EURATOM SUPPLY AGENCY

Annual Report for 1980

ANNUAL REPORT

OF THE

EURATOM SUPPLY AGENCY

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I

THE DEVELOPMENT OF NUCLEAR ENERGY IN THE COMMUNITY

1. Need for the expansion of nuclear energy

Looking back to 1980 and contrary to certain expectations at the turn of the year 1979/80, there were no major changes in the development of nuclear energy as regards an acceleration in the construction of power stations and an enlargement of programmes. Certainly there was a strengthening in positions calling for more intensive and rapid expansion of nuclear energy, but, with few exceptions, these demands met no response in the form of practical measures.

The World Energy Conference in Munich, the Economic Summit in Venice and the competent international organisations all stressed the need for greater utilization of the nuclear energy potential in the medium term in order to reduce oil consumption and provide a basis for regular economic growth. The final communiqué of the Economic Summit includes the following quotation:

> "We underline the vital contribution of nuclear power to a more secure energy supply. The role of nuclear energy has to be increased if world energy needs are to be met. We shall therefore have to expand our nuclear generating capacity. We will continue to give the highest priority to ensuring the health and safety of the public and to perfecting methods for dealing with spent fuels and disposal of nuclear waste. We reaffirm the importance of ensuring the reliable supply of nuclear fuel and minimizing the risk of nuclear proliferation".

From the recommendations and resolutions of the 11th World Energy Conference on matters of nuclear energy, the overall view of this conference may be said to be that nuclear energy can play a major part in solving the problem of energy supply in a number of countries. Moreover, there would be enough uranium for several decades before it became necessary to reduce the demand for uranium by the introduction of breeder reactors. As was made clear at the conference, however, there are still problems to be solved before greater use can be made of nuclear energy, in particular public acceptance of nuclear energy production and the matter of non-proliferation. The conclusion reached at the conference was that both problems are, however, basically political.

Community organs have also repeatedly voiced the need for a greater expansion of nuclear energy. After the President's report on its work in connection with a study of the international crisis, for example, the European Council expressed satisfaction, at its meeting in Venice on 12 and 13 June 1980, with the decisions adopted by the Council of Ministers in May and June concerning the Community's energy policy. One of the aims of these decisions is to reduce oil consumption in the Community in the long term to around 40% of the gross consumption of primary energy. A further aim is to cover 70 - 75% of the energy requirements for electricity production by solid fuel and nuclear energy.

The determination of Community bodies to promote the expansion of nuclear energy is illustrated both by the financial aid granted in the way of Euratom loans for the construction of nuclear power plants and by a number of individual measures. These measures include in particular the adoption of four resolutions by the Council of Ministers regarding communications submitted to it by the Commission on 20 July and 2 August 1977. The latter contain the fundamentals of a nuclear strategy and the basis for Community action

programmes in the fields of radioactive waste, irradiated fuel, reprocessing and fast breeders. These communications are based on the Commission's repeated conviction that in the years to come the Community will have to rely increasingly on nuclear power for its energy requirements. The resolutions, which include the establishment of a consultative ad hoc committee to analyse the position of reprocessing in the Community and which state expressly that fast breeders should be kept open as an option, are set out in Appendix 2.

2. Developments in the Member States

Belgium

No new nuclear power stations were commissioned in Belgium in the year under review. There are three nuclear power plants in operation, totalling 1 665 MWe net. Their production in 1980 aggregated 11 865 GWh as compared with 10 804 GWh in 1979. The share of nuclear energy in Belgian electricity production was 23.3% as compared with 21.8% in 1979. At the present time, four nuclear power plants are under construction, with a total capacity of 3 800 MWe. According to current plans, commissioning should take place between mid-1982 and mid-1985. Decisions regarding new nuclear power station projects have been deferred until after a debate on energy policy in the Belgian Parliament.

Denmark

The Danish Government maintains its view that the bleak outlook for the Danish energy supply situation in the years to come and for many decades makes it essential for Denmark to utilize every energy source - including nuclear power - that can contribute significantly to its energy supply, provided this can be done in a manner that takes proper account of the safety of the population and the protection of the environment. However, in the beginning of 1980 the Government came to the conclusion that the necessary investigations into the questions of nuclear safety and the disposal of radioactive waste could not be completed on a realistic and warrantable basis within the time limits previously set.

It should be emphasized that the principles on which the Danish Government bases its attitude to the question of nuclear power and the conditions for its use as an energy source have not changed. A decision on the possible introduction of nuclear power has been postponed as a consequence of the delay in completion of the investigative work.

When the necessary basis for a decision has been established, the Danish Government will decide whether to advocate the use of nuclear power as an energy source in Denmark. If the Government decides in favour of the use of nuclear power, the question of principle regarding the use of nuclear power will be submitted to the parliament by tabling a bill on the Entry into Effect of the Act on Safety and Environmental Factors in Connection with Nuclear Installations. If the bill is passed by the parliament, the matter will be subject to a referendum.

Germany

At the end of 1980 there were 10 nuclear power plants with a gross capacity of more than 300 MWe each and 4 demonstration reactors with a gross capacity of in total 109 MWe in service. The total capacity was 8 600 MWe net (9 000 MWe gross). No new power plants were brought into operation in 1980. Unit A of the KRB Gundremmingen plant, which had been shut down since 13 January 1977 after an incident, was decommissioned in 1980.

At the end of 1980 partial licences had been pending for three units since 1974, for three since 1975, for two since 1977, for one since 1978 and for one since 1979.

A partial licence for two further nuclear power plants had been issued but execution was halted in view of court proceedings. At the end of 1980 there were nine nuclear power plants, with a total gross capacity of 9 900 MWe, under construction. A new order, for KKI/2, was booked in 1980, thereby increasing the number of planned nuclear power stations to 9.

On the whole, the situation in Germany must be regarded as unsettled. Although in its statement in the autumn of 1980 the Federal Government advocated the further expansion of nuclear energy, and nuclear production already accounts for a considerable proportion of the total electricity production, there was nevertheless the impression of a de facto moratorium, inasfar as there was hardly any progress noticeable in the year under review in the planning of nuclear energy programmes, the expansion of adopted projects or progress with licensing procedures.

In 1980 Germany's nuclear power plants generated 43 701 GWh amounting to 11.5 % of the total electricity production, as against 11.3 % in 1979.

France

At the end of 1980, 20 nuclear power station units were in operation with a total capacity of 12 600 MWe net. French nuclear electricity production, amounted to 57 800 GWh net installed capacity in the year under review, representing 23.5% of the total net electricity generation. This gives an increase of 52.5% over 1979, when the proportion was 16.4%.

In 1980, 5 nuclear power plants were commissioned, totalling 4 600 MWe net and two were connected to the grid for commissioning in 1981.

For the purpose of carrying out the programme adopted under which the share of nuclear electricity in the total electricity production is to be increased to 55% by 1985, EdF was authorized to expand its nuclear investment projects for 1980 and 1981 to 11 800 MWe.

In 1980 a start was made on two 900 MWe units (Gravelines C5 and C6) and four 1300 MWe units (Paluel 4, Saint-Alban 2, Cattenom 2, Flamanville 2) to be brought into service in 1984-1986. At 31 December 1980, there were 30 nuclear units under construction with a total net capacity of 31 100 MWe.

Ireland

The Irish Electricity Supply Board, Dublin, submitted in January 1975 an application for planning approval for a nuclear power station at Carnsore Point which would have a capacity of 650 MWe. Because of, inter alia, a stagnation in electricity usage the project appears to have been delayed. A date for electricity production has not yet been decided. At present all aspects of the project are being scrutinized by the government.

Italy

The situation in Italy remained unchanged with four power stations in operation for a total of 1 400 MWe. The boiling-water reactor in Caorso reached its full rated output of 840 MWe for the first time in April. Acceptance of the plant has not yet been given by the operator. Nuclear production in 1980 was 2 210 GWh, as opposed to 2 627 GWh in 1979. This corresponds to 1.2% of the total electricity production, as compared with 1.4% in 1979.

Two further nuclear power stations with a total capacity of 2 000 MWe are being built. It is still planned to have ten nuclear power units of 1 000 MWe each completed by 1990. Four of these should be in operation at that date and the other six approaching completion. Construction permits have not yet been granted for the two power stations ordered in 1974. There were no new orders in 1980. In addition, the Italian prototype heavy water reactor (Cirene - 40 MWe) is under construction and will be commissioned in 1984.

Netherlands

In the Netherlands there are two nuclear power plants with a total capacity of 531 MWe in operation. In 1980 they produced 3 900 GWh net (4 100 GWh gross), which amounted to an increase of 18% over the 1979 figure of 3 300 GWh net (3 500 GWh gross). The proportion of electricity generation reached 6%, as compared with 5.3% in 1979. This increase is due to a better exploitation of the plants. There are no nuclear power stations currently being built. In a bill presented to Parliament, however, the Dutch Government has entered into a commitment in principle to construct and commission three new nuclear power stations with a total capacity of 3 000 MWe over the next 10 years. Even so, the final decision will only be taken in 1983 after there has been a wide-ranging public discussion on energy.

United Kingdom

During the year 1980, no new nuclear power stations entered into service. At the end of the year there were 33 units in service with a total declared net capacity of 6.4 GWe. The electrical energy of nuclear origin produced in 1980 was 32.400 GWh net (37.200 GWh gross) against 33.300 GWh net (38.300 GWh gross) in 1979. Nuclear electricity in 1980 represented 13% of total electricity production.

In April 1980, the Central Electricity Generating Board and the South of Scotland Electricity Board received government approval for the construction of the AGR stations Heysham II and Torness, with a total net power of 2 500 MWe. With the commencement of construction at the two sites, the number of nuclear plants under construction in the UK amounts to 10 Units with a total net power of 6 250 MWe.

Also in April 1980, the CEGB issued a letter of intent to the National Nuclear Corporation authorising it to begin the design and safety work of the nuclear steam supply system for a PWR station. In October 1980, the CEGB announced that, providing necessary consents are obtained, it is proposed to locate a PWR station at Sizewell. A decision to construct will depend on a public inquiry which is expected to take place in 1982.

Community

For the Community as a whole the situation therefore appears as follows: at the end of 1980 there were a total of 76 power station units in operation with an aggregate net effective capacity of 31.2 GWe of which 4.6 GWe was taken into service during the year under review. Installed capacity therefore increased in 1980 by 17.3%. It should be noted that this increase occurred through the commissioning of new power stations in just one member state.

At the end of the year under review there were 58 nuclear power units with a total nominal capacity of 55 GWe net under construction. Units planned and ordered but not yet under construction amounted to 3 with a total nominal capacity of 3 GWe; in addition there were a further 19 planned units with a nominal capacity of 22 GWe for which orders had not been placed.

DEVELOPMENT OF NUCLEAR POWER IN THE COMMUNITY

SITUATION END 1980 IN GWE NET POWER

	In operation**			Under construction		Planned		TOTAL
	End 1979	1980 additions	per cent increase		ordered in 1980	ordered in 1980	still to be ordered	
Belgium	1.7			3.8				5.5
France	8.0	4.6	57.5	26.0	5.1	1.8	10.7	56.2
Germany	8.6			11.9 *		1.2	9.4	31.1
Italy	1.4			2.0			1.9	5.3
Netherlands	0.5							0.5
U. Kingdom	6.4			3.7	2.5			12.6
	26.6	4.6	17.3	47.4	7.6	3.0	22.0	111.2
TOTAL	31.2			55.0		25.0		111.2

* including 2 units at which construction was temporarily suspended (2.6 GWe)

** net effective power

Of the total electricity production in 1980 in the Community, which amounted to 1 277 TWh, 12.0% was accounted for by nuclear generation which produced 151.9 TWh. To have produced this electricity by oil-fired power stations would have required a consumption of 35.4 million tonnes of oil (1 GWh = 233 toe). Nuclear electricity production increased on average in the Community in 1980 over 1979 by 19%.

ELECTRICITY PRODUCTION OF NUCLEAR ORIGIN IN THE E.C.

	B	F	G	I	NL	U.K.	EUR 9
1978							
Nuclear electricity production TWh	11.8	29.0	33.9	4.2	3.8	32.4	115.1
% with respect to total electricity	24.5	13.3	10.2	2.5	6.4	12.0	10.2
1979							
Nuclear electricity production TWh	10.8	37.9	39.8	2.5	3.3	33.3	127.6
% with respect to total electricity	21.8	16.4	11.3	1.4	5.3	11.9	10.8
% increase 1978 - 1979	- 9.0	+ 31.0	+ 17.0	-41.0	-14.0	+ 3.0	+11.0
1980							
Nuclear electricity production TWh	11.9	57.8	43.7	2.2	3.9	32.4	151.9
% with respect to total electricity	23.3	23.5	11.5	1.2	6.0	13.0	12.0
% increase 1979 - 1980	+ 10.0	+ 52.5	+ 10.0	-12.0	+18.0	- 3.0	+ 19.0

3. Nuclear Fuel Requirements

Nuclear fuel requirements for the power stations in the Community with a net capacity of 31,2 GWe at the end of 1980 amounted to around 9 600 tonnes of natural uranium and approximately 4 900 tonnes of separative work. If the plants currently being built are commissioned according to schedule, these requirements will increase by 1985 to 13 200 tonnes of natural uranium and 8 600 tonnes of separative work, representing increases of around 37.5% and 75.5% respectively. The total cumulative requirements for the years 1981 up to and including 1985 will amount to 56 300 tonnes of natural uranium and 35 100 tonnes of separative work.

II

SUPPLY OF NUCLEAR FUEL AND NON-PROLIFERATION

The main developments in this context were the completion of the International Fuel Cycle Evaluation (INFCE) and the establishment of the Committee for Assurance of Supply (CAS) by the Board of Governors of the International Atomic Energy Agency (IAEA). Mention should also be made of the Second Review Conference on the Non-Proliferation Treaty, which was held in Geneva in August/September 1980 and dealt, in the main committee, "Peaceful use", with problems inherent in non-proliferation and supply. The conference ended without agreement being reached on a final document concerning as to substance a review of compliance with the individual provisions of the Non-Proliferation Treaty in practice.

1. International Nuclear Fuel Cycle Evaluation (INFCE)

The extensive study carried out under the designation INFCE was completed with a plenary conference in February after a period of two years. The conference took note of the reports of the working parties and of the summaries produced by the Technical Coordinating Committee and passed them on to the countries involved in INFCE "for their consideration in developing their nuclear energy policies and in international discussions concerning nuclear energy cooperation and related controls and safeguards." No position was taken at the conference on the results of the study, which covers the entire fuel cycle. It was, however, stated in a unanimously approved final communiqué that INFCE had given support to the views:

- that nuclear energy is expected to increase its role in meeting the world's energy needs and can and should be widely available to that end;

- that effective measures can and should be taken to meet the specific needs of developing countries in the peaceful uses of nuclear energy; and

- that effective measures can and should be taken to minimize the danger of the proliferation of nuclear weapons without jeopardizing energy supplies or the development of nuclear energy for peaceful purposes.

In the final declaration of the Western Economic Summit at Venice in June 1980, the conclusion of INFCE was assessed as follows:

> The studies made by the International Nuclear Fuel Cycle Evaluation Group, launched at the London Summit in 1977, are a significant contribution to the use of nuclear energy. We welcome their findings with respect to: increasing predictable supplies; the most effective utilization of uranium sources, including the development of advanced technologies; and the minimization of proliferation risks, including support of International Atomic Energy Agency (IAEA) safeguards. We urge all countries to take these findings into account when developing policies and programmes for the peaceful use of nuclear energy.

From the supply side one can say in short that the studies have given reassurance that in the medium and long term no structural bottlenecks need be feared in the supply of natural uranium and enrichment services. Moreover, the study produced important findings as regards the interrelationship between non-proliferation and supply. It also showed clearly that the continuous use of nuclear energy calls for a reliable and safe framework for nuclear fuel supply.

2. Follow-up activities

Although one cannot speak of institutionalized INFCE follow-up activities as such, the following matters related thereto are of interest in connection with fuel supply:

(a) of particular importance is the scheme for a system for the storage of excess separated plutonium (International Plutonium Storage - IPS) in line with Article XII A 5 of the IAEA Statute. The associated problems are being discussed by a group of experts within the IAEA, with representatives of both the Commission and most of the Community Member States participating. Completion of the work is not yet in sight. From the standpoint of the industry involved in the fuel cycle as producer and consumer, the discussion on IPS is of interest for two main reasons:

- First, it raises hopes that the acceptance of a commitment to a new international safeguards measure, which could add to the burdens of fuel management, will be offset by a considerable easing of the bilateral conditions, especially where they involve restrictions on reprocessing and the use of plutonium.

- Secondly, the IPS system would have certain consequences for the industry as regards access to and use of plutonium. There may also be questions concerning costs and property rights;

(b) an IAEA study is examining problems of international management of spent fuel elements.

Here too, fundamental problems are being clarified by a group of experts.

(c) Of particular importance for future developments could be the establishment of the Committee for Assurance of Supply (CAS) by the IAEA Board of Governors. This Committee, which is open to all members of the IAEA and observers from international organizations, is responsible for the following matters:

(i) ways and means in which supplies of nuclear material, equipment and technology and fuel cycle services can be assured on a more predictable and long-term basis in accordance with mutually acceptable considerations of non-proliferation; and

(ii) the Agency's role and responsibilities in relation thereto.

The Committee met for the first time in September 1980 in order to elect a chairman and complete further formalities. The work programme has not yet been fixed, but from unofficial comments made by various delegations it can be concluded that special importance will be attached to the vital question for the fuel cycle industry of standardization of the conditions for access to and use of nuclear fuel, to problems of emergency supplies, such as a fuel bank and stand-by arrangements, and also to matters of technology transfer. In addition, questions of a directly commercial nature concerning the establishment of a kind of code of conduct may well come up for discussion. From the point of view of producers and consumers in the Community, however, all efforts to restrict still further the market set-up for trade in nuclear fuel should be resisted. One certainty is that the work will be long-drawn-out and that the bilateral agreements between supplier and recipient countries will retain their basic importance for the immediate future.

3. Community agreements

The position at the end of the period under review with regard to agreements concluded or negotiated by the Community determining conditions for access to and use of nuclear material can be summed up as follows:

USA/Euratom

The basis for the transfer of nuclear material from the United States to the Community is the Agreement for Cooperation between the Government of the United States of America and the European Atomic Energy Community concerning peaceful uses of atomic energy of 8 November 1958, as amended in 1962, and the Additional Agreement for Cooperation between the United States of America and the European Atomic Energy Community of 11 June 1960, as amended on 9 August 1972. The Agreement for Cooperation is valid until 31 December 1985, whereas the Additional Agreement will remain in force until 31 December 1995.

As was already noted in the 1978 Annual Report of the Agency, the United States Government is anxious to bring the terms of these agreements into line with those of the Nuclear Non-Proliferation Act of 10 March 1978. After the Commission of the European Communities had in July 1978 declared its readiness to discuss the agreements without prejudicing the Community's position in any way, there were several rounds of talks, one in the year under review, during which the whole problem was discussed with reference to the partly concomitant activities of INFCE. The United States Government now feels that the stage is set for a new phase. No final arrangement in that connection had been made between the Community and the United States Government at the end of the year. However, talks will probably be resumed in the near future.

The standpoint of the industry in this matter is that supply relationships can only be established and maintained on the basis of a long-term, stable and reliable relationship.

The continuity of supplies from the USA in the year under review was made possible by the decisions of the American President to exempt supplies to the Community for a further year from the application of certain of the export criteria in the NNPA.

Canada/Euratom

Relations between the Community and Canada are governed by the Agreement between the European Atomic Energy Community and the Government of Canada on the peaceful use of nuclear energy of 6 October 1959, as amended by an exchange of letters between the two parties of 16 January 1978. This exchange of letters included the provision that the enrichment of Canadian material and the storage of plutonium can only be effected in accordance with conditions laid down in writing by agreement between the Community and Canada. An arrangement for this purpose for a transitional period was contained in an annex to the exchange of letters in question. It was agreed that negotiations would be initiated at the earliest possible date after 31 December 1979 or after completion of the INFCE study with a view to replacing the interim arrangement by other provisions which took account of the INFCE results. Negotiations between the Community and Canada were duly commenced before the end of 1980. The two parties agreed to extend the interim arrangement to the end of 1981. Negotiations are being continued with the aim of replacing the interim arrangement by a long-term arrangement.

A further consultation on a "sensitive operation" in connection with the interim arrangement was undertaken in the year under review proving satisfactory to both sides.

Australia/Euratom

Negotiations on an agreement with Australia, which started in 1979, had still not been finalized by the end of 1980. An important development was that in September 1980 Australia amplified the principles underlying its non-proliferation policy, as laid down in the Australian Government's decisions of 1977, with regard to reprocessing. This would appear to pave the way for solution of this particularly intractable problem.

In line with the principles of Australia's non-proliferation policy, Australian natural uranium can only be supplied when there is an agreement between Australia and the recipient country which stipulates the conditions for the use of the material. The conclusion of supply contracts, on the other hand, is not dependent on the existence of such an agreement. They are, however, de facto conditioned by the coming into effect of such an agreement, since only then can supplies of uranium actually be made on the basis of the contract in question.

4. The industry's view

The Advisory Committee of the Supply Agency discussed problems resulting from the interdependence between nuclear supply and non-proliferation and has expressed the view of the industry in the Community in a statement which is annexed to this report. (See Appendix 3).

III.

MAIN ACTIVITIES OF THE AGENCY

There were no changes in the main activities of the Agency in the year under review. The factors characterizing the situation with regard to the supply of nuclear fuels, such as subdued demand, excess capacities and uncertainy as to the non-proliferation policy framework regarding conditions of use, have not changed. In pursuance of the tasks assigned to it by the Euratom Treaty, the Agency continued to concentrate its efforts on the following activities:

(a) Maintenance of its continuous review of the supply and demand for nuclear fuels in the Community and observation of developments in markets outside the Community, including the effect of government policies on the supply situation, such as those on the expansion of nuclear energy, raw materials and exports, and conditions governing access to and use of nuclear material.

The Advisory Committee of the Agency made a detailed study of the supply situation in the Community, and its analysis and recommendations, which reflect the standpoints of consumers and producers, were summarized in a report and transmitted by the Agency to the Commission.

(b) Participation in the conclusion of contracts on the supply of nuclear fuels from countries in and outside the Community in accordance with the procedures developed by the Agency in interpreting the provisions of the Euratom Treaty. In addition to advice on specific matters, generally not connected with pure commercial questions, this includes the evaluation of contracts in relation to the supply situation in the Community and verifying that they accord with the basic principles of the Euratom Treaty and also with the commitments undertaken by the Community in agreements with third countries.

(c) Advice and assistance to undertakings on procedures for obtaining export licences from third countries and on applying for re-transfer authorizations.

(d) Cooperation with the appropriate Commission departments in the negotiation and implementation of agreements between the Community and supplier countries in which the outline conditions are laid down for access to and use of nuclear material.

1. The supply of nuclear fuel

It can be generally said of the supply situation in the Community that there have been no problems in the procurement of nuclear fuel. Deliveries were generally made in accordance with the arrangements agreed between the contracting parties, no particular delays being caused by state interventions. The only problems concerned the supply of highly-enriched uranium from the United States within the time prescribed.

Observations made in previous years were confirmed, i.e. that as far as availability is concerned, the market for natural uranium and low-enriched uranium, including enriching services, continues to offer adequate conditions for the assurance of satisfactory supply and to permit diversification. On the other hand the political intervention inherent in the special nature of nuclear fuel continues to impose restrictions on the actual freedom of movement. The industry is therefore right to put repeated emphasis on the fact that the assurance of secure and long-term supply requires a clear, reliable and reasonable framework for the market conditions.

2. Conclusion of supply contracts

The Agency's activity in the conclusion of contracts for the supply of nuclear fuels can be summed up as follows:

(a) In view of the trend in the construction of nuclear power stations and the supply situation in general, not many new long-term contracts for the supply of natural uranium were entered into. On the other hand, an appreciable number of modest-scale short-term contracts were recorded. The Agency did not receive any direct orders for natural uranium.

(b) No new long-term contracts for the supply of enriched uranium or enriching services were signed.

(c) The conclusion of other contracts for the supply of special fissile material and NBS standards proceeded at the normal pace. There was a certain increase in contracts for the supply of plutonium in the light of the planned commissioning of Superphénix in 1983.

(d) For the rest, conclusion and implementation of contracts was marked by an increase in shorter term transactions on the basis of exchanges and loans of natural and slightly-enriched uranium. This reflects the current situation in nuclear energy development, which gives rise to a slackening of demand on account of the excess supply due to long-term commitments and the subsequent pressure for flexible interim solutions. On top of this, the increase in supply transactions and the establishment of widespread contractual relations have resulted in an extension to the usual forms of trade in such material. Substitutions too, are being considered more and more frequently to be necessary in order to ease the undesired constraints imposed by rigid provisions on economic fuel management.

(e) The Agency also notes that the contracting parties are increasingly at pains to counteract the difficulties arising from public intervention mechanisms for both the effective conclusion of a contract and its trouble-free implementation. Technically, this finds expression in an increasingly wide-ranging and complex force majeur ruling. As a result of this sellers or buyers are freed from their respective commitments without liability where the intervention of a public body, of any kind, delays or makes delivery impossible; nevertheless one should not overlook the fact that as a consequence long-term security of supply on the basis of long-term contracts becomes somewhat relative. However understandable and, from the commercial standpoint of the contracting parties, justified the force majeur ruling as a pivot between public intervention and private contract performance may be, efforts should be primarily channelled towards obtaining recognition of the inviolability of contracts and reliable guarantees regarding their implementation in the interests of supply assurance.

(f) Altogether, the Agency was involved in the conclusion of 107 contracts for the supply of natural uranium, enriching services, special fissile materials and standards in 1980.

3. Chapter "Supply" of the Euratom Treaty

As outlined in the 1979 annual report, a fresh initiative was taken in that year in the discussions on Chapter VI of the Euratom Treaty. The ad hoc group of independent high-ranking experts from the Member States set up by the Commission in this context met three times, significant progress being made in clarifying certain aspects although specific problems remain to be solved. In reply to a question in Parliament, the Commission stated in December last year that it could not say when it would make known its position pursuant to Article 76.

Thus for the Agency, which during the year under review commemorated 20 years of existence since its establishment, the necessity of carrying out its task under the procedures laid down in the Euratom Treaty interpreted so as to take account of the overall situation remains unchanged.

IV.

THE SUPPLY OF NUCLEAR FUEL

1. Natural Uranium Sector

General Assessment

Deliveries of natural uranium contracted by users in the Community have this year again been made on time by suppliers both within and outside the Community, the greater part of this uranium originating, if not directly supplied, from external sources.

This situation of dependancy necessitates a diversification of sources in order to reduce the risks of interruption of supplies. Security and stability of supply are essential for the Community which continues to be approximately 80% dependent on external sources for its natural uranium needs.

It can be considered that at least until 1985 demand will be more related to contractual commitments for enrichment services than to the actual requirements of reactors, which are, in fact, lower.

This demand for natural uranium by the electricity producing companies in the Community is substantially covered by contracts, several of which extend beyond 1990. As from the mid eighties, however, some uncovered requirements still exist. In total users will have a substantial volume of reserves (2 1/2 - 3 years needs) in the form of enriched and natural uranium until the middle of the 1980's.

The demand for natural uranium from the Community on the world market during the next few years will therefore probably be weak, except for possible "spot" purchases which might be made for stockpiling and purchases resulting from a recommencement of the development of nuclear energy in certain Member States.

The production (in tonnes U) of the principal supplying countries in 1980 was as follows, the figures for 1978 and 1979 production being shown for comparison.

COUNTRY	1978	1979	Increase 1978/1979	1980	Increase 1979/1980
Australia	516	705	36,6 %	1.561	121,4 %
Canada	6.803	6.817	0,2 %	7.050	3,4 %
France	2.180	2.360	8,3 %	2.650	12,3 %
Gabon	1.022	1.101	7,7 %	1.033	- 6,6 %
Namibia	2.697	3.800	40,9 %	4.000	5,3 %
Niger	2.060	3.615	75,5 %	3.880	7,3 %
South Africa	3.961	4.782	20,7 %	6.146	28,5 %
USA	14.220	14.410	1,3 %	16.460	14,2 %

Australia exported about 1.100 tonnes U_3O_8 and new export contracts totalling some 33.600 tonnes U_3O_8 were approved.

Noteworthy is the emergence in 1980 of new companies with European participation such as Energy Resources of Australia (Ranger) and Cluff Mining (Amok Canada) as producers from 1981.

On account of the substantial resources primarily in Australia, Canada and Africa which could be put into production, provided a market exists, the supply of natural uranium ought to be sufficient to cover requirements for the next ten years.

The current imbalance in supply and demand being experienced throughout the world may give rise to concern about the possible effects of such imbalance on the future investments in prospecting and in production of ore and concentrates. For this reason it appears useful to make some remarks regarding the structure of the markets for uranium.

It is clear that the United States is neither a model nor a "carrier" market because of its very large self-sufficiency, even though its consumption represents about 40% of world consumption and even if some exports are made to the Community. This market obeys its own laws and follows its own commercial practices which have been derived from its own structures and the heritage of its past.

Thus one should beware of judging the economy of natural uranium in Europe in terms of the American economy. On the contrary it is for the users to consider the structure and determine their strategy in the medium and long term according to their knowledge of the capacities of the producing areas of the world and then to direct and support those whose jobs it is to invest in the research and exploitation.

To return to the year 1980, as experienced by the Member States of the Community, it is noticeable that based on information which may or may not have been well-founded but which relates neither to long term contracts nor to the supply of the Community, a certain confusion seems to have arisen on prices whereby what was considered to be the market price was only a spot price of the order of $ 28.

However, the prices in medium and long term contracts, which show considerable differences both in their formula and level, are continuing their tendancy to increase.

Nevertheless the situation of an excess of supply on the "spot" and term markets is having a generally moderating effect on the rate of this increase, in particular when the prices for term contracts are negotiated shortly before the actual deliveries.

It would appear desirable in the common interest that excessive market fluctuations detrimental to producers and consumers should be avoided and that the likely expansion in nuclear programmes - whose effects on demand will be felt mainly in the 1990's - should not result in violent increases; that is to say that uranium supply and demand should be in balance during this decade to the extent that utilities follow a policy of stockpiling and producers, some of whom, moreover, will have to reduce temporarily their level of production, defer new projects and even close marginal mines, to align themselves with the current state of the market.

Several producers have indicated that they can adopt a flexible attitude to the temporary sharp reduction in demand but that they would not engage in substantial new investment without having first concluded supply contracts. This attitude goes along with the sense of responsibility of the electricity producers who are contracting long term and who do not wish to abuse the situation of a buyer's market by depressing prices to an extent where, if such levels persisted, security of supply would be compromised through a lack of incentive to prospect for new deposits. This security necessarily implies also, however, that any conditions imposed by the public authorities in supplier countries on contracting parties be defined clearly in advance, not subject to frequent changes but be predictable in application and limited in scope.

It seems then that taking account of the time needed to obtain construction licences and to build reactors, an appropriate increase in production capacities will be foreseeable in sufficient time to meet the demand occurring even after the present decade.

Conclusion of contracts

The number of natural uranium supply contracts concluded in accordance with the procedures of the Agency between 1.1.80 and 31.12.80 amounted to 42, signed by 17 companies in the Community with suppliers from 12 countries. Of the 42 contracts for the supply of uranium 25 related to "spot" transactions, that is contracts with a maximum duration of 1 year between the date of signature and the date of delivery. The other transactions related to short and, in particular, long term contracts and some cases of leasing or swap.

Concerning the volume of trade there were 33 purchases and lease contracts whose quantities exceeded 10 tonnes of uranium. Uranium purchase contracts concluded in 1980, as known to the Agency, covered approximately 16.000 tonnes to be delivered between 1980 and 1996. Ninety eight percent of the quantities covered by those purchase contracts originated from countries outside the Community, including Australia, with which important contracts were concluded.

Natural uranium deliveries made during 1980 under contracts known to the Agency for the account of companies in the Community amounted to about 8.600 tonnes, more than half of these supplies coming from Africa. This shows that in the imports of uranium preference was given to this continent, which is explained by the long-established relations with its producers, by the delay in Australia in becoming fully a uranium exporting country and the political difficulties attaching so far to supplies from other areas.

It will be seen from the delivery figures mentioned above that deliveries made during 1980 under "spot" contracts known to the Agency amounted to a not negligible share of total deliveries to the Community in 1980.

According to the current contractual situation deliveries should amount to approximately 6.700 tonnes in 1981 and 1982 and 6.000 tonnes in 1983. From 1980 to 1985 inclusive three non-Community countries will supply 60% of the contracted quantities.

With regard to the price formulae adopted in new contracts the trend noted in the Agency's report for 1979 continued, whereby the type 'base price plus a system of indexation' seemed to give way to one of annual price negotiation with indexed minimum prices. Even so, recourse to experts, according to differing procedures, in the event of failure to agree on a negociated price was maintained.

Prices "non-spot" paid in the Community for deliveries made in 1980 and known to the Agency varied according to the method of determination being in a very wide range whose floor was below US $ 30 per lb U_3O_8 and whose ceiling exceeded US $ 40. The weighted average price was of the order of US $ 36 per lb U_3O_8 (In the U.S.A. according to information published by DOE it would have been around $ 26 per lb).

The average price of material supplied in 1980 under "spot" contracts signed by the Agency during the year amounted to US $ 35 per lb U_3O_8.

2. Special Fissile Materials Sector

General Survey

The market for special fissile materials and enrichment services has been characterized for several years by something which is even more pronounced than in the field of natural uranium supply, namely, that most nuclear power station programmes are stagnating. The enrichment services required by the stations in operation and the few coming into operation were secured by contract some years ago; as regards the special situation in France, where new stations are being brought into service continually, the rising demand is met by the Eurodif diffusion plant, which has come on stream as planned.

Consequently, there is in these circumstances scarcely any scope for new contracts and, as already reported in the Annual Report for 1979, transfers from one enriched to another have been carried out. As regards the duration of present contracts, which in some cases extends to 1995, scarcely any contracts of significant size have yet been concluded to meet the on-going demand. In addition, owing to the delay in the completion of most nuclear power stations and their belated commissioning, the demand has been deferred anyhow. Nor should it be forgotten that, just as in the natural uranium field, considerable stocks of enriched uranium have been and are being built up which likewise, when additional demand arises, will first of all be drawn upon, leaving only a strategic reserve.

By comparison with previous years, scarcely any changes have occurred in the supply structure. The majority of deliveries continued to be made by the US Department of Energy and Technabsexport. Certainly the growing share of Eurodif and Urenco production will be more noticeable in coming years.

By the mid-1980s, the proportion of enriched uranium supplied to Community enterprises by the European enrichers will amount to about 74%, and by the end of the decade to 84%.

In the year under review, there has been a hardening of the predictions that in the medium term capacity will most probably exceed the actual demand for enrichment services. Nevertheless, the industry is confident that in the long term this will not affect plans for plant extensions. The same also applies outside Europe, as regards both the US DOE's plans for the completion and commissioning of the new centrifuge plant at Portsmouth and plans by the Japanese to provide their own capacity. It is not considered that, on the basis of the present and medium-term situations, supply problems will arise later. In contrast to the construction of new capacities for natural uranium, which may involve lead times of 10 years and more, the construction of new enrichment capacities requires less time than that for a nuclear power station. Theoretically, therefore, the construction of new enrichment capacity could parallel that of nuclear power programmes.

Eurodif

The year 1980 was marked by the completion and commissioning at the beginning of September of the third production unit. Consisting of large-scale separation stages, this unit brings the production capacity of the Tricastin facility to 6 500 tonnes of separative work per year. The enrichment cascade is now made up of 1 000 diffusion stages in series.

Assembly of the elements of the fourth and last unit was started and will be followed by the progressive start-up of this unit, which should be completed during 1982, bringing the capacity up to a total of 10 800 tonnes of separative work per year. It is likely that this capacity will be able to meet 25% of world demand for low enriched uranium.

The commissioning procedure and the operation of the units already in production have confirmed the excellent performance of the installations which in 1980 achieved an output of close to 5 500 tonnes of separative work.

The supply programme this year involved deliveries to most of the long-term Eurodif customers and, for the first time, to customers outside the Community, the latter deliveries amounting to about 20% of the separative work sold.

The operating flexibility allowed the production schedule to be adapted to the needs expressed by the customers and helped to provide a considerably better seasonal balance in the electricity supply network through the carrying over of part of the winter consumption to the summer period.

In addition, the sector of ancillary services associated with the supply of enriched UF6 was developed at the request of the customers and is in a position to offer a wide range of services such as blending, various analyses and controls, and temporary or long-term storage.

Share transfers currently in progress between CNEN and AGIP Nucleare on the one hand, and COGEMA, on the other, should result in a reduction of the Italian share in Eurodif of 8.75%, the new shareholding being 16.25%.

Urenco

Urenco's current portfolio requires deliveries rising to approximately 2 000 tonnes of separative work per year by 1985, and plant continues to be installed progressively to match capacity to the annual increase in order book. Most of the civil work on the first 400 tonnes sw/a tranche of a 1 000 tonnes plant in Almelo (Netherlands) was completed during 1980 and the installation of centrifuges will commence in the near future. Construction work on the first half of a 430 tonnes sw/a plant in Capenhurst (UK) is similarly advanced. First separative work production in these two plants is scheduled to start in 1981, and the full capacity of these tranches will be reached by end 1982/beginning 1983.

Approximately 450 tonnes of separative work were produced during the year, of which 290 tonnes were delivered under contract. The remainder will be required for deliveries due under major contracts which commence in 1981. According to Urenco its policy of exploiting the potential of centrifuge technology to match capacity to requirements remains unchanged, and new plant will be constructed only against firm contracts. Also the flexibilities in Urenco's contracts have allowed Urenco contract holders to ameliorate their situation in the light of these problems.

The two 200 tonnes plants at Almelo and Capenhurst which were completed in 1979 have continued to operate at above 99 percent capacity. Centrifuge failures have, as in previous years, been well below 1 percent. In addition the three pilot plants, totalling 60 tonnes sw/a, have continued to function, thus providing additional capacity : they have also proved to be very useful as test-beds for various experimental programmes.

Urenco Deutschland oHG has been established as the owner/operator of Urenco's third centrifuge enrichment plant, to be constructed at Gronau, Germany. The site licensing procedure is underway, and public hearings are scheduled for spring 1981. Construction work on a centrifuge assembly plant at the site has been completed and centrifuge production has commenced.

Urenco's partners have realigned their participation in each of the Urenco companies, Urenco (UK), Urenco Nederland and Urenco Deutschland, so that each country will eventually own 96% of the local company, the other countries each holding 2%. For the present the shareholdings in the existing Almelo facility remain at 49% Germany, 49% Netherlands and 2% U.K. The shareholdings in the central company, Urenco Limited, which is owned one third by each country, remain unchanged.

US Department of Energy

As mentioned previously, no new long-term enrichment contracts were concluded with the US DOE in 1980 (as, indeed, since 1975).

Two contracts having been terminated in the year under review, the overall situation is now as follows: there are five LTFC contracts, two of which run until 1995. In addition, there are four AFC contracts in force, running for not less than 10 years from the first delivery. So far, no delivery, except in connection with a partial assignment, has yet been made under such a contract. In addition to the 'offset' contract, under which product deliveries were made in 1980, and the three PDPI contracts, which cover deliveries up to 1983-85, there were still 13 requirements contracts at the end of the year, two of them being terminated in the meantime. For a further two contracts of this type there were no needs after the reactors were finally shut down. The requirements contracts have expiry dates ranging from 1990 to 1995.

Product deliveries by the US DOE in 1980 totalled 300 tonnes of LEU, containing 1 410.51 tonnes of separative work. This is equal to about 15% of the overall deliveries of product uranium in the Community in 1980. Techsnabexport's share, which relates to deliveries under 10 contracts in all (some also running until 1995), came to 25% in 1980.

The US DOE's charges for enrichment services rose again during the year under review. The published requirements price of a unit of separative work rose from 98.30 US dollars/swu to 110.75 US dollars/swu, i.e., by 12.7%. Notwithstanding the ceiling price concept, this increase exceeded that of the 'fixed-commitment' price, which rose from 98.95 to 110 US dollars, or by about 11.2%.

Since the end of the year, the requirements price has climbed further to 119 dollars, the published price for the period as from 28 January 1981; the ceiling price for requirements contracts increased by about 18% from 101.63 US dollars to 119.62 US dollars.

The above mentioned prices relate to contracts with the US DOE, which entail a commitment to buy and deliver at the price stipulated by the producer at the time of delivery. Other suppliers of enriching services conclude more traditional commercial contracts, including some with fixed prices agreed between customer and supplier. It is for this reason that such prices are not for publication.

Export licences

No difficulties in obtaining export licences arose during the year under review. The processing time was appreciably shorter than in previous years. In 1980, a 'multiple reload licence', i.e., an authorization covering deliveries over several years, was finally issued to a Community electricity undertaking after quite a protracted preparation process. Meanwhile, several applications for such licences have been submitted and some have even been already approved. This is to be welcomed as it makes possible the long-term management of fuels.

Supply of highly enriched uranium

The Community's HEU requirements consist of supplies for approximately 12 research reactors, for the high-temperature reactor being built in Uentrop and due to come into operation in 1983, and for the manufacture of fuel elements on behalf of customers in non-member countries. In recent years the annual requirements have amounted to about 500 kg, being 100% covered by deliveries from the United States.

As had also happened in previous years, delays occurred because the authorization procedures in the United States, which in cases where the quantity of highly enriched uranium to be delivered exceeds 15 kg require Presidential consent, are usually very protracted.

Of the 32 export authorisation procedures that were pending at the beginning of 1980 concerning deliveries of approximately 1.680 kg for different reactors mainly in the Community, 15 export licences were granted; eight licences covered a total of 296 kg at an enrichment of 93% and the remaining seven for a total of 150 kg at enrichments of 20% and 45%. Up to 24 months was required on average before export authorisations were approved. During the year a total of 450 kg of uranium enriched to more than 20% was delivered to the Community.

As previously the procedure for the supply of highly enriched uranium is based on the revised version of the criteria published by the Department of Energy in the spring of 1978, which should in the normal course mean a reduction in the deliveries of highly-enriched uranium (see also the Annual Report for 1978, page 22). These considerations basically find acceptance among those affected; on the other hand, it is also pointed out that, in certain cases, changing from highly enriched uranium to medium - or even low - enriched uranium encounters almost insurmountable technological and economic difficulties. This especially applies to university research reactors and, in respect of neutron-flux properties, to high-flux reactors.

In view of this situation, the Agency vigorously supports proposals for improving and accelerating the authorization procedures so as to make it possible to formulate long-term plans for supplies for specific reactors, on the basis of which the export licences can then be issued without entailing a lengthy examination in each individual case.

A final development worthy of mention in this connection was the successful conclusion during the year under review of the negotiation between the DOE and two Community fuel-element fabricators initiated in 1979, on leasing agreements for uranium containing 20% or 45% U-235. Arrangements for co-operation between US DOE and the companies concerned in the Community provide for the development and testing of high density fuel.

New contracts and other activities

In 1980, 50 sales contracts for special fissile materials were concluded, two thirds of which related to intra-Community transactions. Ten additional contracts covered deliveries of special isotopes and NBS Standards. This meant, incidentally, the introduction of a new procedure.

During the year under review, the relatively long times involved in processing authorizations for the transfer of American materials to or from other countries (the MB-10 procedure) were hardly shortened at all, the average time taken being always several months. In certain cases this was appreciably exceeded, and in some of them no authorisation at all was given. New applications submitted in 1980 totalled 43 and by the end of the year 12 applications were still awaiting decision. On the other hand, the procedures for obtaining authorizations to transfer Canadian material were as a general rule unattended with difficulties and were implemented within an average processing time of under 2 months.

V.

ADVISORY COMMITTEE OF THE SUPPLY AGENCY

The Committee's executive officers, Mr. Bastrup-Birk, Chairman, Mr. Minnard and Mr. Waddams, Vice-Chairmen were re-elected in office for the current year.

The principal activity of the Committee and its Working Party on Uranium has been to make an assessment of the Community's nuclear fuel supply situation. The main conclusions from this study have been incorporated in the preceding sections. At the Committee's request the Agency submitted the report to the Commission. As a result of this work the Committee has decided to examine in more detail general and technical questions relating to stocks and stockpiling in the light of general conditions currently pertaining to supply.

The Committee's Geologists Group examined a study which reviewed the potential for uranium discoveries within the Community before and after 1976, the date at which Community funds were first made available to assist uranium prospecting under Article 70 of the Euratom Treaty. This potential (defined as material which might be developed so as to constitute reasonably assured resources and estimated additional resources by the end of the century) was estimated as being 80 000 tonnes U in 1976 in the US $ 30 lb U_3O_8 cost category and 105 000 tonnes U in the US $ 30 - 50/lb U_3O_8 cost category. As at 1979 these tonnage figures were estimated at 89 000 tonnes U and 170 000 tonnes U respectively. The Committee intends to consider again the principles and criteria which it previously worked out and recommended to the Commission as the basis on which the merits of projects eligible for benefit from Community funds under Article 70 of the Euratom Treaty should be assessed.

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NUCLEAR REACTORS IN SERVICE IN THE EUROPEAN COMMUNITY END 1980

Reactor *	Country	Type (x)	Commencement of operation	Net installed power MWe	
				Projected	Effective
Calder Hall (BNFL)	UK	GG	1956 - 59	200	200
Chapelcross (BNFL)	UK	GG	1959 - 60	200	192
G3 Marcoule (CEA)	F	GG	1960	40	40
VAK (Kahl)	D	BWR	1961	15	15
Berkeley (CEGB	UK	GG	1962	275	276
Bradwell (CEGB)	UK	GG	1962	300	245
Latina (ENEL)	I	GG	1963	200	152
Windscale (UKAEA)	UK	AGR	1963	33	32
Hunterston A (SSEB)	UK	GG	1964	320	300
Garigliano (ENEL)	I	BWR	1964	150	154
Trino Vercel. (ENEL)	I	PWR	1964	247	260
Chinon 2 (EDF)	F	GG	1965	200	180
Chinon 3 (EDF)	F	GG	1967 **	480	360
Hinkley Point A (CEGB)	UK	GG	1965	500	430
Trawsfynydd (CEGB)	UK	GG	1965	500	390
Dungeness A (CEGB)	UK	GG	1965	550	410
Sizewell A (CEGB)	UK	GG	1966	580	420
MZFR (Karlsruhe)	D	HWR	1966	51	51
BR 3 (Mol)	B	PWR	1966	10	10
SENA (Chooz)	F	PWR	1967	305	305
Winfrith (UKAEA)	UK	HWR	1967	92	92
EL 4 (Monts d'Arrée)	F	HWR	1967	70	70
Oldbury-on-Servern A (CEGB)	UK	GG	1967	600	416
AVR (Jülich)	D	HTR	1967	13	13
KWO (Obrigheim)	D	PWR	1968	328	328
GKN (Dodewaard)	NL	BWR	1968	52	52
St. Laurent A 1 (EDF)	F	GG	1969	480	390
St. Laurent A 2 (EDF)	F	GG	1971	515	450
Wylfa (CEGB)	UK	GG	1971	1 180	840
KWW (Würgassen)	D	BWR	1972	640	640
KKS (Stade)	D	PWR	1972	630	630

* Some reactors consist of more than one unit.

** Date of commercial operation.

Reactor	Country	Type (x)	Commencement of operation	net installed power MWe	
				Projected	Effective
KNK II (Karlsruhe)	D	FBR	1977	19	19 **
Bugey (EDF) Rhône	F	GG	1972	540	540
KEC (Borssele)	NL	PWR	1973	450	447
Rhénix (Marcoule)	F	FBR	1973	233	233
PFR Dounraey (UKAEA)	UK	FBR	1974	250	200
Biblis A - RWE (Rhein)	D	PWR	1974	1 146	1 146
Doel 1 (Schelde)	B	PWR	1974	390	395
Tihange (Meuse)	B	PWR	1975	870	870
Doel 2 (Schelde)	B	PWR	1975	390	395
Hinkley Point B 1	UK	AGR	1976	625	500
Hunterston B 1	UK	AGR	1976	625	550
Biblis B - RWE (Rhein)	D	PWR	1976	1 178	1 240
GKN 1 Neckarwestheim	D	PWR	1976	810	785
KKB Brunsbüttel	D	BWR	1976	770	744
Hinkley Point B2	UK	AGR	1976	625	500
Fessenheim 1	F	PWR	1977	890	890
Hunterston B 2	UK	AGR	1977	625	550
Fessenheim 2	F	PWR	1978 ***	890	890
KKI Ohu (Isar)	D	BWR	1977	870	870
Enel 4 (Caorso (Po)	I	BWR	1977	840	840
Bugey 2	F	PWR	1978	925	920
KWU Unterweser	D	PWR	1978	1 230	1 230
Bugey 3	F	PWR	1979 ***	925	920
Bugey 4	F	PWR	1979	905	900
Philippsburg 1	D	BWR	1979	864	864
Bugey 5	F	PWR	1980 ***	905	900
Gravelines 1	F	PWR	1980	925	920
Tricastin 1	F	PWR	1980	925	920
Dampierre 1	F	PWR	1980	905	900
Tricastin 2	F	PWR	1980	925	920
Gravelines 2	F	PWR	1980	925	920
				33.151	31.261

(x) GG = Gas Graphite
BWR = Boiling water reactor
HTR = High temperature reactor
FBR = Fast breeder
AGR = Advanced gas cooled reactor
PWR = Pressurised water reactor
HWR = Heavy water reactor

** Since 1977 equipped with a fast core
*** Date of commercial operation.

REACTORS UNDER CONSTRUCTION IN THE EUROPEAN COMMUNITY END 1980

(EXCLUDING THOSE ORDERED IN 1980)

Reactor	Country	Net Power MWe
ADVANCED GAS REACTORS (AGR)		
Dungeness B (CEGB)	UK	1 200
Hartlepool (CEGB)	UK	1 250
Heysham (CEGB) A + B	UK	1 250
TOTAL AGR		3 700
BOILING WATER REACTORS (BWR)		
KKK (HEW/NWK Krümmel/Elbe	G	1 260
KRB II B (RWE/Bayern W) Gundremmingen/Donau	G	1 249
KRB II C (RWE/Bayern W) Gundremmingen/Donau	G	1 249
ENEL 6 (Montalto di Castro)	I	982
ENEL 8 (Montalto di Castro)	I	982
TOTAL BWR		5 722
PRESSURISED WATER REACTORS (PWR)		
Tihange 2/Meuse	B	900
Tihange 3/Meuse	B	980
Doel 3/Schelde	B	900
Doel 4/Schelde	B	980
Mulheim/Kärlich (RWE)/Rhein	G	1 154
KKG (Bayern W) Grafenrheinfeld/Main	G	1 229
KBR (NWK/HEW) Brokdorf	G	1 294 *
KWG (Preag/GWK Weser) Grohnde/Weser	G	1 294
KKP 2 (Baden W/EVS) Rhein Philippsburg	G	1 281
KWS-1 (Badenwerk/EVS) Wyhl/Rhein	G	1 283 *
Gravelines 3 (EDF) Nord	F	920 (°)
Gravelines 4 (EDF) Nord	F	920
Dampierre 2 (EDF) Loire	F	900 (°)
Dampierre 3 (EDF) Loire	F	900

* Construction suspended at end 1980 (but for Brokdorf work was resumed at the beginning of 1981).

(°) Connected to the grid at the end of 1980 but not in service at the end of 1980.

Reactor	Country	Net Power MWe
Dampierre 4 (EDF) Loire	F	900
Tricastin 3 (EDF) Rhône	F	920 (+)
Tricastin 4 (EDF) Rhône	F	920
Le Blayais 1 (EDF) Gironde	F	920
Le Blayais 2 (EDF) Gironde	F	920
Le Blayais 3 (EDF) Gironde	F	920
Le Blayais 4 (EDF) Gironde	F	920
St. Laurent B 1 (EDF) Loire	F	880 (+)
St Laurent B 2 (EDF) Loire	F	880
Paluel I (EDF) Seine-Maritime	F	1 285
Paluel II (EDF) Seine-Maritime	F	1 285
Paluel III (EDF) Seine-Maritime	F	1 285
St Alban I	F	1 285
Flamanville I (EDF) Manche	F	1 285
Chinon B 1 (EDF) Loire	F	875
Chinon B 2 (EDF) Loire	F	875
Cruas I (EDF) Ardèche	F	880
Cruas II (EDF) Ardèche	F	880
Cruas III (EDF) Ardèche	F	880
Cruas IV (EDF) Ardèche	F	880
Cattenom I (EDF) Moselle	F	1 270
TOTAL PWR		36.080
HIGH TEMPERATURE REACTOR (HTR)		
THTR 300 (HKG Uentrop/Schurehausen)	G	300
FAST BREEDER REACTORS (FBR)		
SNR 300, Kalkar, Niederrhein	G	282
Superphénix (Creys-Malville Rhône)	F	1 200
TOTAL FBR		1 482

(+) Connected to the grid at the beginning of 1981.

Reactor	Country	Net Power MWe
HEAVY WATER REACTOR (HWR)		
Cirene (CNEN), Latina	I	40
REACTORS UNDER CONSTRUCTION END 1980 (except those ordered in 1980)		
AGR		3 700
BWR		5 722
PWR		36 080
HTR		300
FBR		1 482
HWR		40
T O T A L		47 324

REACTORS ORDERED IN 1980

Type	Plant	Country	Net Power MWe	Year of order	Commencement of construction
AGR	Heysham C + D	UK	1 250	1980	1980
"	Torness A + B	UK	1 250	1980	1980
PWR	KKI 2 Isar	G	1 230	1980	-
"	Paluel IV	F	1 285	1980	1980
"	Saint Alban 2	F	1 285	1980	1980
"	Cattenom 2	F	1 270	1980	1980
"	Flamanville 2	F	1 285	1980	1980
"	Gravelines C5 + C6	F	1 840	1980	-
TOTAL			10 695		

From the table above it can be seen that 11 units for a total of 10 695 MWe were ordered in 1980, of which 8 195 MWe were pressurised water reactors (PWR). Work was commenced in 1980 on 8 units having a total power of 7 625 MWe, of which 5 125 were PWR.

(°)

ADVANCED PROJECTS IN THE EUROPEAN COMMUNITY END 1980

BUT NOT YET UNDER CONSTRUCTION

Reactor	Country	Net Power MWe
PRESSURISED WATER REACTORS (PWR)		
Biblis - C (RWE) Rhein	G	1 240
GKN 2 Neckarswestheim	G	810
Chinon B 3 (*)	F	875
Chinon B 4 (*)	F	875
KWB (Preag) Borken	G	1 240
KKH Hamm (VEW/Elek. Hagen)	G	1 232
Neupotz (Pfalg/RWE) A/B Rhein	G	2 460
KRL (RWE/LEW) Pfaffenhof, Bayern	G	1 230
Nogent 1	F	1 270
Nogent 2	F	1 270
KK Ems (VEW/El. MARK) Lingen	G	1 230
Belleville 1	F	1 270
Belleville 2	F	1 270
Cattenom 3 (*)	F	1 270
Golfech 1 (*)	F	1 270
Chooz B 1 (*)	F	1 270
ENEL 5 (Adriatico)	I	952
ENEL 7 (Adriatico)	I	952
T O T A L		21 986

(°) Reactors ordered in 1980 but not yet under construction are listed in the previous table.

(*) Investment programmes 1981/82.

I

(Information)

COUNCIL

COUNCIL RESOLUTION

of 18 February 1980

on the implementation of a Community plan of action in the field of radioactive waste

THE COUNCIL OF THE EUROPEAN COMMUNITIES,

Having regard to the Treaty establishing the European Atomic Energy Community,

Having regard to the draft resolution submitted by the Commission,

Whereas the Commission has submitted to the Council a communication on a Community plan of action in the field of radioactive waste;

Whereas the development of nuclear energy is intended to enable the Community to meet an increasing proportion of its electrical energy needs while at the same time ensuring availability of supplies as a result of diversification of its sources of fuel;

Whereas the foreseeable growth in the generation of electrical energy by nuclear means during the coming decades will involve corresponding waste production;

Whereas this growth must be achieved in strict compliance with the requirements of industrial and public safety and of environmental protection;

Whereas to this end the management and storage of radioactive waste must be carried out under optimum conditions;

Whereas the Council has already approved Community environment programmes and research and development programmes currently in progress in the field of management and storage of radioactive waste;

Whereas, however, the problems raised by radioactive waste constitute a combination of questions involving the perfecting of existing technologies and questions of a legal, administrative, financial and social nature which must be resolved in one and the same context;

Whereas current Community research and development work must therefore be supplemented in the manner provided for below;

Whereas, finally, collaboration with third countries and organizations in the field of management and storage of radioactive waste could benefit from an expansion of Community activities,

Approves the plan of action which forms an integral part of this resolution,

Notes that the Commission will put forward appropriate proposals for putting this plan into effect.

ANNEX

COMMUNITY PLAN OF ACTION IN THE FIELD OF RADIOACTIVE WASTE

The plan refers to the problems posed by radioactive waste from nuclear installations and in particular those concerning the management and storage of high-activity and/or long-life waste.

It runs from 1980 to 1992 and is reviewable every three years.

It is based in the first instance on the following five points:

1. Continuous analysis of the situation with a view to adoption of the necessary solutions

The following should be drawn up:

(a) a list of the techniques available and of installations already in existence or planned by the Member States for the processing and conditioning of waste with a view to its possible transportation and storage, together with an indication of the earliest dates on which these techniques can be applied;

(b) a list of the technological research and development work on the storage of waste which the Member States and the Community intend to carry out, and a list of the storage installations which the Member States intend to construct and put into service, having regard to the nature of the products to be stored, together, where applicable, with the relevant timetable;

(c) for the various categories of waste, a list of the management practices which have been defined or are to be defined in the Member States in accordance with the safety rules applicable in each Member State, the timetables according to which these practices should become applicable and an analysis of these timetables in the light of the dates for the application of the techniques referred to in (a);

(d) since the foregoing is not specifically concerned with permanent storage, also an inventory of the processes and procedures designed to make possible the permanent storage of radioacitve waste and, as far as possible, the estimated implementation dates and an analysis of these estimates in the light of (a), (b) and (c).

The information and results obtained from the work referred to above will be used to keep the Community and the Member States constantly up to date on work and achievements in the management and storage of radioactive waste, having regard to nuclear programme requirements.

2. Examination at Community level of measures which could ensure the long-term or permanent storage of radioactive waste under optimum conditions

The intensification and extension to all national programmes for the study and establishment of long-term or permanent storage sites of the present arrangements for existing concerted action and exchange of information through the current Community research and development programme.

Study, in due course, of the technical options and programmes concerning the demonstration activities of the various Member States.

Encouragement of the development of technical cooperation in the field of storage whenever such cooperation is considered to be both useful and feasible by the Member States concerned.

In general, examination of measures which could constitute the optimum solutions to long-term or permanent storage of radioactive waste.

3. **Consultation on practices concerning the management of waste, the quality and properties of conditioned waste and the conditions governing the disposal of waste**

Regular consultations should be organized in the Advisory Committee on Programme Management for the Management and Storage of Radioactive Waste and, if necessary, between the national authorities responsible.

This should make it possible to:

— make, on the basis of the experience gained in the various Member States in the management, conditioning and storage of radioactive waste, recommendations concerning the satisfactory execution of these operations from the standpoints of safety and environmental protection; these recommendations should have an indicative character and should keep pace with developments in techniques during the plan,

— assess the feasibility and desirability of harmonizing waste management practices,

— approximate the methods of assessing the quality and properties of conditioned waste,

— seek methods of exchanging information on waste management costs,

— promote, where this is found to be advisable, consultation between the Member States under existing Community procedures on the positions to be adopted in international organizations such as the IAEA, the ISO and the NEA.

4. **Continuity of Community research and development work during the plan**

The Council undertakes to act on the new five-year research and development programme proposals (indirect action) submitted by the Commission. The Council is resolved to ensure the continuity of the research and development programmes during the plan.

The Council notes that the Commission undertakes to submit these proposals not later than one year before completion of the preceding five-year programme and to provide the necessary technical coordination between activities in the sphere of radioactive waste which take place under the JRC's programme of direct action and activities in the context of the programme of indirect action.

In particular, on 5 March 1979 the Commission submitted a second research and development programme for 1980 to 1984, to follow immediately the 1975 to 1979 programme.

5. **Providing the public with regular information**

The public must be informed of the radioactive waste situation.

In this context the Member States will continue and step up their efforts to ensure that the public receives the fullest information on their activities in the sphere of radioactive waste management and radioactive waste storage.

The Commission will do likewise as regards activities with which it is concerned.

COUNCIL RESOLUTION

of 18 February 1980

concerning the Advisory Committee on Programme Management for the Management and Storage of Radioactive Waste

THE COUNCIL OF THE EUROPEAN COMMUNITIES

HEREBY ADOPTS THIS RESOLUTION:

1. In addition to the tasks laid down in paragraphs 2, 3, 4, 5 and 6 of the resolution of 18 July 1977 on advisory committees on research programme management, the Advisory Committee on Programme Management for the Management and Storage of Radioactive Waste shall be given the additional task of advising the Commission in connection with implementation of the Community plan of action on radioactive waste approved by the Council in its resolution of 18 February 1980.

2. The Committee shall deliver opinions separate from those referred to in the resolution of 18 July 1977 where they are concerned with implementation of the plan; these opinions shall be prepared by the secretariat and submitted for the Committee's approval. Any member of the Committee may request that his views be recorded in these opinions. Opinions shall be forwarded to the Commission and a copy sent to the Council.

3. For the purpose of carrying out the task referred to in paragraph 1 of this resolution, and notwithstanding paragraph 7 of the resolution of 18 July 1977, the Governments of the Member States and the Commission may, if they deem it advisable, appoint up to two experts per delegation to replace the members appointed for the management of the research programme.

4. The Advisory Committee on Programme Management for the Management and Storage of Radioactive Waste shall carry out the additional task referred to in this resolution, in accordance with the detailed rules specified, for the full duration of the Community's plan of action in the field of radioactive waste, even if its original task has been completed.

5. This resolution supplements the resolution of 18 July 1977.

COUNCIL RESOLUTION

of 18 February 1980

on the reprocessing of irradiated nuclear fuels

THE COUNCIL OF THE EUROPEAN COMMUNITIES,

Having taken note of the Commission communication on the points for a Community strategy on the reprocessing of irradiated nuclear fuels, and bearing in mind that:

— the Community energy-supply situation is marked by heavy dependence upon imports of primary energy coupled with uncertain prospects for world hydrocarbon supplies,

— reprocessing makes it possible to achieve a reduction in natural uranium and enrichment requirements as a result of the recycling of uranium and plutonium in thermal and fast reactors, with the prospect of reduced dependence on outside supplies of uranium through fast breeder technology,

HEREBY RECORDS ITS AGREEMENT ON THE FOLLOWING:

1. It is in the interest of the Community and its Member States to keep open the option of recovering

and re-using spent fuel discharged from nuclear reactors, this being without prejudice to the procedures of the decision-making processes within Member States.

2. To this end, it is necessary that:

— the Member States and undertakings which, particularly with a view to enhancing the availability of energy supplies in the Community, have considered it appropriate to carry out programmes in the field of reprocessing, ensure continuity in their execution and in the studies concerned, without prejudice to the measures which they are obliged to take with regard to the detailed rules of application,

— with due regard to legal provisions and industrial arrangements already obtaining, coordination is organized amongst all interested parties to ensure that industrial reprocessing activities are carried out under the best possible conditions, from the point of view of both the undertakings carrying them out and users making use of their services,

— the Community, the Member States and the undertakings concerned persevere in the efforts made to ensure that these activities remain compatible throughout their industrial development with the objectives of public safety, environmental protection and non-diversion of nuclear materials from the intended uses declared by the users.

COUNCIL RESOLUTION

of 18 February 1980

on fast breeder reactors

THE COUNCIL OF THE EUROPEAN COMMUNITIES,

has studied the Commission communication on the fast breeder option in the Community context — justification, achievements, problems and action perspectives, and in view of the fact that:

(a) the Community energy-supply situation is marked by heavy dependence on imported primary energy coupled with very uncertain prospects for world hydrocarbon supplies;

(b) the fast breeder reactor could play an important role in the Community's energy supplies by helping to reduce gradually its dependence on imported uranium and by contributing to the improvement of its balance of payments;

(c) efforts have already been made and results already been achieved as a result also of the collaboration agreements existing between Member States of the Community with a view to the development of this family of reactors;

HAS RECORDED ITS AGREEMENT ON THE FOLLOWING:

— it is in the interest of the Community and of its Member States to keep open the option of making fast breeder reactors available to energy producers on a commercial basis within a period which takes due account of energy requirements in the Community, this being without prejudice to the procedures of the decision-making processes in the Member States,

— the Member States and the undertakings which have considered it appropriate, particularly with a view to enhancing the availability of energy supplies in the Community, to carry out programmes in the field of fast breeder reactors will ensure continuity in their execution and in the studies concerned, including those concerning the fuel cycle, without prejudice to the measures which they are obliged to take with regard to the detailed rules of application and will continue their efforts to ensure that the performance of this reactor system provides at all times adequate guarantees in accordance with the provisions

concerning safety, radiation protection and protection of the environment,

— the Community will lend its support to the achievement of the abovementioned objectives. Any new form which that support might take and the detailed arrangements for its practical implementation will be decided upon by the Council on the basis of proposals from the Commission.

Work on the gradual harmonization of safety codes and measures will be continued in the Coordinating Committee for Fast Reactors.

The public must be informed of the situation in the field of fast breeder reactors.

In this context the Member States will continue and step up their efforts to ensure that the public receives the fullest information on their activities in the field of fast breeder reactors.

The Commission will do likewise as regards activities with which it is concerned.

The industry's view on non-proliferation and the nuclear fuel market

Statement by the Advisory Committee of the Euratom Supply Agency

There is general agreement in the industry that a balanced supply and demand situation in the long term also requires an international framework through which stability and reliability in international trade with nuclear fuel can be assured, essentially through a simple set of rules which is accepted by all parties. Experience during recent years has clearly demonstrated that need.

The industry is conscious of the political context in which this issue has to be seen and it underlines its full agreement with the basic principles of non-proliferation policy, such as the commitment to peaceful non explosive use of nuclear material and its submission to IAEA safeguards. The industry, however, feels also encouraged to contribute to on-going discussions with regard to the determination of additional non-proliferation conditions in bilateral agreements. It therefore offers some comments based on the practical impact that certain conditions may have on the supply and demand situation and on the freedom and economics of international trade with nuclear fuel.

1. It is of considerable concern for the industry that non-proliferation conditions determining access to and use of nuclear material, be they imposed unilaterally by the supplier or be they agreed to mutually between the supplier and the recipient, do not lead to separated markets. It is essential that these conditions are substantially the same, or at least compatible so as to enable one integrated fuel market to operate and to guarantee that the establishment of producer/customer relations and the determination of commercial conditions, such as prices, are not directed by differences in the applicable political conditions.

It should be clearly understood, however, that this requirement should not lead to a general upgrading of conditions on the most stringent level.

2. The industry needs confidence that no unpredictable governmental interference will prevent the timely delivery of contracted material. The industry is aware that national policies and the sovereignty of producing countries in practice imply certain limitations, but governments should be aware that there are also industrial realities which cannot be overlooked. They should be aware too that their credibility can be destroyed by unilateral and unpredictable acts. Whilst fully recognising the sovereignty of exporting countries it is urged, however, that their governments should not exercise their sovereignty in a way which is detrimental to existing contracts but only, if such action is deemed essential, by refusing to permit new contracts.

3. In view of the value of nuclear material and its specific long term use perspective, assurance has to be provided that, once the material has been purchased and delivered, there is freedom to use it throughout the fuel cycle, including reprocessing and recycling without a possibility for the supplier to interfere at certain stages on a case by case basis and in an unpredictable manner.

4. Technical and economic reasons make it necessary, often even unavoidable, that nuclear material of a given origin is - at each stage of the fuel cycle - produced, processed or used together with material of another origin. The industry recognises that, in general, the need for mixture of material of different origin is now agreed to by the suppliers and that with the introduction of the so-called pro rata principle (in contrast to the contamination principle) an important improvement has been made in this regard.

Apart from the question of whether this principle will work reasonably in practice and also with regard to all the subsequent generations of material which will arise in the not so distant future, it is the industry's view that further efforts should be undertaken to provide full fungibility of nuclear material - at least for natural uranium and low enriched uranium. There is a need from a technical and economic viewpoint for promptness and flexibility in fuel cycle management, and in particular also with regard to the establishment of stocks and a stockpiling and back-up policy. This means that the industry must be free to engage in common operations such as substitutions, swaps, loans, etc ..., wherever it is necessary.

5. The industry is aware of the need for accounting and bookkeeping of nuclear material, including to a certain extent, the recording of origin. The industry would find it helpful and conducive to long term predictability if the origin accounting procedures to be followed were clearly defined in the context of safeguards agreements and were not subject to unilateral revision.

The exporting countries should recognise that the procedures to be defined in connection therewith should respect the principle of fungibility. The technical and economic constraints of the industry should also be taken into account in order to minimize the practical burden resulting from such procedures in day to day fuel cycle management. It may be added that in the industry's view, the credibility of the whole system of nuclear fuel supply and its control, including credibility in the stability of assured supply is dependent on the feasibility and practical possibility of its implementation.

MARCH 1981