EURATOM SUPPLY AGENCY

ANNUAL REPORT

1999

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OVERVIEW

Supply of nuclear fuels continued unhindered during 1999. However, for many years now, world production of natural uranium has been well below consumption with the deficit filled by drawdown of inventories or recycling by utilities, producers, traders and governments. Undoubtedly, the excess production from the past needs to be absorbed, but the Agency views with some concern the extent of utilisation of such material in a short time frame and the fact that almost half of the world supplies are coming from secondary sources. This trend is occurring moreover at a time when the utilities are under pressure to reduce their own inventories in a quest to reduce operating costs and the number of suppliers is being reduced through closures or consolidations.

The disposal of the excess Russian highly enriched uranium (HEU) from the military stockpile represents a major secondary source of natural uranium feed and separative work (SW). Governmental and commercial arrangements were put in place during the year providing for an option for the feed component to be purchased and for the remainder to be stored. So far, however, the effect of such material has been negligible as only a very limited amount entered the market. This situation will not change unless the market improves or the contractual conditions are revised. In any event, it is expected that most of the material will be sold in the United States.

As the perceived depletion of secondary sources of natural uranium is not in sight, market prices remained depressed with producers in general cutting back, delaying new production and having little or no incentive to start new mines. Although the long term availability of uranium is not in question, short to medium term disruption is possible, given the low level of fresh production, if large inventory sources are withdrawn from the market for political or other reasons.

With the deregulation of the electricity markets, competition among the utilities increased, and they had to cut costs at all levels. This has been reflected in the management of inventories and in the fuel cycle procurement activities. The pressure on the suppliers has led to consolidation through mergers and acquisitions and offers of integrated supply packages rather than single products. Economies of scale and cost cuttings are expected, but such measures will also lead to a reduction in the number of suppliers with consequent risks for the diversification of sources of supply.

In the other sectors of the nuclear fuel cycle industry, conversion of natural uranium suffered also from the disposal of inventories which led to a considerable reduction of demand and depressed prices. Enrichment, traditionally characterised by long term contractual arrangements has been less affected, but competion for new business remained high. Fabrication prices have reduced considerably over recent years, and the industry adapted through integration of companies and services. At the back end of the fuel cycle, reprocessing plants continued to operate normally.

The year 1999 was a difficult one for the nuclear industry with negative publicity from the Tokai Mura accident, continued political pressure in some countries and lack of public recognition of the fact that this form of energy has negligible greenhouse gas emissions compared to other sources. However, the feared closures of plants due to a perceived lack of competitivity with other sources of electricity, following deregulation, did not materialise. Not unexpectedly, the phasing out of nuclear energy in some countries, for political reasons, encountered serious problems. So far, only one reactor in the European Union (EU) was closed (Barsebäck 1 in Sweden).

Nuclear energy production remained fairly stable and even increased in some cases due to better plant availability and utilization. It generated about 1/3 of the electricity produced in the EU and some 17 % worldwide. Nuclear power plants continued to contribute to the avoidance of greenhouse gas emissions during electricity generation. In this respect improved performance of the nuclear plants has been a major contributor to the reduction of these gases, particularly in Europe and the United States. According to an industrial analysis, the quantity of CO_2 avoided in the EU amounts to some 600 million tonnes per year.

CHAPTER I

GENERAL DEVELOPMENTS

SUPPLY SITUATION

As a result of increased competition following the deregulation of electricity markets utilities have become more concerned about costs and look for ways to reduce them. Although the fuel represents only a small part in the total cost of nuclear electricity generation, it constitutes a significant part of the operation and maintenance (0 & M) costs. The pressure to continue decreasing fuel costs at all levels was noticeable in the front-end procurement operations (natural uranium, conversion, enrichment and fabrication) and particularly in the reduction of strategic stockpiles, which carry important financial costs.

Although it is up to the utilities to choose their suppliers and to determine the level of strategic stockpiles (in some cases with their governments), the Agency reiterates the need to maintain a portfolio of long term supply contracts with primary producers at sustainable prices. The Agency recommends also that a sufficient level of stockpiles should be maintained in order to face supply difficulties resulting from delivery disruptions or sudden changes in market conditions. In this respect, among other ways of assuring fuel stocks, a level equivalent to at least one year's total requirements for natural uranium (without including the material in processing), would appear appropriate as a minimum strategic inventory.

NATURAL URANIUM

With preliminary estimates of around 31,000 tU the world production of natural uranium in 1999 decreased compared with 33,800 tU in1998. This reduction was due to delays in the startup of new planned production in Canada, the phasing out of Gabon production and lower output in Niger, while only Australia increased its production.

The continued reduction of primary production causes some concern to the Agency because in the event of a need for new primary production arising, long lead times between prospection and startup (10-15 years) may lead to supply disruptions in the short to medium term. This may be further aggravated by the fact that prospection has been reduced to minimal levels.

As in previous years world wide uranium production in 1999 was far below consumption[1] (estimated to be around 60,000 tU). The gap was covered by Newly Independent States (NIS) and western secondary sources: stocks from utilities, suppliers and governments, re-enrichment of depleted uranium (tails) and a reduction in requirements due to the use of uranium from reprocessing and plutonium in mixed oxide fuels (MOX).

The EU requirements were covered mainly by deliveries under long term contracts. Deliveries under spot contracts accounted for only 8 % of the total. Supply took place without disruption. The Supply Agency concluded 11 new multiannual natural uranium purchasing contracts for some 4,600 tU and 7 spot contracts for 1,700 tU. Amendments to existing contracts increased the contracted quantities by some 800 tU. In addition, there were 4 enriched

[1] According to figures published by the Uranium Institute production has been below consumption since 1985.

uranium product (EUP) purchasing contracts involving 600 tU as natural uranium feed equivalent.

During 1999 the spot and long term prices for new contracts remained depressed, notwithstanding a modest increase in the beginning of the year. This is believed to be due to the large amounts of uranium still available from secondary sources and particularly their rate of utilisation. In this context the sale of USEC's stockpiles, on which the Agency expressed serious concern in last year's report, was particularly problematic and unhelpful. From the initial stock of some 30,000 tU it appears, according to market observers, that only about 1/3 (or even less) was left at the end of the year and that so far most of the material was sold in the US. No sales from this source to EU users have been submitted to the Agency. The matter continued also to raise serious concerns in the US.

The market continued to be driven by the perception of plentiful supplies, which caused some aggressive selling by producers and others for financial reasons, and the fear that prices may fall even further. In turn this led to forward purchasing by some utilities which reduced short term demand and consequently increased the downward pressure on prices.

Producers continued to be buyers of natural uranium, e.g., feed material from the Russian HEU Agreement and natural uranium equivalent in re-enriched tails. This compensated for production cuts and helped to stabilise the market.

CONVERSION

The conversion market was characterised by depressed prices due to the availability of UF6 from inventory supplies containing the conversion component such as EUP, feed derived from military HEU and re-enriched tails. Spot prices continued to fall. As a consequence one converter announced in 1999 the reduction of its production output by 25%.

ENRICHMENT

Enrichment plants world-wide and in the EU in particular continued to provide adequate coverage of the utilities' requirements. Competition was high and there was a slight price drop in US $. However, during the year, there was a substantial depreciation of the euro against the US $ which gave the EU enrichers a competitive edge in the United States and Japan. Transactions continued to take place mainly under multiannual contracts.

USEC continued its role as executive agent for the disposal of the enrichment component under the Russian HEU Agreement. It complained about the price it had to pay for the SWU and requested US government intervention. For a time, the continuation of its role was in question, but, in the end, the situation remained unchanged. Due to the relatively high price paid to the Russians and the fact that USEC adapted its production schedule, the sale of the enrichment component has so far not disrupted or depressed the prices to a significant extent. This is in marked contrast with the situation on the natural uranium market where the secondary sources had a rather depressive effect.

USEC decided to abandon its AVLIS project after considerable investment. It showed instead an interest in the Australian SILEX process, on a low key basis, and is also looking at centrifuge options.

Enrichment of reprocessed uranium by blending it with HEU continued to be offered as an alternative to re-enrichment. This process has the advantage of reducing the concentration of undesirable isotopes.

The tendency for higher enrichment assays, associated with extended fuel burn ups, continued to increase.

In line with the current trend in the industry to offer integrated products, enrichers increased their sales of EUP instead of limiting themselves to the sale of separative work. In the past, with a few exceptions, EUP had mainly been available from the sale of inventories.

FABRICATION

Fabrication facilities continued also to provide adequate coverage of the utilities' needs. The market remained very competitive and suppliers resorted to large scale mergers and acquisitions to profit from consolidation, rationalisation of production and possible synergies.

Following the trend of other fuel cycle industries, fabricators appear also to be showing an interest in the sale of integrated packages comprising EUP and fabrication.

Mixed Oxide (MOX) fuel fabrication at BNFL suffered a set back with quality control problems. The issue attracted significant negative publicity, although the UK regulator (Health and Safety Executive) stated that the totality of the fuel manufacturing quality checks were such that the fuel would be safe in use.

The US Department of Energy (US-DOE) announced that the contracting team led by Cogema, Duke Engineering Services and Stone & Webster was authorized to start designing a MOX fuel fabrication plant to assist in the disposal of the US military ”surplus" plutonium.

The Franco-German-Russian co-operation on a parallel project to build a MOX fabrication plant in Russia (DEMOX) continued with feasibility studies. Italy and Belgium became associated with the project. Some EU financial support having a relation to this initiative had been approved at the end of the year[1].

REPROCESSING AND USE OF MOX

Reprocessing continued at the plants at La Hague and Sellafield at full capacity. The immediate termination of the German utilities' reprocessing contracts announced at the end of 1998 did not materialise, but the German Federal Radiation Protection Agency maintained its ban on the transportation of high level waste (HLW) and spent fuel, which was imposed in mid-1998[2*].

SUPPLY OF MATERIAL FROM THE NEW INDEPENDENT STATES (NIS)

The NIS countries remained the largest source of supply of natural uranium to the EU. During the year, EU utilities took delivery of 4,600 tU under purchasing contracts as natural uranium or feed contained in EUP (re-enriched tails are not included in this figure, see below). A further 500 tU were delivered as a result of exchanges. The total acquisitions of natural uranium from the NIS were therefore some 5,100 tU representing about 35 % of the total deliveries to the EU utilities under purchasing contracts in 1999 (34 % in 1998) or 26 % of the total amount of fuel loaded in EU reactors during the year. Of this amount acquisitions from Russia were 3,400 tU under purchasing contracts and 500 tU under exchange contracts resulting in a total of 3,900 tU representing 27% of the total deliveries to the EU utilities under purchasing contracts in 1999 (28% in 1998) or 20 % of the total amount of fuel loaded in EU reactors during the year (24% in 1998).

[1] The EU has decided at the end of last year to launch a Joint Action in the frame of its Common Foreign and Security Policy. Financing has been made available for disarmament projects in the chemical, biological and nuclear fields. Projects for the handling of the Russian plutonium from the military stock will be defined in coordination with other existing programmes.

[2] The ban was lifted in early 2000.

There were only a few new supply contracts concluded by the Supply Agency for NIS uranium during the year for less than 1,000 tU (including natural uranium feed equivalent contained in EUP).

Re-enrichment of western origin tails in Russia for EU enrichers continued in 1999. One of the enrichers opted for a large scale sale to a uranium producer. It is expected that most of the re-enriched tails will be sold in the EU in contrast with the Russian HEU feed which is expected to remain mostly in the US (see page 7).

In 1999, deliveries of re-enriched tails to EU utilities represented some 800 tU.

PHYSICAL IMPORTS OF NIS ORIGIN MATERIAL

Total physical imports from the NIS of natural uranium or feed contained in EUP amounted to some 9,400 tU in 1999. This figure compares with 5,900 tU delivered to the EU users during the year. Russian physical exports to the EU were essentially in the form of feed contained in EUP or re-enriched tails (natural UF_6 equivalent) for western enrichers, while other NIS countries exported mainly uranium concentrates.

For the period 1992-99 imports of natural uranium and feed contained in the EUP from the NIS as well as western tails re-enriched in Russia amounted to a cumulative total of 96,700 tU. From these, only 38,100 tU were delivered to EU end users during the same period (see table 1).

Table 1 - Physical imports by EU operators of NIS natural uranium or feed contained in EUP and deliveries to EU utilities (in tU)

YEAR	Total Imports	Deliveries to EU utilities(1)	% 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	5,300	34
1999	9,400	*5,900*	*35*
Total	96,700	*38,100*	

Note : (1) Including exchanges. The figure for 1999 includes also 800 tU as re-enriched tails.
(2) Percentage of NIS deliveries relative to total deliveries to EU utilities under purchasing contracts during the respective years (excluding re-enriched tails).

After peaking in 1996, annual imports from NIS countries (particularly from Russia) started decreasing. This downward trend would have increased further if imports of re-enriched tails (over 2000 tU/year since 1997) had not taken place.

The Supply Agency has almost completed its study on the physical imports into the EU of NIS origin natural uranium and feed material to determine the source and commercial destination during the period 1992-1998. It was found that the greater part of NIS natural uranium was imported by intermediaries (about 80%), while imports of enriched uranium and the feed contained was spread among utilities, intermediaries and fabricators.

The study established the use or destination of over 90% of the imports between 1992 and 1998 and concluded that the gap between imports and EU consumption was explained, first, by identified exports, secondly, by storage pending fulfillment of contracts with EU utilities and, thirdly, by market operators' inventories awaiting sale.

Partly as a result of the imports referred to above, it has been observed that the total inventories of natural uranium in the EU have increased significantly during the period 1992-97 but started decreasing slightly in 1998-99.

It should be noted that the studies and analysis of NIS imports mentioned here relate strictly to the commercial use and destination of the material. All such imports are subject to Euratom and IAEA safeguards while on the territory of the Member States, as applicable.

SUPPLIES DERIVED FROM DISARMAMENT OF NUCLEAR WEAPONS

Deliveries of low enriched uranium (LEU) derived from the Russian military HEU continued to be made to USEC somewhat behind schedule. Deliveries under the 1998 order for 723 t LEU derived from 24 t HEU were only completed in July 1999. The 1999 order for LEU derived from 21.3 t HEU was due to be completed in February 2000. USEC reported that 2,205 MT LEU fuel derived from 75 MT HEU were received from Russia up to the end of 1999.

On 24 March 1999, a contract was signed between Cameco, Cogema and Nukem on one side and Minatom and Tenex on the other providing an option for the disposal of a major share of the HEU feed component. This followed an intervention by the US government which, among other initiatives, allocated the necessary funds to acquire the feed accumulated at USEC during the years 1997 and 1998 and accepted a 10 year moratorium on sales of that material.

The Agency welcomed these two developments because of their importance in the context of non-proliferation objectives and as a contribution to market stabilisation and security of supply. However due to logistical difficulties, the cost of transportation of the material as UF6, the administrative burden resulting from the US additional obligations, as well as the fact that the provisions under the USEC Privatisation Act allow for increasing amounts of material to be sold in the US in future years, it is expected that most of this material will remain in the United States.

THE POLICY OF DIVERSIFICATION OF SOURCES OF SUPPLY AND ITS APPLICATION TO NIS ORIGIN MATERIAL

In order to take into account major changes in the market, the Agency made adjustments to its policy following consultations with the three companies involved in the HEU feed deal, other producers, EU users and finally with its Advisory Committee. The revisions concern tails from EU enrichers re-enriched to the level of natural uranium in Russia, already mentioned in last year's report, and the feed derived from the Russian military HEU. These changes did not affect the continuation of the main elements of the Agency's supply policy with regard to the NIS.

GENERAL

It is recalled that, in order to ensure regular and reliable supply, the Agency applies a policy aiming at avoiding over-dependence of the EU users on any single source of supply (i.e. diversity of sources), and at ensuring market related prices[1]. In practical terms diversity of sources means that EU users should not depend, on average, for more than about one quarter of their natural uranium needs from NIS (primarily Russia, Uzbekistan, Kazakhstan and Ukraine). For enrichment, the dependency of the EU users from Russia is limited to slightly less than one fifth of their needs. The policy is applied proportionately with regard to the procurements of each EU utility or consumer. In the case of transactions concerning EUP, the NIS feed and Russian enrichment components respectively are both taken into account.

Since its inception the policy has been applied on a case-by-case basis, consideration being given to the specific merits of each case and the overall supply situation. This has allowed a high degree of flexibility, e.g., by allowing:

- users to consume more than one year's proportionate share in a given year (and carrying forward a negative balance for some years);

- advanced deliveries under long term contracts;

- combined purchases of EU production and NIS materials without accounting the latter against the users' individual proportionate share (because of their support of Community production);

[1] According to a statement made by Commissioner Sir Leon Brittan in 1992 (see 1992 Annual Report), market related prices mean prices which should cover production costs in a market economy environment and which are in line with prices offered by the most competitive market economy producers. However, so far the Agency has not refused to conclude a contract solely on price considerations.

- very small users to acquire more than their normal proportionate share based on a strict percentage of needs;

- "grandfathering" deliveries under contracts concluded before the policy was announced.

It should be noted that, by reason of Euratom Treaty provisions, deliveries under contracts entered into by parties in Member States before their accession to the EU are unaffected by the policy (see 1997 Annual Report).

Furthermore, the limitations have been applied only to purchases and acquisitions by the EU users rather than to overall imports, which have been unrestricted. This explains the reason for the very large quantities of NIS material imported in the Community as mentioned above.

The Agency accounts separately for supplies from each producing NIS republic and will continue to monitor the situation in each country. The Agency will be prepared to consider revising its policy to take into account developments in individual supplier countries and will continue to consult with the parties concerned and the Advisory Committee on the matter.

RE-ENRICHED TAILS (RET)

Tails re-enriched in Russia are assimilated to Russian natural uranium, if sold as imported, but may be acquired by EU utilities without being subject to any limitations if they are further enriched in the Community. However, the import into the US of the re-enriched tails and the EUP obtained from them may be subject to restrictions in that country.

If requested, the Agency would be prepared to allow “de-conversion” exchanges whereby natural uranium concentrates of other origins would be exchanged against re-enriched tails in the form of UF6. Equally exchanges involving re-enriched tails which would avoid the need for transportation would be regarded favourably. In both cases, it would be required that the material being exchanged be subsequently enriched in the EU in lieu of the re-enriched tails.

In order to monitor the supplies of re-enriched tails, and compliance with the policy, the Agency requires the identification of the applicable enrichment contract (the Agency's reference) and, if possible, the schedule for further enrichment.

HEU FEED

EU users may acquire freely HEU feed, through new contracts or existing open origin contracts, without affecting their normal NIS proportionate share.

It is recalled that the enrichment component of the HEU blended product is deemed to be Russian and hence subject to the limitations mentioned above.

DEVELOPMENTS IN THE US

Following the termination by Kazakhstan of its suspension agreement with the US, the anti-dumping procedure resumed and for a short period the provisional anti-dumping duties were again applied. The procedure resulted in a positive determination of dumping by the US Department of Commerce (DOC) and a negative ruling of injury by the US International Trade Commission (ITC) which was challenged before the US courts. As a consequence of these rulings the restrictions on Kazakh natural uranium have been terminated. This means that the US permits direct and indirect imports (after exchange or enrichment in a third country) of Kazakh natural uranium. The status of enriched uranium, in particular whether a stockpile of Kazakh natural uranium enriched before the break-up of the Soviet Union should be considered as covered by the Russian suspension agreement, had yet to be decided at the year's end.

Revision procedures (known as "sunset reviews") were initiated for the remaining applicable restrictions, i.e., the suspension agreements with Russia, Uzbekistan and Kyrgystan and the anti-dumping order for Ukraine. As interested parties did not request continuation of the Kyrgyz suspension agreement, it lapsed automatically. For Russia, Uzbekistan and Ukraine the procedures, should be concluded by mid 2000[1].

In early 2000, Russia and the US initialed an amendment to the suspension agreement which would increase the amounts eligible for import from Russia for "matched sales" and alleviate the relevant procedures.

It is expected that even a partial withdrawal of US restrictions, which already is the case with the termination of the Kazakh restrictions for natural uranium, will alleviate somewhat the pressure on the EU market to absorb most of the traditional NIS exports.

The US DOC published administrative procedures for the Russian HEU feed which should allow smooth management of the imports, stockpile and sales. Control will be done essentially at the level of the three Western supplier companies which will benefit from the progressively growing US quota.

LEGAL DEVELOPMENTS

FINAL RULING ON THE KLE CASE

In 1999 a major legal challenge to the Agency's supply policy finally came to conclusion with the rejection by the Court of Justice in its judgement of 22 April 1999[2] of the appeal by Kernkraftwerk Lippe Ems (KLE) against the judgement of the Court of First Instance of 25 February 1997[3].

It is recalled that the Court of First Instance admitted three legal obstacles which allowed the Agency to refuse the unconditional conclusion of a supply contract for NIS natural uranium :

1. The general policy of diversification of sources resulting in a maximum level of dependence;

2. The non market related prices;

3. The privileged position which would exist if one user received more than its proportionate share.

The Court of Justice examined only the first obstacle, because each of the legal obstacles was sufficient to support the Agency's decision. The Court rejected the appeal as inadmissible on this point, because KLE merely reiterated its arguments as developed before the first court. The Court also upheld the reasoning of the first court that the Agency is able to implement a diversification policy with a maximum level of dependence on a country or group of countries, by stating that "*no provision of the Treaty prevents the Agency or the Commission from taking into account in the management of the common supply policy, in particular when the "place of origin" of supplies has to be determined, a geographical territory which is more or less extensive than a State considered in isolation".*

[1] The DOC found that dumping would likely resume if the Russian and Uzbek suspension agreements were terminated and confirmed the continuation of the restrictions in the interim.

[2] Case C-161/97P, KLE/Commission, European Court Reports, 1999, I, pg. 2057.

[3] Joined Cases T-149/94 and T-181/94, KLE/Commission, European Court Reports, 1997, II, pg 161, see Annual Report 1997, pg. 11-13.

More in general, on the rights and powers of the Agency, the Court recalled a statement already made in the ENU case[1] "*that where decisions concerning economic and commercial policy and nuclear policy are involved, the Agency has a broad discretion when exercising its powers. In those circumstances, review by the Court must in any event be confined to identifying any manifest error of assessment or misuse of powers."* It is also worth noting that the Court highlighted that "*the Agency plays an essential role in the common supply policy*" and furthermore stated that "…*the task of the Agency is to guarantee one of the essential aims which the Treaty assigns to the Community, in Article 2 (d), namely reliability of supply …".*

ELK RIVER REACTOR SPENT FUEL IN ITALY

CNEN (Comitato Nazionale per l'Energia Nucleare), the predecessor of ENEA (Ente per le Nuove Tecnologie, l'Energia et l'Ambiente) received a number of HEU-thorium fuel elements which were irradiated in the US AEC's Elk River reactor in the 1960s and later shipped to Italy for reprocessing and recovery. In recent years ENEA requested the material to be returned to the US under DOE's programme for spent research reactor fuels, but this was refused as it was considered to be outside the scope of that programme.

ENEA questioned the ownership of the material and the US-DOE's leaving it in Italy and took legal action. In the dispute that followed a US District Court dismissed the case against the DOE, the judge considered that the matter was essentially of a political nature not appropriate for judicial determination.

[1] Court of First Instance judgment of 15 September 1995, Cases T-458/93 and T-523/93, ENU/Commission, European Court Reports, 1995, II, pg. 2459 confirmed by Court of Justice judgment of 11 March 1997, Case C-337/97P, ENU/Commission, European Court Reports, 1997, I, pg. 1329.

BARSEBÄCK'S CLOSURE

The decision by the Swedish government to close one of the Barsebäck reactors (see Chapter III) has been the subject of litigation before several Swedish courts, inter alia with regard to certain aspects of European Community law. After a provisional stay of execution of the decision by an interim ruling of 14 May 1998, the Supreme Administrative Court rejected on 16 June 1999 the claims by the owners and operator of the reactor against the decision, without referring the aspects of Community law to the Court of Justice for a preliminary ruling in application of Article 177 of the EC Treaty (now Article 234 EC).

Following this refusal to refer the case, the owners and operator filed a complaint with the European Commission.

After long negotiations the parties agreed on a compensation scheme, as a result of which an equivalent share of electricity production in the government owned Ringhals reactors was granted to Sydkraft AB, the owner of Barsebäck.

MERGERS AND ACQUISITIONS

With the deregulation of the electricity market and globalization of all industries, competition increased and obliged the nuclear industry in general to respond with price cuts. For the utilities it meant lowering purchasing costs, reducing inventories and further improving the performance of the fuel and their reactors. The situation led also to a number of large scale mergers and acquisitions.

In the fuel cycle industry, ABB agreed to sell its nuclear division to BNFL, which follows last year's acquisition by BNFL of the nuclear business of Westinghouse in partnership with the US group Morrison Knudsen. Framatome S.A. and Siemens A.G. announced a plan to merge their nuclear businesses in 2000.

Concerning utilities, action took place essentially in Germany with the mergers of RWE and VEW and Viag and VEBA. Also EDF took an interest in the acquisition of EnBW. The situation was similar in the United States with a number of utility mergers and single-unit reactor sales.

RESEARCH REACTORS FUEL CYCLE

Research reactors continued to be supplied regularly with fresh fuel during the year. However long term supply of HEU for reactor fuels and targets for isotope production remains difficult due to political pressure associated with non-proliferation considerations.

The Joint Research Centre of the Commission confirmed further its intention to convert its reactor at Petten in the Netherlands to LEU. Diplomatic notes were exchanged between the Commission and the United States giving the required assurances which will allow fresh supplies of HEU to be made to the reactor until its conversion and also make possible the return of irradiated spent fuel if needed.

The AEA facility at Dounreay in the United Kingdom stopped providing its services to research reactors which created serious difficulties, particularly concerning the recovery of target materials used in the production of isotopes for medical applications.

Extensive international co-operation 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. However it will take several years before the research will be complete and the new fuels will be licensed and deployed.

Return of irradiated spent fuel to the United States for ultimate disposal continued without major difficulties. Cogema continued to offer to reprocess HEU fuels by diluting them with commercial LEU fuels at its plant in La Hague.

It is recalled that the policy which allows the return of spent research reactor fuels to the US-DOE is due to expire in 2006 and it is not expected to be renewed. Due to the long lead times required to implement solutions for the disposal of spent fuel it is becoming increasingly urgent to establish alternatives. In addition further problems may arise in the future due to the fact that LEU silicide fuels currently used in research reactors cannot be reprocessed at present.

OTHER DEVELOPMENTS

ENLARGEMENT OF THE EU

The Supply Agency was associated in discussions between Commission services and applicant countries for EU membership in order to assess the conformity of their legislation with that of the EU and to monitor progress made by those countries towards compliance with EU legislative requirements.

CHAPTER II

SUPPLY AND DEMAND FOR NUCLEAR MATERIALS AND ENRICHMENT SERVICES IN THE EUROPEAN UNION

REACTOR NEEDS/NET REQUIREMENTS

During 1999, about 2,900 tU of fresh fuel were loaded in EU reactors containing the equivalent of 19,400 tU as natural uranium and 10,800 tSW, most tails assays were in the range of 0.25 – 0.35 %.

Future EU reactor needs and net requirements for uranium and separative work, based on data supplied by EU utilities, rounded to the nearest 100 t, are estimated as shown in Table 2.

Table 2 - Reactor needs and net requirements for uranium and separative work

A) From 2000 until 2009

Year	Natural Uranium (tU)		Separative Work (tSW)	
	Reactor needs	Net require-ments	Reactor needs	Net require-ments
2000	21,200	17,400	11,900	11,000
2001	21,900	17,500	12,100	10,700
2002	21,600	18,600	12,200	10,900
2003	21,300	19,900	12,000	10,900
2004	22,000	19,600	12,500	11,500
2005	21,400	19,200	12,300	11,200
2006	21,300	19,400	12,200	11,300
2007	21,600	19,700	12,400	11,500
2008	21,000	19,600	12,100	11,300
2009	21,000	19,900	12,100	11,500
TOTAL	214,300	190,800	121,800	111,800
Average	21,400	19,100	12,200	11,200

B) Extended forecast from 2010 until 2019

Year	Natural Uranium (tU)		Separative Work (tSW)	
	Reactor needs	Net require-ments	Reactor needs	Net require-ments
2010	21,200	20,100	12,200	11,700
2011	20,900	19,900	12,200	11,700
2012	20,300	19,200	11,800	11,400
2013	20,500	19,400	11,900	11,500
2014	20,000	18,900	11,700	11,200
2015	19,600	18,500	11,300	10,800
2016	19,700	18,700	11,200	10,800
2017	20,000	18,900	11,400	10,900
2018	19,500	18,400	11,100	10,600
2019	19,400	18,300	11,000	10,600
TOTAL	201,100	190,300	115,800	111,200
Average	20,100	19,000	11,600	11,100

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.

Average reactor needs for natural uranium over the next 10 years will be 21,400 tU/year, while average net requirements will be about 19,100 tU/year. Relative to 1998 future reactor requirements remained stable.

Average reactor needs for enrichment over the next 10 years will be 12,200 tSW/year, while average net requirements will be in the order of 11,200 tSW/year. Relative to 1998 future enrichment needs remained stable.

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 Agency's procedures during 1999 is shown in Table 3.

Transactions involving natural uranium totalled about 25,600 tU, some 6,200 tU of which were the subject of new purchase contracts by EU utilities (spot and multiannual), in addition 800 tU were contracted by utilities under amendments to existing contracts. Some 17,700 tU transacted related to purchases by producers or intermediaries, as well as exchanges, loans, etc. In comparison with the figures reported for 1998, the total amounts contracted have increased by almost 50%, but purchases by the utilities have decreased.

Table 3 - Natural uranium contracts concluded by or notified to the Supply Agency

Contract Type	Number	Quantity (tU) *(1)*
Purchase (by a EU utility/user)		
– multiannual *(2)*	11	4,560
- spot *(2)*	7	1,670
Sale (by a EU utility/user)		
– multiannual	0	0
- spot	0	0
Purchase-sale (between two EU utilities/users)		
- multiannual	1	-
- spot	2	-
Purchase-sale (intermediaries)*(3)*		
– multiannual	6	11,010
- spot	23	3,150
Exchanges *(4)*	35	3,490
Loans	1	-
TOTAL *(5)*	86	25,600
CONTRACT AMENDMENTS *(6)*	7	800

Notes

(1) In order to maintain confidentiality the quantity has been indicated only when there were at least 3 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 8 contracts of less than 10 tU each.

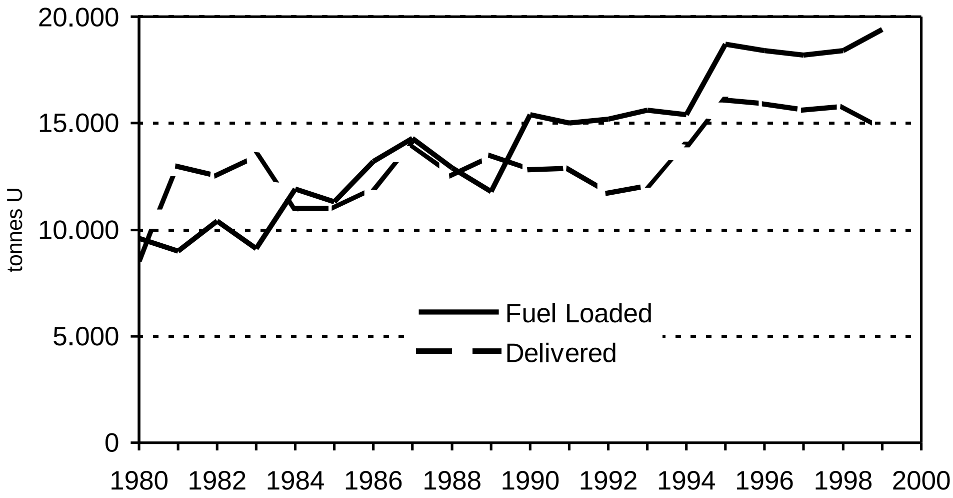
(6) Concerning purchasing contracts only. The quantity represents the net increase (or decrease).

VOLUME OF DELIVERIES

During 1999, natural uranium deliveries under existing purchasing contracts amounted to approximately 14,700 tU compared with 15,800 tU in 1998. Deliveries under spot contracts represented about 8 % of the total (6 % in 1998).

The deliveries taken into account are those made under purchasing contracts to the EU electricity utilities or their procurement organisations; they include also the natural uranium equivalent contained in enriched uranium purchases. Deliveries under purchasing contracts and fuel loaded into reactors by EU utilities since 1980 are shown in Graph 1. The corresponding table is in Annex 1. The difference between deliveries and the amount of fuel loaded can be explained by the use of reprocessed uranium, MOX and drawdown of inventories.

Graph 1 - Natural uranium feed contained in fuel loaded into EU reactors and natural uranium delivered to utilities under purchasing contracts (in tU)



AVERAGE PRICES OF MULTIANNUAL CONTRACTS

Prices for deliveries under multiannual contracts were expressed in 6 different currencies. To calculate the average price, the original contract prices were converted into EURO[1] (€) and then weighted by quantity. For the conversion into EURO the Agency used the average annual exchange rate of the respective currency as published by Eurostat. A very small number of contracts where it was not possible to establish reliably the price of the natural uranium component (e.g. in some cases of enriched uranium deliveries priced per kg of EUP) were excluded from the price calculation.

The average price for deliveries in 1999 for all contracts notified to the Agency (including those agreed in earlier years) rounded to the nearest ¼ EURO was as follows:

€ 34.75 /kgU contained in U_3O_8
(ECU 34.00/kgU in 1998).

[1] The ECU was replaced by the EURO on 1 January 1999 with a conversion rate of 1:1. However, historical references (pre-1999) to the ECU continue to be labelled as ECU.

AVERAGE PRICES OF SPOT CONTRACTS

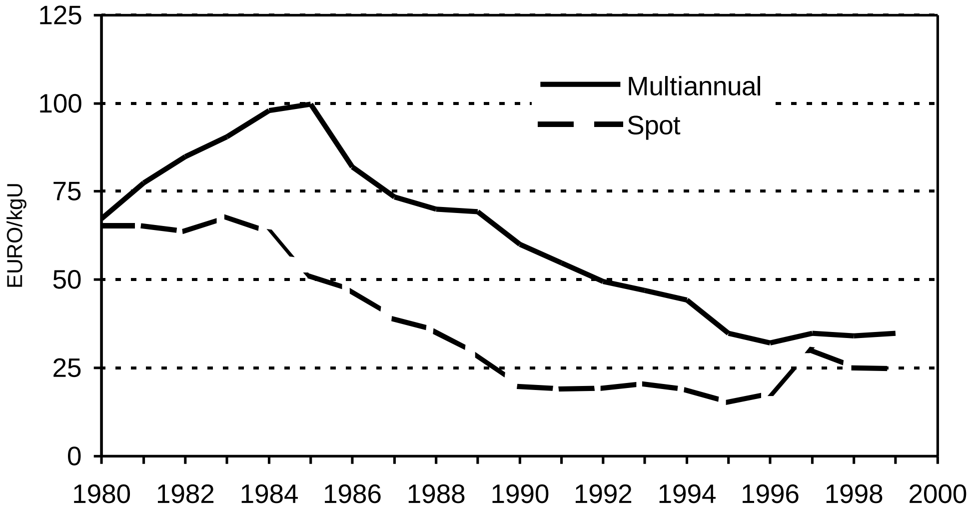
The average price of material delivered in 1998 under spot contracts, calculated according to the same principles, was as follows:

€ 24.75 /kgU contained in U_3O_8
(ECU 25.00/kgU in 1998).

PRICE HISTORY

Graph 2 shows prices for deliveries under multiannual as well as spot contracts since 1980, expressed in ECU/EURO. For ease of reference, historical data on prices published in previous Annual Reports and variations in exchange rates are presented in Annex 2.

Graph 2 - Average price for natural uranium delivered under spot and multiannual contracts (EURO/kgU)

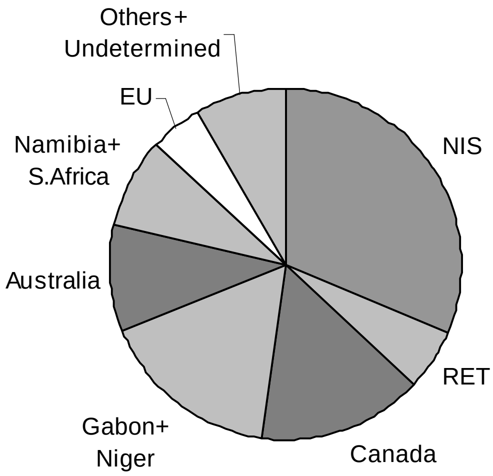


ORIGINS

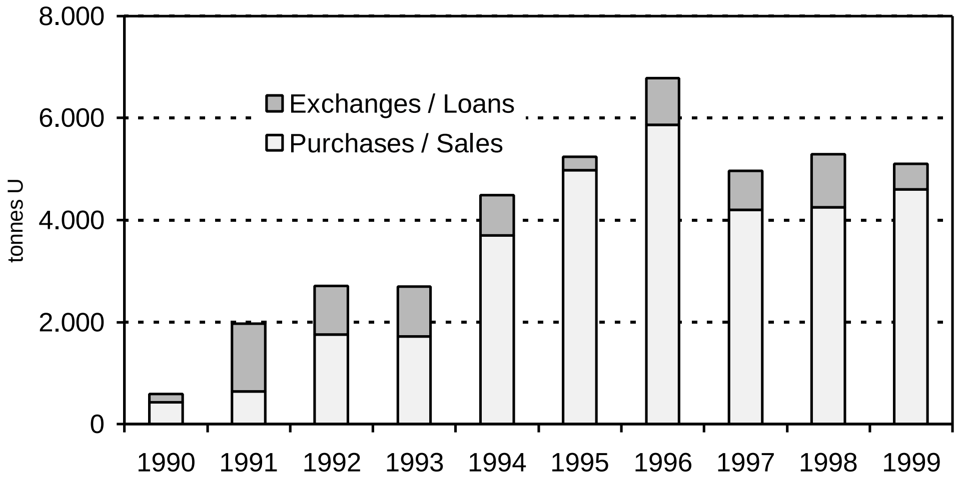
EU utilities or their procurement organisations obtained in 1999 approximately 90 % of their supplies from 12 countries outside the EU. The largest supplier was Russia, which provided some 26 % of external supply under purchasing contracts, followed by Canada with 17% (graph 3).

Acquisitions of NIS origin natural uranium by EU utilities since 1990 are shown in Graph 4, which is provided for reference purposes and brings together information already published in previous Annual Reports. Re-enriched tails are not included.

Graph 3 - Origin of the natural uranium delivered to EU utilities under purchasing contracts



Graph 4 - Acquisitions of NIS origin natural uranium by EU utilities (in tU)



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 1999 in accordance with the Agency's procedures is shown in Table 4.

Table 4 - Special fissile material contracts concluded by or notified to the Supply Agency

Contract Type *(1)*	**Number**
I. Special Fissile Materials	
Purchase (by a EU utility/user)	
- multiannual	2
- spot	9
Sale (by a EU utility/user)	
- multiannual	7
- spot	28
Purchase-sale (between two EU utilities/users)	
- multiannual	0
- spot	16
Purchase-sale (intermediaries)	
- multiannual	1
- spot	13
Exchanges (swaps)	13
Loans	11
TOTAL, including *(2)*	100
- Low enriched uranium	53
- High enriched uranium	22
- Plutonium	25
CONTRACT AMENDMENTS	5
II. Enrichment Contracts ***(3)***	
- multiannual	8
- spot	4
CONTRACT AMENDMENTS	25

Notes

(1) See explanations under Table 3, as appropriate.

(2) Some contracts may involve both LEU and plutonium or HEU and plutonium.

(3) Contracts with primary enrichers only.

DELIVERIES OF LOW ENRICHED URANIUM (LEU)

In 1999, supply of enrichment services to EU utilities totalled approximately 9,700 tSW, delivered in 1,900 tLEU which contained the equivalent of some 16,100 t of natural uranium feed. Some 77 % of this separative work was provided by EU companies (Eurodif and Urenco). Deliveries of separative work under spot contracts were in the order of 2%.

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, 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 (see also Chapter I). The Supply Agency continued to provide support to reactor operators in the procurement of fuels.

PLUTONIUM

In 1998, transactions involving plutonium were again mainly related to its use for MOX fuel fabrication, and the Agency concluded 25 such contracts.

The use of MOX has contributed to a significant reduction in requirements for natural uranium and separative work in recent years. The quantities loaded into EU reactors and the estimated savings are shown in Table 5.

Table 5 - Utilization of Pu in MOX in the EU and estimated natural uranium and separative work savings

Year	Pu (KgPu)	Nat U savings[1] (tU)	SW savings [1] (t SW)
1996	4,050	490	320
1997	5,770	690	460
1998	9,210	1,110	740
1999	7,230	870	580
TOTAL	26,260	3,150	2,100

Note : (1) The published figures on Nat U and SW savings vary considerably. It was assumed that 1 t Pu saves the equivalent to 120 tU as natural uranium and 80 t SW.

However, the use of MOX fuels will face increased competition as a result of the decline in natural uranium prices.

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 1999, 3 authorisations were granted by the Commission for the export of LEU with enrichments below 5% containing the equivalent to 1,390 tSW of EU origin.

CHAPTER III

NUCLEAR ENERGY DEVELOPMENTS IN THE EUROPEAN UNION MEMBER STATES

BELGIQUE/BELGIË – BELGIUM

ENERGY POLICY

On 29 April 1999, the new law concerning the organisation of the electricity market was promulgated. This law was enacted in compliance with the European Directive concerning the common rules for the internal electricity market. A series of royal decrees is necessary to make the law operational. A number of decrees had already been issued at the end of the year and the remainder was in an advanced state of preparation.

The committee of experts charged by the former government with the examination of the future choices for electricity production has been confirmed by the new government. Its mission has, however, been enlarged :

1) the committee has to take into account the following elements of the government's policy. A moratorium will be maintained on nuclear electricity. The government intends Belgium to withdraw progressively from nuclear energy production while respecting, however, the objectives of the Kyoto protocol on CO_2-emissions. In order to have enough time for the development of renewable and clean energy sources, the government will follow a scenario according to which the closure of the nuclear power plants will only start after 40 years of operation;

2) the committee has to evaluate the implications and the statute of the provisions for the management of the radioactive waste and for the dismantling of the nuclear power plants.

NUCLEAR ELECTRICITY GENERATION

In 1999 Belgium's nuclear power plants (including the French share of Tihange 1) generated about 467 TWh. This is 6.4% higher than in 1998 and represents 57.9% of the country's total electricity production in 1999. The load factor of Belgium's nuclear power plants reached 93.3% in 1999, which is considered an excellent performance.

FUEL CYCLE DEVELOPMENTS

Production of uranium from imported phosphates was halted in December 1998.

The production of MOX fuel by Belgonucleaire in its Dessel plant amounted to 36 t in 1999, to be used in Belgian, German, Japanese and Swiss plants.

The new government has established a moratorium on the reprocessing of irradiated fuels from Belgian nuclear power plants. As requested by the previous government a report to the Parliament about the management options of spent nuclear fuel is in preparation. This report will complement the one drafted at the end of 1998.

During 1999, the last spent fuel elements of the reprocessing contract concluded in 1978 between Synatom and Cogema were transported to La Hague.

Eight MOX fuel elements were loaded in 1999 in the Doel 3 unit. This brings the total to 80 MOX fuel elements for the whole of Belgium. No outage for Tihange 2, the other unit using MOX fuel in Belgium, was necessary in 1999.

During 1999, studies continued on the conditioning of spent nuclear fuel. Some specific aspects were examined in order to optimise the process.

With respect to R & D on the geological disposal of conditioned spent fuel and high level, medium-level and long-lived waste, the second access shaft for the extension of the underground research laboratory (in connection with the feasibility demonstration of the underground disposal of high-level waste) was completed. The preparation has started for the construction of the connection gallery between the new shaft and the existing laboratory.

The drafting of the SAFIR 2 report, giving an overview of the results so far obtained and indicating future R & D orientations, continued.

During 1999, 76 spent fuel elements were placed in 3 dry storage containers in the interim storage building at Doel. This brings the total to 492 fuel elements placed in 19 containers. At Tihange 204 spent fuel elements were placed in the wet storage building, which brings their total number to 575.

The action programme with respect to the disposal of low-level and short-lived waste, the aim of which is to present integrated preliminary near surface or geological disposal concepts for nuclear sites in Belgium, has progressed according to schedule. A work programme has been set up with the aim of creating local partnerships at the existing nuclear sites in Belgium, to involve local parties in the decisional process concerning repository projects and to integrate these draft projects in global regional development plans. By the end of 1999, a partnership was formed with the municipality of Dessel on whose territory the Belgoprocess site (central interim storage) is located. Two other partnerships were on the verge of being formed, i.e. with Mol, on whose territory the SCK-CEN is located, and Fleurus-Farciennes, on whose territory the Institute for Radio-Elements (IRE) is located.

RESEARCH

The BR2 research reactor at the Nuclear Research Centre at Mol operated as scheduled during 105 equivalent full power days. The same scientific programmes as those mentioned in the 1998 report were continued, as well as the commercial production of radio-elements and nuclear silicon doping.

One transportation of spent BR2 fuel elements took place in the framework of the reprocessing contract concluded with Cogema in 1997.

The Nuclear Research Centre at Mol is also working on the pre-design of an Accelerator Driven System (ADS), called MYRRHA. It is a neutron source for multiple purposes, amongst which are :

- research on waste transmutations;
- safety research on reactor materials, reactor physics and fuel;
- production of radio-elements;
- applications of neutron bundles, such as medical applications.
- study of the ADS-technology itself.

DANMARK - DENMARK

Denmark has no nuclear power plants and the amount of radioactive waste is therefore small. At Riso National Laboratory there are two reactors in operation : a research reactor, DR3, and a small homogenous reactor, DR1, used for education. Another research reactor, DR2, has been decommissioned to stage 2. DR3 is operated at 10 MW and is used for basic research, silicon doping, and isotope production. Spent fuel is sent by ship to the United States according to the US policy for receipt of spent 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 two intermediate storage facilities situated at Risø.

Solid LLW is compacted in drums and liquid ILW is treated in an evaporator and a bituminization plant. Between 1/2 and 2/3 of the LLW is produced by Risø National Laboratory, the remainder comes from hospitals, industry, laboratories and other users of radioactive isotopes in Denmark. At the end of 1999 about 4,600 drums were stored in the facility for LLW, and about 80-100 drums are added annually. The facility has a capacity of about 5,000 drums.

The storage facility for ILW is also used for long-lived LLW. Annually it receives from 0 to 5 drums or other containers with loosely packed, untreated solid waste. At the end of 1999 about 130 m^3 long-lived ILW and LLW were stored in the facility. This facility is almost full and a small extension of its capacity is planned for 2000. Nevertheless after the closure of the Risø hot cells the need for this type of storage will be reduced.

At the end of 1999 there were no conclusive plans for final disposal of Danish ILW or LLW.

DEUTSCHLAND - GERMANY

NUCLEAR ENERGY PRODUCTION

In 1999, Germany's nuclear power plants generated about 168.4 TWh of electricity (gross). The record result of 1997 has thus only narrowly been missed. Nuclear power's share in the public electricity supply amounted to about 34%. This is a 5% increase as compared to the previous year, and can be attributed to the excellent level of availability of the German power plants, to reduced interruption for maintenance and to the fact that longer outages did not occur.

Of the 20 commercial nuclear power plants, 19 were connected to the grid, as in the previous year. The Mülheim-Kärlich nuclear power plant continued to be out of operation for legal reasons. The request for a new first partial permit submitted by the operator RWE Energie AG to the authorities of the competent Land, Rheinland-Pfalz, has not yet been approved.

ENERGY POLICY

The consensus discussions between the federal government and the nuclear industry, which began already in 1998, did not reach a conclusion in 1999. A series of discussions which took place in the first half of the year produced some initial results, especially at the level of experts, but these results remained subject to an overall consensus. The discussions were subsequently suspended. Instead, a committee at state secretary level was established to examine the national and international legal framework conditions relevant to the discussions on an energy consensus, especially for an ex-post limitation of the reactor operation permits without payment of compensation, for the banning by law of reprocessing, for the termination of the exploratory work on the Gorleben project and for the termination of the planning procedures for Konrad, including the effects on the advanced payments made by the utilities. At the year end the Committee had not been able to clarify definitively these fundamental questions. The discussions with industry are to be taken up again in early 2000.

NEW REACTOR DESIGN

The cooperative development work for a European Pressurised Water Reactor (EPR) was further pursued by the German and French partners. Activities concentrated especially on the additional technical and economic optimisation of the plant design. Work towards additional clarifications will continue until mid-2000 through several technical commissions established by the government. Work also continued, through cooperation between the German utilities and Siemens AG, on the project of an innovative boiling water reactor with passively working components and systems to control failures and breakdowns (BWR-1000). The particular interest shown by Finnish operators led to first discussions with the licensing authority of that country.

TRANSPORT

It was not possible in 1999 to resume the transport of spent fuel elements from the reactor sites which are necessary for waste management by the reactor operators, but which had been interrupted, on a voluntary basis, in May 1998 after the events relating to the contamination of the transportation casks had become known. A study initiated by the Federal Ministry of Environment and prepared by the Eisenbahnbundesamt concerning the transports to the reprocessing sites was only presented on 22 November, 1999. The technical and organisational remedial measures proposed by the operators are considered to be pertinent and have been taken into account formally through a series of expert recommendations. These recommendations are currently being urgently put into effect.

FUEL CYCLE

Although mining operations ceased after 1996 with the closing of the Wismut mine, reclamation activities yielded 33 tU of natural uranium from slurries in 1999.

Through the installation of additional centrifuges, the capacity of the URENCO enrichment plant in Gronau was increased in 1999 to 1,120 t SW/year. The installation operated according to plan at nearly 100% capacity. In order to extend the capacity to 1,800 t SW/year, work has begun on the construction of two additional enrichment halls. The application for the nuclear licence necessary for an extension of capacity to 4,000 t SW/year is currently being processed by the competent authorities.

The ANF fuel fabrication plant in Lingen, a 100%-affiliate of Siemens AG, continues to dispose of a maximum capacity for the production of powder and pellets of 400 t U/year. It is in addition able to accept 250 t U/year in the form of pellets for the fabrication of fuel rods and elements. The whole of the plant's supply of nuclear fuel elements goes to European customers.

SPENT FUEL

The extent of use of the interim storage facilities in Ahaus and Gorleben has not changed since 1998, due to the transport moratorium for spent fuel elements which has been in force since May 1998. For the same reason it has not been possible to receive the six CASTOR casks, each containing 28 vitrified ingots, which since early 1998 have been due to be removed from La Hague.

In November 1999, the transport container storage facility of the "Zwischenlager Nord" at Greifswald in Mecklenburg-Vorpommern was licensed to store irradiated fuel elements from the nuclear power plants Greifswald and Rheinsberg where operations have ceased.

The pilot conditioning installation (PKA) at Gorleben has been completed. All operation and acceptance tests, including the cold commissioning, have been undertaken with positive results. The granting of the operating licence has been somewhat delayed; it is expected for early 2000. The PKA remains an essential instrument for the optimisation of the use of the containers in the direct disposal of spent fuel elements.

WASTE

The situation of the final waste disposal facility at Morleben has not changed since 1998. The storage activities have been interrupted for formalistic legal reasons. Activities essentially concentrated on maintaining safe operation and on work in the framework of the planning procedure for the shut-down of the final disposal facility.

According to the competent authority of the Land Niedersachsen, all conditions for the licensing of the planned Konrad final disposal site have, without reservation, been fulfilled. It considers itself to be "forced" to issue the licence in the coming months. For many years, this project has been the subject of political differences between the federal and local governments.

Because of important political considerations, the complete exploratory programme for the final disposal project at Gorleben and for the necessary mining activities has only been pursued with limited intensity. Until 1998 the competent federal authorities had made known that the explorations undertaken so far gave reason to expect that the saliferous rocks would be suitable. The political programme of the new government provides for an interruption of the exploration activities and for an extension of the studies to additional sites with different geological formations. It is intended to resolve the controversal final disposal questions in consensus with the industry.

DECOMMISIONING

The decommissioning of the "uranium treatment" section of the former fuel element installation at Hanau continued according to plan. The production installations have been removed from the buildings. The "emptying" of the MOX-processing section was realized on time. By the end of 1999, half of the 13 t MOX, which had been stored for many years as residues from earlier MOX orders, had been used for the fabrication of fuel rods.

The decommissioning of the Karlsruhe reprocessing plant (WAK) progressed further. All installations of the operating building essential for reprocessing (e.g. the dissolving facility and the extraction batteries) have been dismantled. Therefore, WAK can no longer be considered to be a reprocessing plant. The remote control installations for the deconstruction of other highly active components have been installed and tested. The remote control dismantling will start in 2000. The licence for the construction of a vitrification plant for the dissolved highly radioactive wastes has been granted and construction has begun.

ELLAS - GREECE

Greece has no nuclear power plants. Electricity is produced by plants fueled with lignite or oil and by hydroelectric plants. At the National Centre for Scientific Research (NCSR) "Demokritos", GRR-1, a 5 MW Research Reactor is in operation for basic and applied research, radioisotope production and other applications.

Two subcritical assemblies are used for education at the Athens Polytechnic University and at Thessaloniki University. Spent nuclear fuel is sent by sea to the US according to the policy of acceptance of research reactor fuel of US origin for permanent disposal.

Low-Level and Intermediate-Level Waste are treated and stored at NCSR-"Demokritos" site. Greece's nuclear policy objectives place a strong emphasis on radiation protection and emergency preparedness.

ESPANA - SPAIN

NUCLEAR ELECTRICITY GENERATION

Gross production of electrical energy of nuclear origin in Spain during 1999 was 58,582 TWh, which represents approximately 30 % of the total national production. As in recent years, the performance of the nuclear park has been highly satisfactory, as reflected in the average load factor of 87.4 %.

The following are the most significant developments in the nuclear field that took place in 1999.

NUCLEAR INSTALLATIONS

During 1999 the Ministry of Industry and Energy authorised increases of electrical power as result of a thermal power increase in the following nuclear plants :

- Vandellos II, an increase of 72.73 MWe
- Asco, Unit II, an increase of 38.56 MWe.

These developments bring the total power of the Spanish nuclear park to 7,749.1 MWe.

FUEL CYCLE

During 1999 the Quercus uranium concentrates production plant, which is owned by ENUSA, continued to operate below design capacity and produced 300.2 t of locally mined U_3O_8 (255 tU). The closure of the mining activities of Quercus is sheduled for the year end.

The Juzbado (Salamanca) fuel fabrication plant, owned by ENUSA, continued to manufacture PWR and BWR fuel elements both for Spanish nuclear plants and for various European countries. Its production in 1999 was 586 elements containing 200 t of U, of which 336 elements are for PWR and 250 for BWR; 346 fuel elements were exported to Sweden, Belgium, Germany and Finland.

The intermediate and low-level solid radioactive waste storage of the Empresa Nacional de Residuos Radioactivos (ENRESA) at Sierra Albarrana (El Cabril) continued to operate satisfactorily. By 31 December 1999, 32 % of the storage facility had been filled. It is scheduled that the storage facility will be completely filled around 2016.

With regard to the temporary storage of spent fuel, the work to change the racks of spent fuel pools has been completed in all nuclear plants. It is expected that the capacity of the spent fuel pool at the Trillo plant will be filled in 2002. The construction of an additional building for the storage of spent fuel inside metal containers, has started and will be used once the capacity of the spent fuel pool has been filled.

On 31 July 1999 the Council of Ministers approved the 5th General Plan for Radioactive waste. As a fundamental hypothesis the Plan provides that the working “life” of a nuclear plant is 40 years. In consequence, it is estimated that in Spain some 193 600 m^3 of low and intermediate activity radioactive waste will have to be disposed of as well as 6,750 tU contained in spent fuel. With regard to the temporary disposal of spent fuel and high activity radioactive waste, the Plan envisages the existence of a centralised temporary storage facility in 2010. No decision on definitive disposal will be taken before that date. The Government will take the decision in the light of research conducted on both deep geological storage and partition and transmutation technologies.

It is estimated that the cost of the disposal of spent fuel and radioactive waste up until 2070 (end date of the plan) will amount to 1.6 billion pesetas. The relevant costs plus the costs for the dismantlement of nuclear power plants are financed by means of a fee on the sale of electricity which for the year 2000 amounts to 0.8% of the selling price.

The dismantling of Vandellos I nuclear plant continued during the year in accordance with the Plan schedule, focusing on dismantling of active and conventional parts as well as the insulation of the reactor vessel. Finalisation of the dismantling work is scheduled for the end of 2002 when the so-called level 2 will be reached. Then, a waiting period of 30 years will have to elapse before commencement of the following phase.

REGULATORY PROVISIONS

The new regulation concerning nuclear and radioactive installations was approved on 3 December 1999. It repeals the 1972 regulation. This new regulation updates existing legislation to ensure consistency with EU and other Spanish legislation.

FRANCE

HIGHLIGHTS

At 31 December 1999, the French nuclear facilities numbered 58 pressurized water reactors in operation (Thirty four 900 MW, twenty 1 300 MW and four 1,450 MW) and one fast reactor (PHENIX). One reactor of 1,450 MW (CIVAUX 2) was commissioned at the end of 1999.

In July 1999, a new fuel line of MOX fabrication was licensed at the MELOX plant of COGEMA to diversify its MOX production, especially to serve Japanese customers.

Following the investigations with a view to testing underground disposal of nuclear wastes, the French Government decided in December 1998 to build two laboratories : one in clay, in eastern France, whose construction, authorized in August 1999, has begun and the other in granite, in a place to be found.

NUCLEAR POWER AND ELECTRICITY GENERATION IN 1999

Gross national consumption of electricity rose to 430 billion kWh, showing an increase of 1,5% compared with 1998. The export balance increased compared with 1998 and amounted to 63.7 TWh.

Total net production of electricity rose to 500 billion kWh, i.e. 2.8% more than in 1998. 375 million kWh were produced by nuclear power stations, representing approximately 75% of domestic production. Thermal production from fossil fuels was 48.5 TWh, a decrease of 7.8% compared with 1998. Hydroelectric production increased by 16.3% compared with 1998 and amounted to 76.5 TWh.

As regards nuclear operation, 1999 showed a decrease in availability factor, which was 79.3% compared with 81.2% in 1998. This reduction is mainly due to the technical problems which occurred at the 1300 MW PWR reactor containments.

The units CHOOZ B1, CHOOZ B2, CIVAUX 1 and CIVAUX 2 have been reconnected (or connected) to the grid during the year.

A new daily peak of domestic consumption, expressed in terms of power, was reached on 21 December 1999 and amounted to 71.9 GW. The previous record, established on 31 December 1993, was 70 GW.

The programme of testing and removing vessel heads was carried forward. Since 1994, 35 vessel heads out of the 54 in operation have been replaced. Also 6 steam generator replacements have been achieved since 1995.

At the end of 1999, 19 reactors were operating with MOX fuel and 20 reactors with 4% U235 fuel elements.

URANIUM MINING

In 1999, the national uranium production amounted to 439 tU in concentrates, around 13.5% down as compared with 1998.

Production came mostly from SMJ (Société des Mines de Jouac) in Limousin.

With regard to French mining interests outside France, in Canada the first production of the McClean mine started in June 1999 as expected. The overall production in Canada reached 1,700 tU. Cluff mine is planned to be closed by end 2000. In Niger, production was 2,918 tU, 21.5% down as compared with 1999. In Gabon, the COMUF facilities produced 294 tU and were closed in mid 1999.

URANIUM CONVERSION

In 1999, the two Comurhex plants of Malvési and Pierrelatte operated very satisfactorily, reaching a good level of production.

URANIUM ENRICHMENT

The Georges Besse facility at Tricastin ran extremely well, with seasonal adjustment of the production being made in order to optimize the electricity consumption.

REPROCESSING

The UP2 and UP3 plants operated very satisfactorily during 1999 : 712.9 tonnes of oxide fuel were reprocessed in UP3, 848.6 tonnes of oxide fuel were reprocessed in UP2. A total of 1,561.5 tonnes of oxide fuel was reprocessed in 1999, bringing the cumulative quantity to 15,098 tonnes since 1976.

IRELAND

Ireland does not have a nuclear power industry and there are no plans for such. Ireland's nuclear policy objectives place a heavy emphasis on the enhancement of nuclear safety, radiation protection and emergency preparedness world-wide. Ireland remains opposed to the operation and expansion of the nuclear industry, particularly in the UK, because of its proximity to Ireland and the scale and complexity of its nuclear activities. Ireland is also concerned about the safety of many nuclear plants in Central and Eastern Europe.

In the implementation of its nuclear policy, the Irish Government is advised and assisted by the Radiological Protection Institute of Ireland.

ITALIA – ITALY

ENEL AND THE DECOMISSIONING OF NUCLEAR POWER PLANTS (NPP)

In the framework of the re-organisation of the electricity sector in implementation of the related EC, ENEL has been restructured according to Government instructions issued in a Ministry of Industry decree.

This re-organisation has involved the setting up of ENEL as a holding company, composed of various companies, responsible for previous activities and now devoted to new and innovative activities not included in ENEL's strategy up to now. In particular, as regards nuclear activities, the Italian nuclear power plants and all the necessary ressources have been entrusted to a new company named SOGIN. Its task is to manage the decommissioning of the Italian nuclear plants as well as the fuel cycle back-end, including the ENEA pilot plants. This company will remain the Ministry of Treasury's property, while the Ministry of Industry will define its strategic options.

The new Ministry of Industry's strategy foresees the conclusion of the decommissioning activities for all nuclear plants in Italy within the next 20 years.

The strategy for spent nuclear fuel has also received a new orientation : the fuel reprocessing contracts already signed with BNFL are planned to be managed until their termination. The remaining irradiated fuel still existing in the NPPs will not be reprocessed but instead will be stored. A call for tender has consequently been issued for the provision of adequate containers to be used for dry storage and fuel transportation.

All fresh fuel has been sold to an American company and a part of it has already been shipped.

ENEA AND THE MANAGEMENT OF WASTE

In the framework of its current programme on waste management, ENEA has completed the revision of the Basic design and the Preliminary Safety Report for the vitrification plant to be built at the Saluggia Centre, according to the requests of the National Licensing Authority (ANPA).

At the Trisaia Centre, the cementation of the last 3 m^3 of liquid waste produced in the past by the ITREC plant has started.

Pre-decommissioning activities at the fuel fabrication plant of FN SpA (formerly "Fabbricazioni Nucleari") now under complete control of ENEA, have also been carried out.

Basic technical and scientific activities, aimed at the selection of a site for the national repository of conditioned medium level waste, have also been carried out by the relevant ENEA Task Force.

NEDERLAND – NETHERLANDS

ENERGY POLICY CONSIDERATIONS

The liberalization of both the electricity and the gas market is at the moment one of the main objectives of Dutch energy policy. The electricity market liberalization is at an advanced stage of progress; for the gas-market a new law was introduced in Parliament in mid 1999.

NUCLEAR ELECTRICITY GENERATION AND CONSUMPTION

The Netherlands uses nuclear energy on a modest scale. There is only one nuclear power plant, the Borssele NPP, which will stay in operation until the end of 2003. In February 2000 the Raad van State, the highest administrative court, decided to cancel the limitation of the period of operation, which had been included in the licence by the previous government, as this had been contested by the employees of the plant. The government reacted to this decision by stating that other means will be investigated to end the plant's operation in 2003, in order to give effect to a motion accepted in parliament at the end of 1994. The nuclear power station of Dodewaard stopped producing electricity in March 1997. The Dutch Electricity Generating Board decided to close down this plant mainly for economic reasons, triggered by market liberalisation. Thus, the percentage of nuclear power in the total electricity generated in the Netherlands is 4%.

ENRICHMENT

In November 1999, the Dutch Cabinet agreed to a study of the possibility of selling the shares of the Dutch Government in Ultra Centrifuge Nederland (UCN). Also, the Committee for Economic Affairs of the Parliament agreed to proceed with such a study, provided that no irrevocable steps would be taken. Therefore, if the study favours a disposal, the decision whether or not to privatise will have to be discussed with the Parliament.

REPROCESSING

The 1998 Supply Agency's Annual Report mentioned discussions in the Parliament on the possibility of terminating the reprocessing of spent fuel from the Dodewaard and Borssele nuclear power stations. Based on a study carried out by E.C.N., the government took the view that there were no weighty and urgent reasons to change the current strategy which is based on the reprocessing of spent fuel. However, Parliament expressed its doubts on this issue and requested further investigations with respect to the possibilities and consequences, including financial aspects, of changing the reprocessing strategy.

The results of the in-depth study, which was carried out subsequently, were discussed again in Parliament in June 1999. Although the Government was of the opinion that the results of this study gave a clearer picture of the whole situation of reprocessing as compared with the earlier investigation, it confirmed, however, the previous conclusions. Therefore, the Government maintained its position with respect to the reprocessing of spent fuel. This position was acceptable to a majority of the Dutch Parliament.

RADIO-ACTIVE WASTE POLICY AND DEVELOPMENTS

In the course of 1999, problems arose with the transport of spent fuel from the Petten reactor to COVRA and from Dodewaard to Sellafield. The Minister of the Environment decided not to issue any licence until the Health Council had given its advice on the question of whether such transports can take place without any risks to health and for the environment. In autumn 1999 the Health Council advised positively and Minister Pronk decided to issue the transport licences. However, Greenpeace and the local council of Zijpe objected against this decision. So, the transport licenses were again suspended, pending a further decision of the Minister. A decision to grant new transport licences was taken at the beginning of 2000.

NUCLEAR RESEARCH

Within the context of the "open nuclear energy option", the Netherlands is interested in and remains dedicated to the development of new reactor concepts such as the advanced light water reactors and the high temperature gas-cooled reactors in order to contribute to a sustainable energy supply in the long term. In this respect the Netherlands research institutes cooperate with ESKOM in South Africa and JAERI in Japan.

ÖSTERREICH - AUSTRIA

ENERGY POLICY

The Austrian energy policy goals, laid down in the Energy Report of the Austrian Government of 1996, have remained unchanged since then. Austria's energy-supply system is committed to the following four goals:

- security;
- (cost-)efficiency;
- environmental compatibility;
- social acceptability.

These energy policy goals are fully in line with those of the EU and the principles of the International Energy Agency. In order to achieve these objectives the Federal Government makes use especially of the following strategies:

- promotion of rational use of energy (improvements in energy efficiency);
- promotion of renewable sources of energy.

These strategies are complemented by a number of activities in various energy policy action fields:

- liberalisation of energy markets;
- diversification of energy sources;
- diversification of suppliers;
- IEA crisis-mechanisms;
- mandatory oil stocks;
- prohibition of nuclear energy;
- price monitoring.

AUSTRIA AND THE EUROPEAN UNION

For Austria, among all international fora, the EU is certainly the dominating driving force for intensified international co-operation. Thanks to this co-operation a large number of activities in many fields of energy policy have been carried out. Examples include:

- energy efficiency: a directive on energy efficiency as well as the SAVE II - programme;
- renewable sources of energy : the ALTENER II-programme (alternative energies);
- oil: directive on minimum stocks of crude oil and/or petroleum products;
- gas: the directive on the single market in natural gas;
- coal: CARNOT-programme (promotion of clean solid fuel technologies);
- electricity: the directive on the single market in electricity;
- research, technological development and demonstration (RD&D): the Energy Programmes within the Framework-Programme for RD&D: ENERGY;
- co-operation with non-member countries in the energy sector: the SYNERGY-programme.

NO UTILISATION OF NUCLEAR ENERGY IN AUSTRIA

Austria does not operate any nuclear power plant. The origin of this situation is a law of 1978 establishing the prohibition of nuclear power plants on Austrian territory. This was the legal consequence of a referendum in November 1978 resulting in a negative vote against the nuclear power plant project Zwentendorf. The events in Chernobyl in 1986 reinforced this parliamentary decision and further strengthened the opposition of the Austrian population against nuclear power.

RESEARCH REACTORS

Austria has no nuclear power plants. However three research reactors are in operation in Vienna, Seibersdorf and Graz.

With respect to the ASTRA Reactor in Seibersdorf there are plans to close down the reactor and to begin with the appropriate steps to put the reactor definitely out of operation.

The overall situation for the remaining other two reactors, as already reported in the annual report 1998, remains unchanged.

RADIOACTIVE WASTE

Since Austria does not operate nuclear power plants, there is no major production of high level radioactive waste (HLW). Consequently, there is no need to envisage intermediate or final storage capacities in Austria for HLW. The relatively small quantities of HLW resulting from the Austrian research reactors are covered by a framework contract for "US-origin nuclear fuel“ under which they will return to the US during the next decade.

Low and medium level waste (L/MLW) from hospitals, industry and research laboratories (30-40 t/year) is collected and treated by the Austrian Research Centre Seibersdorf. The research centre is equipped with suitable facilities to process and condition low and medium level waste, e.g. incinerator, supercompactor and waste water evaporator. As a conditioning process, cementing is predominantly used.

On the basis of a joint agreement between the Republic of Austria, the community of Seibersdorf and the Austrian Research Centre Seibersdorf, 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. After this date, the waste is to be transferred to a final storage facility which is planned to be built on a site to be selected at the beginning of the next decade.

PORTUGAL

ENERGY POLICY CONSIDERATIONS

The dependence on imported energy remains at a high level, of the order of 90%.

In 1997, the Total Primary Energy Supply (TPES) amounted to 20.4 Mtoe and the Final Energy Consumption to 14.2 Mtoe, which represented an increase of 3.9% and 2.6%, respectively, compared with the previous year.

Imported oil and coal contributed 69% and 18% respectively to the total energy supply in that year. In order to diversify energy supply, reduce costs and the growth rate of $C0_2$ emissions, Portugal is pursuing the introduction of natural gas from Algeria.

The programme is being successfully implemented and consumption reached $2.1x10^9$ cubic meters in 1999, well ahead the forecasts of $1.65x10^9$ cubic meters. Natural gas is presently used in two units of the dual fired (gas and fuel) power plant of Carregado (6x125 Mwe) and in the gas fired combined cycle plant of Tapada do Outeiro (3x330 Mwe) which was completed in 1999.

NUCLEAR ELECTRICITY GENERATION

Portugal has no plans for the time being to use this source of energy.

FUEL CYCLE DEVELOPMENTS

Uranium (yellow cake) production remains at very low level and amounted to 12 t $U_3 0_8$ (10.2 tU) in 1999.

RESEARCH REACTORS

The RPI (Reactor Português de Investigaçao) is the sole research reactor in operation in the whole of the Iberian Peninsula. So far it has been predominantly used by the Portuguese community although there are also users from Spain and more recently also from Centre Européen de Recherche Nucléaire (CERN) of Geneva.

During the year contracts for the return of all the spent fuel of US origin were signed and all the accumulated irradiated fuel was sent to that country.

The operation of the reactor is continuing with the fuel in existence and according to the present schedule this fuel should permit operation until the end of the period allowed by the US Foreign Research Reactor Spent Nuclear Fuel receipt programme.

SUOMI/FINLAND - FINLAND

ENERGY POLICY CONSIDERATIONS

A new government was formed after general elections in March. In its programme declaration this new government stated inter alia: " Because energy production solutions occupy a key position in Finland's achievement of the carbon dioxide emission targets, decisions on the establishment of new power plants must start from the premise that the possibilities of building combined heat and power stations should be exploited to the full and that natural gas or domestic fuel sources be used to sustain this capacity. Other decisions on future power plants must be based on low-emission options in a manner that encompasses all economically and technically viable forms of energy production which meet the prevailing environmental constraints." The expression "low-emission options" has been interpreted by the key ministers to include nuclear energy.

Each of the two companies operating nuclear power plants in Finland continued work towards a possible decision at the company level to start a new power plant project. They submitted to the competent authority an Environmental Impact Assesment (EIA) report in August 1999. In both cases the EIA process was almost finished at the end of the year. Towards the end of the year, these two companies jointly announced that only one of them, Teollisuuden Voima Oy, would be responsible for any possible new nuclear project.

NUCLEAR ELECTRICITY GENERATION AND CONSUMPTION

The total amount of electricity produced by the four nuclear power units in 1999 was 22.0 TWh or 5.2 % more than in 1998. This corresponds to 33.0 % of the electricity generation and 28.3 % of the electricity supply in Finland. The capacity factors of the units varied between 91.0 and 96.8 %.

RADIOACTIVE WASTE POLICY AND DEVELOPMENTS

Posiva Oy, a company jointly owned by the two nuclear power operators in Finland, submitted in May to the government an application whereby it asked the government to formally state that a specified project is in line with the overall good of society. This kind of statement is a necessary prerequisite for obtaining later a construction licence, in this case envisaged to take place sometime around 2010. The project consists of an encapsulation plant and a final disposal site for spent nuclear fuel in a named location. Processing of the application, with many compulsory steps, progressed during the year and the formal decision on the application will most probably be taken in spring 2000. The locality in question gave its formal consent to the project in January 2000.

RESEARCH REACTOR

A new operating licence was granted to the single research reactor, a 250 kW Triga Mark II reactor, operating in Finland. Its current activities include boron neutron capture therapy (at the reactor site), research, education and isotope production.

SVERIGE – SWEDEN

ENERGY POLICY CONSIDERATIONS

With the closure of the power reactor Barsebäck 1, the phasing-out of nuclear power in Sweden began in 1999. Following a judgement by the Supreme Administrative Court, which upheld a Government decision of 1998, the reactor was shut down permanently on 30 November 1999. Sydkraft AB, the owner of Barsebäck, will be compensated with equivalent power through part-ownership of the state-owned Vattenfall's Ringhals nuclear plant. The State will furthermore pay a yearly sum for the additional cost of operating Barsebäck 2 as a single entity and towards additional costs of decommissioning Barsebäck 1. The compensation package, agreed by Sydkraft but pending parliamentary approval, also covers the principles for compensation to be applied if Barsebäck 2 is shut down as the result of a political decision.

NUCLEAR ELECTRICITY GENERATION

The Swedish nuclear power stations generated 70.1 TWh in 1999, slightly less than in the previous year. Nuclear power represented ca. 47 % of the electricity generated in 1999 (hydro ca. 47 %). The hydro production was about 6

TWh higher than in a normal year due to high water flow to the reservoirs.

Availability of the Swedish reactors was on average 82.8 % in 1999, compared with 84.8 % in 1998. The three reactors in Forsmark (BWR) and the PWR reactors in Ringhals achieved very good production results, with an availability of more than 90 %.

FABRICATION

At the ABB Atom fuel fabrication plant 365 t of uranium dioxide powder were converted and 265 t of fresh fuel were produced during 1999. More than half of the production was for the export market.

RADIOACTIVE WASTE

In mid 1999 two additional municipalities, Älvkarleby and Hultsfred, decided to participate in feasibility studies for siting of a deep repository. The decision in Hultsfred was unanimous and in Älvkarleby there were only a few votes against. This means that in total six municipalities are now participating in the siting process on a voluntary basis.

In November 1999 SKB, the Swedish Nuclear Fuel and Waste Management Co. (owned jointly by the nuclear power utilities), submitted a major safety assessment of the complete deep repository system to the Government. The safety analyses have been performed for various long term scenarios, in which the outcomes are compared for three sites with different geographical and geological characteristics.

Immediately after the turn of the millennium the Government approved the new "Programme for Research Development on Final Storage of Spent Fuel" which in 1998 was submitted to the Government. SKB is required to make a few additional studies during 2000 as input to a forthcoming Government decision about detailed site investigations on two or three localities in Sweden.

The Studsvik centre treats low and intermediate level waste from nuclear reactors and provides services for the dismantling of European nuclear facilities. Its European operations focus on the treatment of low level waste in Studsvik's incineration and melting facilities. In 1999 the facilities, with a melting capacity of 900 t, were modernised and rebuilt with a capacity of 2,500 t.

The fee due during the year 2000 for the waste management activities and future decommissioning of all Swedish reactors was lowered in December 1999 to an average of 0.011 SEK per KWh.

RESEARCH REACTORS

During 1999 a Boron Neutron Capture Therapy facility at the R2-0 reactor in Studsvik was built. The purpose is to treat patients suffering from brain tumours with neutron radiation. A facility for production of iodine-125 was also taken into operation. This radioisotope is used for treatment of prostatic cancer.

Both the R2, a 50 MW MTR-reactor in operation since 1960 and used for fuel testing, fuel investigations, silicon doping and isotope production, and the R2-0 (1 MW) reactors have operated at full capacity. Both reactors also provide neutrons for basic research for the Neutron Research Laboratory in Sweden.

UNITED KINGDOM

ENERGY POLICY CONSIDERATIONS

The Government's central energy policy objective is to ensure secure, diverse and sustainable supplies of energy at competitive prices. The Energy Sources White Paper, published on 8 October 1998, observed that existing nuclear power plants make a valuable contribution to diversity of supply and to emissions reduction. The Government believes that existing nuclear stations should continue to contribute both to electricity supply and to reduction of emissions as long as they can do so to the high safety and environmental standards which are currently observed. The White Paper also noted that nuclear power's share of generation is expected to decrease in the first decades of the next century as existing capacity is retired.

It is for the market to take the initiative for proposals for new generating capacity and, at this point in time, there are no proposals for new nuclear capacity. With economics and public acceptance issues to be resolved, it remains to be seen what part nuclear generation will play in electricity generation in this new century.

Arrangements to fully integrate Magnox Electric plc with British Nuclear Fuels plc (BNFL) have still to be finalised. This process will be completed once all of the magnox stations have been re-licensed and granted new discharge authorisations. The underlying aim of this merger is to improve the arrangements for managing public sector nuclear liabilities.

Following a report, commissioned by Government from consultants KPMG on options for the future of BNFL, the Government announced in July 1999 that it would look to introduce a public private partnership (PPP) into BNFL. The introduction of any PPP is subject to the company's overall progress towards achieving a range of targets on safety, health, environment and business performance, as well as further work to be undertaken by the Government and its advisers.

There was some restructuring of British Energy in 1999. British Energy is now the holding company of British Energy Generation (UK) Ltd (formerly Scottish Nuclear), of which British Energy Generation Ltd (formerly Nuclear Electric) is now a subsidiary. The latter two companies run the UK's eight most modern nuclear power stations making British Energy the largest generator in Great Britain.

NUCLEAR ELECTRICITY GENERATION AND CONSUMPTION

The UK's nuclear power stations supplied 87.7 TWh in 1999, compared with 91.2 TWh in 1998. This represented 25.5% of total electricity supplied in 1999 (compared with 27% in 1998).

INTERNATIONAL ACQUISITIONS

In December 1999, BNFL announced that it is to purchase the nuclear power business of ABB which comprises nuclear systems businesses worldwide. The acquisition will be subject to the relevant US regulatory processes. The purchase builds on the acquisition, with Morrison Knudsen, of the nuclear business of Westinghouse Electric Company which was completed earlier in the year.

During 1999, British Energy continued to expand its international activities, notably in the United States through its joint venture with US utility PECO Energy. In addition to the completion of their purchase of the Clinton and Three Mile Island-1 nuclear power stations, four other acquisitions - Nine Mile Point 1-2, Oyster Creek and Vermont Yankee - await regulatory and other clearances. The Group also announced the proposed acquisition of flexible fossil generation and an electricity and gas supply business in the UK.

FUEL CYCLE DEVELOPMENTS

Urenco, the UK based British-Dutch-German centrifuge enricher further expanded its enrichment capacity during 1999 following increased business commitments. Total capacity at all three plants at the end of 1999 was 4400 tSW per annum.

In April 1994, BNFL began construction of the Sellafield MOX Fuel Plant (SMP) which will fabricate mixed oxide (MOX) fuel from a blend of plutonium and uranium. In June 1999, the Government gave the go-ahead for the introduction of uranium into the plant's commissioning process. The final decision on whether to commence operation of the plant rests with Ministers at the Department of Environment, Transport and the Regions and the Ministry of Agriculture, Fisheries and Food.

BNFL's Thermal Oxide Reprocessing Plant (Thorp) at Sellafield began operation in March 1994. The plant's throughput has been gradually ramped up over the past five years. Cumulative throughput at the end of 1999 was approximately 2500 tonnes.

Following an announcement in June 1998, the reprocessing plants at Dounreay will continue to operate, subject to the necessary regulatory consents, only for as long as necessary to deal with existing liabilities and committed work. No new commercial contracts for reprocessing at Dounreay will be accepted. Currently, the plants are not operating following a safety review by the Health and Safety Executive; work is in hand to address the review recommendations.

In March 1999, the House of Lords Select Committee on Science and Technology published the report of its enquiry into "The Management of Nuclear Waste". Its principal recommendations support the principle of deep disposal in preference to long term surface storage and propose a non-governmental nuclear waste management commission to oversee policy implementation and also a new radioactive waste disposal company which would construct, operate and close disposal facilities. The Government responded in October and proposes to take forward many of the issues raised in the report in a consultation document which it hopes to publish by Easter 2000.

RESEARCH FACILITIES

The UK currently has only 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.

On 1 January 2000, the UK took over management responsibility for the Joint European Torus (JET) at Culham, Oxforshire. An agreement has been drawn up which will allow continued operation of this leading international fusion research facility. It is expected that all existing participants to the current JET organisation will sign up to the new agreement before the end of the year.

CHAPTER IV

INTERNATIONAL RELATIONS

INTRODUCTION

European Union (EU) operators acquire nuclear materials and services from a number of external supplying countries. Moreover, some EU operators also process materials on behalf of foreign clients. While in the European Union, nuclear materials in the civil fuel cycle are subject to the safeguard provisions of the Treaty establishing the European Atomic Energy Community (Euratom or the Community) and, as appropriate, also to the agreements entered into by the Community, its Member States and the International Atomic Energy Agency (IAEA). In addition, nuclear materials transferred between the Community and three non-Community countries - Australia, Canada and the USA - are subject to international agreements concluded between the Community and the country concerned. These agreements provide for some additional conditions which apply to such materials. Furthermore, transfers of nuclear materials with some other countries are or may become covered under agreements with the European Community and Euratom of a more general nature.

The Agency has compiled a compendium of agreements to which the European Atomic Energy Community is a party and which relate to nuclear fuel supply[1].

Under the provisions of the Euratom Treaty, international agreements are negotiated on behalf of the Community by the European Commission in accordance with directives issued by the Council of Ministers. Where these agreements relate to the supply of nuclear materials or services, the Euratom Supply Agency takes part in the Commission's negotiating team and in any ongoing consultations with the authorities of the countries concerned. Developments in relation to these agreements during the year relevant to nuclear fuel supplies are reported below.

[1] This document is published by the Office for Official Publications of the European Communities Luxembourg under reference nr ISBN 92-828-0091-1.

BILATERAL NUCLEAR COOPERATION AGREEMENTS

EURATOM/AUSTRALIA

As provided for in Article XIII of the Agreement between Euratom and the Government of Australia concerning transfers of nuclear material, consultations took place in Brussels in December 1999.

These consultations provided a useful opportunity to review nuclear developments in Australia and in the European Union. Both sides exchanged views and information on current and future levels of uranium production, on general market trends related to nuclear trade and to the nuclear supply situation in the EU.

As a follow-up to previous contacts, the two sides also discussed Australian requirements for possible transfers of Australian obligated depleted uranium tails to Russia for further enrichment and arrangements for leaving the “secondary tails” material there.

The 1997 exchange of diplomatic notes between Euratom and Australia concerning the Australian generic prior consent for retransfers of

Australian obligated plutonium from Euratom to Japan, entered into force on 7 May 1999.

EURATOM/CANADA

Contacts took place during the year in particular with regard to the issue of Canadian requirements for possible retransfers of Canadian obligated depleted uranium from Euratom to Russia for further enrichment with a view to leaving the "secondary tails" material there.

The next round of consultations under art. XIII of the Euratom/Canada agreement is scheduled in the first quarter of 2000.

EURATOM/USA

The Supply Agency and the European Commission continued to request the US Government to find an equitable and fair solution to the issue of overpricing by the United States Enrichment Corporation (USEC) of enrichment services supplied to two EU companies. In this regard, they met with the US Government to reiterate the EU view, that the US Government, through the Department of Energy, was still legally responsible to the two EU companies as the original and continuing US contractual party to the enrichment services contracts subsequently transferred to USEC under the US Policy Act of 1992. After consideration the US Government maintained its position that following a policy change which was incorporated into US law, all obligations under the contracts had been transferred to and were to be performed by USEC. Therefore, it concluded that the US Department of Energy had no further contractual obligations vis-à-vis the companies nor had it breached the contracts.

In the framework of the Euratom/US agreement, the US authorities granted the generic prior consent for retransfers to Switzerland of separated plutonium in the form of MOX fuel, recovered from US obligated material transferred from Switzerland to the EU and subject in the latter to the Euratom/US agreement.

RETRANSFERS

Under the terms of the Community's agreements with Australia, Canada and the USA, these supplier countries retain the right of consent, albeit often in a long-term programmatic framework, over the retransfer from the Community of nuclear materials subject to those agreements to other countries outside the Community.

Under the Euratom/Canada agreement, simplified procedures relating to retransfers of certain Canadian-obligated nuclear items are in place for most of the Community's nuclear trading partners. In the case of the Euratom/Australia Agreement retransfers from the Community of Australian obligated material can take place, subject to certain notification conditions, to countries with which Australia has a co-operation agreement in place for activities for which Australia has accepted those countries as a destination. Again, this includes most of the Community's nuclear trading partners.

Under the Euratom/US agreement, a mechanism providing for advance generic consent for retransfers of nuclear items subject to the agreement is in place based on a list of destinations outside the EU which includes most of the Community's nuclear trading partners. Advance generic consent for the retransfer to Japan of plutonium, including plutonium contained in mixed oxide fuel, is maintained under this agreement by reference to an exchange of letters of 1988 between the European Commission and the US Mission to the European Communities.

Following the entry into force of a new US/Switzerland nuclear co-operation agreement in June 1998, a similar mechanism for retransfers of this kind to Switzerland became operational in 1999.

Applications for retransfer consents falling outside the generic consents provided for under the above agreements are handled by the Supply Agency. During 1999, seven such retransfers were approved by the US.

BILATERAL RELATIONS IN THE NUCLEAR FIELD WITH OTHER COUNTRIES

THE RUSSIAN FEDERATION

Within the framework of the EU/Russia Partnership and Co-operation Agreement, (PCA) the second meeting of the Sub Committee on Energy, Environment and Nuclear Issues was held in Brussels in July 1999. On this occasion, the EU and Russian sides confirmed data on current nuclear trade flows and trends. Both sides agreed that they share the same basic understanding on the market situation.

Also, the two sides exchanged views on their respective positions concerning the shape of a possible arrangement on trade in nuclear materials as envisaged in the EU/Russia PCA and agreed to continue discussions on this issue at the next Sub Committee meeting.

Contacts took place during the year with regard to the issue of possible transfers of Australian and Canadian obligated depleted uranium for further enrichment in Russia and the necessary arrangements to be agreed between Australia and Canada with the latter to allow "secondary tails" material to be left in Russian territory.

OTHER NEWLY INDEPENDENT STATES (NIS)

The Council approved in April 1999 directives for the Commission to negotiate a nuclear co-operation agreement with Ukraine, which will cover, inter alia, nuclear trade. The negotiations are expected to begin in the course of 2000.

An agreement regarding nuclear safety and nuclear fusion between Euratom and Ukraine was signed in July 1999. A nuclear safety agreement with Kazakhstan was signed in July 1999.

JAPAN

Two rounds of negotiations between Commission and Japanese government officials concerning a new agreement on nuclear co-operation took place in Brussels and Tokyo during 1999. The negotiations have allowed the parties so far to reach a considerable level of understanding on the scope and contents of the agreement. The next round of negotiations is expected to be held around April 2000 in Brussels.

MULTILATERAL AGREEMENTS IN THE NUCLEAR FIELD

ENERGY CHARTER TREATY

No developments occurred during the year concerning trade in nuclear materials.

CHAPTER V

ADMINISTRATIVE REPORT

The new Commission, which took office in September, decided to undertake an ambitious programme of rationalisation requiring the reorganisation in depth of a number of its services. In this context, and as part of the Commission's aim to achieve economies of scale, it was decided in December to reduce the staff establishment of the Agency to 19 posts with effect from 2000, partially compensated by assistance from the Directorate General for Energy and Transport in routine administrative matters. These changes, however, will not affect the autonomy of the Agency nor its prerogatives as provided for in Chapter 6 of the Euratom Treaty.

PERSONNEL

The staff establishment of the Agency at the end of 1999 was 24.

FINANCE

The Agency's expenditure amounted to ECU 158,265.04 for 1999. This amount was 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 Agency as provided by the Euratom Treaty.

ADVISORY COMMITTEE

The Advisory Committee held two meetings in 1999. The Agency updated the Committee on general developments related to nuclear supply policy. More specifically, the Committee discussed, on the basis of proposals of the Agency, the supply policy to be applied in the EU to natural uranium derived from Highly Enriched Uranium from the Russian Federation and also to uranium resulting from the re-enrichment within the Russian Federation of depleted uranium transferred from the EU. Exchanges of views took place on market developments, levels of production and stockpiles in producer countries, in particular in the Russian Federation and other New Independent States. The Committee was briefed by the Commission services and the Agency on the results of meetings with the Russian authorities in the context of the Partnership and Co-operation Agreement between the EU and the Russian Federation as well as on the results of conversations with the US authorities concerning the matter of overpricing of enrichment services by the USEC to two EU companies. The Committee was also regularly informed of the status of and developments related to potential Euratom international nuclear cooperation agreements with Japan and Ukraine. Likewise, the Committee was updated on the current work being undertaken by the Commission services with regard to the General Agreement on Trade and Services (GATS) 2000 negotiations. In this regard Committee members were invited to provide their input with regard to the GATS negotiations.

ORGANISATIONAL CHART

(AS AT 31 DECEMBER 1999)

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Assistant to the Director General	D. MONASSE
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• General Affairs; Secretariat of the Advisory Committee	D.S. ENNALS P. MARTINEZ-VARGAS

ADVISORY COMMITTEE OF THE SUPPLY AGENCY

Chairman	Mr. S. SANDKLEF (Vattenfall Fuel, Sweden)
Vice-Chairmen	Mr. L. F. DURRET (Cogema, France) Mr. C. GIMENO SANZ (Ministry of Industry and Energy, Spain)

WORKING PARTY

Chairman	Mr. M. S. TRAVIS (Rio Tinto, Mineral Services, UK)
Vice-Chairmen	Mr. G. PAULUIS (Synatom, Belgium) Mr. J. HUBER (Bayernwerk, Germany)

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ANNEX 1

Fuel loaded into EU reactors and deliveries of fresh fuel under purchasing contracts

YEAR	FUEL LOADED			DELIVERIES		
	tU	Feed Comp tU	Enrich Comp tSW	Natural U tU	Natural U % Spot	Enrichment tSW
1980		9,600		8,600	(4)	
1981		9,000		13,000	10.0	
1982		10,400		12,500	<10.0	
1983		9,100		13,500	<10.0	
1984		11,900		11,000	<10.0	
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	15,600	4.4	11,700
1997	2,900	18,200	11,000	15,100	12	10,100
1998	2,830	18,400	10,400	15,800	6	9,200
1999	2,860	19,400	10,800	14,700	8	9,700

ANNEX 2

ESA average price for multiannual and spot contracts involving natural uranium

YEAR	MULTIANNUAL CONTRACTS		SPOT CONTRACTS		EXCHANGE RATE
	EURO/kgU	US$/lb$U_3O_8$	EURO/kgU	US$/lb$U_3O_8$	US $ PER EURO
1980	67.20	36.00	65.34	35.00	1.392
1981	77.45	33.25	65.22	28.00	1.116
1982	84.86	32.00	63.65	24.00	0.978
1983	90.51	31.00	67.89	23.25	0.890
1984	98.00	29.75	63.41	19.25	0.789
1985	99.77	29.00	51.09	15.00	0.763
1986	81.89	31.00	46.89	17.75	0.984
1987	73.50	32.50	39.00	17.25	1.154
1988	70.00	31.82	35.50	16.13	1.182
1989	69.25	29.35	28.75	12.19	1.102
1990	60.00	29.39	19.75	9.68	1.273
1991	54.75	26.09	19.00	9.05	1.239
1992	49.50	24.71	19.25	9.61	1.298
1993	47.00	21.17	20.50	9.23	1.171
1994	44.25	20.25	18.75	8.58	1.190
1995	34.75	17.48	15.25	7.67	1.308
1996	32.00	15.63	17.75	8.67	1.270
1997	34.75	15.16	30.00	13.09	1.134
1998	34.00	14.66	25.00	10.78	1.121
1999	34.75	14.25	24.75	10.15	1.066