government finances and national economy, for generation of baseload power within the framework of the Kyoto Protocol. In addition, it will lead to a more stable price of electricity in Finland. The decision alone is, however, not sufficient for the climate strategy. The government is already actively supporting and will continue to support electricity produced from renewable energy sources by means of investment subsidies and tax concessions. Also, electricity demand is being curbed by promoting energy conservation measures.

NUCLEAR POWER GENERATION

There are four nuclear power plant units in operation in Finland: two on the west coast of Finland, in the municipality of Eurajoki on the island of Olkiluoto, and two on the south coast in the town of Loviisa. The total amount of electricity produced by the four nuclear power units in 2002 was 21.4 TWh (net). This corresponds to 30 % of the electricity generation and 25.6 % of the electricity supply in Finland. The load factors of the units varied between 82.2 and 96.6 %.

RADIOACTIVE WASTE POLICY AND DEVELOPMENTS

The Parliament endorsed in 2001 the government's decision-in-principle concerning the construction of a disposal facility planned by Posiva Oy, a company jointly owned by the two Finnish nuclear power companies. The intended site of the disposal facility is Olkiluoto, which is also one of the two Finnish nuclear power plant sites. On 24 May 2002 the Parliament also ratified a separate decision-in-principle on the final disposal of nuclear fuel spent from the new nuclear power plant unit. Thus the spent fuel of the possible new nuclear power plant unit would also be disposed of in the bedrock in Olkiluoto.

According to the plans of Posiva Oy, the construction licence of the final disposal facility itself would be applied for around the year 2010. The next step in the project is the construction of an underground research laboratory, which is planned to be started in 2004.

RESEARCH REACTORS

The only research reactor in Finland, a 250 kW Triga Mark II reactor in Espoo, near Helsinki, was as before, used for boron neutron capture therapy (at the reactor site), research, education and isotope production.

SVERIGE — SWEDEN

ENERGY POLICY CONSIDERATIONS

In 2002 two consultant reports were delivered to the administration dealing with the effects of a closure of the second reactor in the Barsebäck plant. The reports have been under consideration by various authorities and NGO's.

NUCLEAR ELECTRICITY GENERATION AND CONSUMPTION

The total production of electricity in Sweden in 2002 was 143.0 TWh and consumption 148.3 TWh. The net import of electricity was 5.3 TWh.

The 11 nuclear power reactors generated 65.6 TWh, compared with 69.2 TWh in the previous year. Hydro electricity production reached 66 TWh which is slightly above the statistical average. However, following normal hydropower production during the beginning of 2002, a very hot and dry summer was followed by the autumn when precipitation did not come as expected, but temperature was lower than normal. The result was the lowest ever recorded water flow in rivers and the lowest ever recorded water levels in the reservoirs in Sweden and Norway when the winter commenced. Electricity prices in the Nordic power exchange, Nord Pool, consequently reached a record high in November and December.

The average availability of the power stations was high.

Oskarshamn unit 1 finalised the modernisation work in November after almost one year. There have been major changes in the safety systems and the installation of a new turbine. The control room has changed to software-based systems. The restart of the unit took place in December, and the first connection to the grid was made in January 2003. Besides the improved safety standards, the new turbine will increase the output power level by 5 %

All supplies of nuclear fuel materials and services were made in time and without any problems, as were all transports of radioactive waste and spent fuel.

NUCLEAR FUEL CYCLE DEVELOPMENTS

At the Westinghouse Atom fuel fabrication plant 396 t of uranium dioxide powder were converted and 265 t of fresh fuel were produced during 2002.

The siting process of a deep geological repository for spent nuclear fuel took a major step forward in 2002 when SKB, the Swedish Nuclear Fuel and Waste Management Co., began site investigations in two municipalities. These include more comprehensive geo-scientific investigations with the aid, among other things, of measurements from the ground surface and in drill holes.

SKB had originally selected three sites for site investigations, but in April 2002 the municipal board of Tierp voted against any further investigations in the municipality. The municipal boards of Oskarshamn and Östhammar, however, said yes to investigations with strong majorities.

This also heralds the start of the environmental impact asessment process for a potential deep repository in either Oskarshamn or Östhammar. This process will eventually result in an environmental impact statement, which will be submitted by SKB along with an application for an encapsulation plant and a deep repository in one of the municipalities.

Following a comprehensive hearing, the government decided in December 2002 that SKB's 2001 RD&D-programme fulfils the requirements expressed in the Nuclear Activities Act. According to this act, SKB has to report to the government every third year.

In 1998 OKG Aktiebolag made an application to use MOX fuel based on the plutonium coming from reprocessing of OKG spent fuel sent to BNFL in the 1970´s and the 1980´s. In December 2002 the government approved the application and gave OKG permission to use MOX fuel in Oskarshamn power plants. OKG plan to load this fuel after 2005.

RESEARCH REACTORS

At Studsvik both the R2 (a 50 MW MTR)l and the R2-0 (1 MW) reactors operated at full capacity. R2 was used primarily for fuel testing, fuel investigations, isotope production and neutron doping of silicon. The R2-0 reactor was used for BNCT-therapy (Boron Neutron Capture Therapy), test programmes related to BNCT and supplied neutrons to the Neutron Research Laboratory. During 2002 extensive PSA-studies were conducted and updated safety analyses were filed with applications for future operation permits.

UNITED KINGDOM

ENERGY POLICY CONSIDERATIONS

In February 2002 the Cabinet Office performance and innovation unit (PIU) published its report on the longer term, strategic issues surrounding energy policy for the UK. Importantly it was a report to the government, not of the government which means it provides recommendations but does not signify a change of government policy. It was welcomed by the government as a valuable contribution to the debate on how best to meet Britain's future energy requirements. The report argued that the introduction of liberalised and competitive energy markets in the UK had been a success, and this should provide a cornerstone of future policy — in the UK and internationally. It also argued that security of supply and climate change issues were international issues that must be addressed via international policies and agreement, particularly through EU market liberalisation and the Kyoto agreements. In relation to nuclear option, the report stated that there were good grounds — security and environmental — for taking a positive stance to keep the nuclear option open and it acknowledged that nuclear power offers a zero carbon source of electricity on a scale which for each plant is larger than other options.

Following this, in May the government launched a public consultation aimed at developing a new energy strategy. A government statement with the consultation stressed the need to move toward a low-carbon economy and greater energy efficiency to respond to climate change targets with sustainable energy being the key. Over 6 000 responses were submitted. These have been analysed and a White Paper outlining a long-term policy was issued in February 2003. The White Paper puts the priority on renewables and energy efficiency.

In July 2002, the Energy Minister announced the publication of the White Paper: *Managing the nuclear legacy: a strategy for action*. The White Paper sets out detailed plans for radical changes to the current arrangements for cleaning up the legacy created by the early years of Britain's civil nuclear programme. The changes include the creation of a new national body- the liabilities management authority (LMA). The LMA will be responsible to government with a specific remit to ensure that the nuclear legacy is cleaned up safely, securely, cost effectively and in ways which protect the environment for the benefit of the current and future generations. The setting up of the LMA will require primary legislation. It was announced in November that a Bill for this purpose will be published in draft in the next Parliamentary session. Legislation will then be brought forward at the earliest opportunity. The Bill will also include provisions enabling the transfer of BNFL and UKAEA assets and liabilities to the LMA.

Following a public consultation exercise, *Managing radioactive waste safely,* in 2001-02, the government and the devolved administrations for Scotland, Wales and Northern Ireland announced in July 2002 that they would set up an independent body to oversee a review of options for dealing with radioactive waste in the long term. This should make recommendations by around 2006 so that Ministers can announce the UK's long term strategy.

NUCLEAR ELECTRICITY GENERATION AND CONSUMPTION

The UK's nuclear power stations supplied 81.08 ([15]) TWh in 2002, compared with 82.99 TWh in 2001. This represented 22 % ([16]) of total electricity supplied in 2002 (compared with 23 % in 2001).

FUEL CYCLE DEVELOPMENTS

Following a deterioration in its financial situation, British Energy approached the UK Government in early September seeking immediate financial support and discussions about longer term restructuring. The government's overriding priorities are to ensure the safety of nuclear power and security of electricity supplies. In accordance with these priorities, the government provided a short-term loan to the company in order to give sufficient time to clarify the company's full financial position and to come to a clear view on the options for restructuring the company. The European Commission approved the loan as 'rescue aid' on 27 November. On 28 November, British Energy announced a restructuring plan intended to achieve its long-term viability. On the same day, the government set out the limits of what it was willing to do to support a solvent restructuring by taking financial responsibility for British Energy's historic spent fuel liabilities; underwriting, to ensure safety and environmental protection, new and enhanced arrangements by the company to fund decommissioning and other nuclear liabilities; and continuing to fund the company's operations while the plan is agreed and implemented. British Energy must reach an agreement in principle to its plan with

([15]) Provisional data.
([16]) Provisional data.

its major financial creditors by mid-February 2003. The government will then notify the restructuring plan to the European Commission under State aid rules.

In the antidumping and countervailing duty investigations initiated by USEC for imports of low enriched uranium from the Netherlands, Germany and the United Kingdom, the US International Trade Commission found that these imports had caused, or threatened to cause injury to USEC and imposed a definitive duty of 2.23 %. Urenco has appealed the ITC decision.

On 6 October Urenco and Areva signed a memorandum of understanding with the aim of establishing a joint venture in the field of centrifuge technology for uranium enrichment.

On 19 July Urenco signed a memorandum of agreement (MOA) together with Cameco Corporation, Westinghouse Electric Company, Fluor Daniel and the affiliates of three US energy companies, Exelon, Entergy and Duke, as an initial step towards restructuring the LES partnership. The MOA marks the first step towards a formal partnership to design, construct and operate a new uranium enrichment facility based on the Urenco centrifuge technology in the United States.

In April, BNFL announced that it would not be extending the lives of its two largest Magnox reactors, Wylfa and Oldbury. BNFL had intended to extend the life of Wylfa to at least 2016 and of Oldbury to 2013. The reactors will now close in 2010 and 2013 respectively. This is to allow BNFL and the UK to meet obligations under OSPAR to curtail discharges to the Irish Sea, through the closure of the Sellafield Magnox reprocessing plant by 2012. In June, BNFL announced that Calder Hall would be shut in March 2003 and not 2006 and Chapelcross would close in March 2005 and not 2008. These accelerated closures were in response to a fall in electricity prices.

Under the White Paper referred to above any new proposals for new reprocessing contracts would require approval by the Secretary of State. In the event of such a proposal the government has indicated that it would look at a range of issues which would be involved in increasing the current volume of fuel to be reprocessed through Thorp. These issues would include consistency with clean-up plans for Sellafield and with the UK's environmental objectives and international obligations. The same principles will be applied in the interim period leading up to the establishment of the LMA.

A report published in January 2002 by the Health and Safety Executive and the Scottish Environment Protection Agency closed out the safety audit on Dounreay which had commenced in 1998. Eighty-nine recommendations have been met by UKAEA and those that remain are mostly of a long term or strategic nature.

More than 200 firms are known to be interested in being involved with the GBP 4 billion clean-up project of the Dounreay complex over the next 50-60 years. Up to 20 new processing and waste treatment plants are going to be required on-site within the next 10-15 years to enable large quantities of radioactive waste to be properly managed.

RESEARCH REACTORS

The UK currently has one operating civil nuclear research reactor, belonging to Imperial College, part of London University. Others await decommissioning, are in the process of being decommissioned, or have been fully decommissioned.

ELLAS — GREECE, IRELAND, ITALIA — ITALY

No new developments were reported on matters relevant to the Supply Agency's annual report.

ANNEX 2: NIS SUPPLIES

A) Russian supply of natural uranium and feed contained in EUP to the EU

Year	Deliveries (1)	Exchanges (2)	Subtotal (1+2)	Re-enriched tails (3)	Total (1+2+3)	Total as % of supply
1992	1 800	900	2 700	0	2 700	23
1993	1 700	600	2 300	0	2 300	19
1994	1 700	500	2 200	0	2 200	16
1995	4 300	200	4 500	0	4 500	28
1996	5 100	700	5 800	0	5 800	36
1997	3 900	500		—	4 400	28
1998	3 900	600	4 500	—	4 500	28
1999	3 500	400	3 900	1 100	5 000	34
2000	4 200	0	4 200	1 200	5 400	34
2001	2 850	200	3 050	1 050	4 100	29
2002	3 900	600	4 500	1 000	5 500	33
Total	36 850	5 200	42 050	4 350	46 400	28

Note: For 1997 and 1998, re-enriched tails are included under deliveries because quantities were small and could not be shown separately for confidentiality reasons.

B) Physical imports by EU operators, and acquisitions by EU utilities of natural uranium and feed contained in EUP from the NIS (tU)

Year	Physical imports	Acquisitions([1])			
		Quantity tU	As % of supply([2])	incl. RET([3])	incl. RET as % of supply([2])
1992	9 500	2 700	23		
1993	12 100	2 700	22		
1994	12 200	4 500	32		
1995	12 100	5 200	32		
1996	17 600	6 800	43		
1997	12 200	5 000	32	—	—
1998	11 600	5 600	35	—	—
1999	9 400	5 100	34	6 200	42
2000	8 700	5 800	37	7 000	44
2001	8 600	4 100	29	5 100	37
2002	8 600	6 900	41	7 900	47
Total	122 600	54 400	33		

Notes:

([1]) Acquisitions cover deliveries to EU utilities including exchanges but excluding re-enriched tails except for 1997-98 as explained under ([3]).

([2]) Supply to EU utilities covers total deliveries to EU utilities under purchasing contracts during the respective year.

([3]) Deliveries of re-enriched tails (RET) to EU utilities started in 1997 but were negligible (<1 % of total supply) during the first two years. For confidentiality reasons they have been included under 'acquisitions' for 1997 and 1998. The figures for 1999 and 2000 include RET acquired as a result of exchanges.

ANNEX 3: EU REACTOR NEEDS AND NET REQUIREMENTS

(Quantities in tU and tSW)

A) From 2003 until 2012

Year	Natural Uranium		Separative Work	
	Reactor needs	Net requirements	Reactor needs	Net requirements
2003	21,100	17,000	12,300	10,800
2004	20,800	18,000	11,700	10,300
2005	20,300	17,100	11,300	10,100
2006	21,400	19,000	12,100	11,000
2007	20,500	18,400	11,700	10,800
2008	20,000	18,200	11,500	10,700
2009	19,500	17,800	11,400	10,600
2010	19,600	18,200	11,200	10,600
2011	18,500	17,300	10,600	10,100
2012	19,000	17,900	11,200	10,700
Total	200,700	178,900	115,000	105,700
Average	20,100	17,900	11,500	10,600

B) Extended forecast from 2013 until 2022

Year	Natural Uranium		Separative Work	
	Reactor needs	Net requirements	Reactor needs	Net requirements
2013	18,700	17,600	10,900	10,500
2014	17,700	16,500	10,400	9,900
2015	17,800	16,600	10,600	10,100
2016	17,600	16,400	10,400	9,900
2017	16,900	15,700	10,000	9,500
2018	17,000	15,800	10,100	9,700
2019	16,900	15,700	9,900	9,400
2020	16,300	15,100	9,600	9,200
2021	16,100	14,900	9,500	9,100
2022	16,000	14,800	9,500	9,100
Total	171,000	159,100	100,900	96,400
Average	17,100	15,900	10,100	9,600

ANNEX 4: FUEL LOADED INTO EU REACTORS AND DELIVERIES OF FRESH FUEL UNDER PURCHASING CONTRACTS

Year	Fuel loaded			Deliveries		
	LEU (tU)	Feed eq. (tU)	Enrich. eq. (tSW)	Natural U (tU)	% spot	Enrichm. (tSW)
1980		9,600		8,600	(4)	
1981		9,000		13,000	10	
1982		10,400		12,500	<10	
1983		9,100		13,500	<10	
1984		11,900		11,000	<10	
1985		11,300		11,000	11.5	
1986		13,200		12,000	9.5	
1987		14,300		14,000	17.0	
1988		12,900		12,500	4.5	
1989		11,800		13,500	11.5	
1990		15,400		12,800	16.7	
1991		15,000	9,200	12,900	13.3	10,000
1992		15,200	9,200	11,700	13.7	10,900
1993		15,600	9,300	12,100	11.3	9,100
1994	2,520	15,400	9,100	14,000	21.0	8,800
1995	3,040	18,700	10,400	16,100	18.1	9,600
1996	2,920	18,400	11,100	15,900	4.4	11,700
1997	2,900	18,200	11,000	15,600	12	10,100
1998	2,830	18,400	10,400	16,100	6	9,200
1999	2,860	19,400	10,800	14,800	8	9,700
2000	2,500	17,400	9,800	15,800	12	9,700
2001	2,800	20,300	11,100	13,900	4	9,100
2002	**2,900**	**20,900**	**11,600**	**16,900**	**8**	**9,500**
Total	25,270	341,800	123,000	310,200		117,400

ANNEX 5: SUPPLY AGENCY AVERAGE PRICES FOR NATURAL URANIUM

Year	Multiannual contracts		Spot contracts		Exch.rate
	euro/kgU	US$/lb$U_3O_8$	euro/kgU	US$/lb$U_3O_8$	US$/euro
1980	67,20	36,00	65,34	35,00	1,39
1981	77,45	33,25	65,22	28,00	1,12
1982	84,86	32,00	63,65	24,00	0,98
1983	90,51	31,00	67,89	23,25	0,89
1984	98,00	29,75	63,41	19,25	0,79
1985	99,77	29,00	51,09	15,00	0,76
1986	81,89	31,00	46,89	17,75	0,98
1987	73,50	32,50	39,00	17,25	1,15
1988	70,00	31,82	35,50	16,13	1,18
1989	69,25	29,35	28,75	12,19	1,10
1990	60,00	29,39	19,75	9,68	1,27
1991	54,75	26,09	19,00	9,05	1,24
1992	49,50	24,71	19,25	9,61	1,30
1993	47,00	21,17	20,50	9,23	1,17
1994	44,25	20,25	18,75	8,58	1,19
1995	34,75	17,48	15,25	7,67	1,31
1996	32,00	15,63	17,75	8,67	1,27
1997	34,75	15,16	30,00	13,09	1,13
1998	34,00	14,66	25,00	10,78	1,12
1999	34,75	14,25	24,75	10,15	1,07
2000	37,00	13,12	22,75	8,07	0,92
2001	38,25	13,18	21.00 (*)	7.23 (*)	0,90
2002	**34,00**	**12,37**	**25,50**	**9,27**	**0,95**

(*) The spot price for 2001 was calculated on the basis of an exceptionally low total volume of only some 330 tU under four transactions, one of which accounted for two thirds of this quantity. Some 300 tU were delivered as UF_6 without a price being specified for the conversion component. To establish a price excluding conversion costs for these deliveries, the Supply Agency applied an estimated average conversion price of EUR 5.70/kgU (USD 5.10/kgU).