

EURATOM SUPPLY AGENCY

Annual Report for 1979

THE DEVELOPMENT OF NUCLEAR ENERGY IN THE COMMUNITY

The development and expansion of nuclear energy in the Community proceeded essentially as in previous years. The original plans for nuclear plant programmes could not be maintained in some cases, and, except in one Member State, no new projects were commenced. In total this led to a further fall in the projections for nuclear power programmes for the next ten years.

On the other hand the Community institutions left no doubt that, taking account of the world-wide development in the demand for energy and in view of the limited potential of the classical energy sources, recourse to nuclear energy by the Member States of the Community is unavoidable. The price development on the oil market has, moreover, very clearly demonstrated the economic attraction of the introduction of nuclear energy.

Thus the European Council at its meeting of 12th and 13th March 1979 again underlined that the present position in the world market for crude oil confirms how urgent it is to put into effect the decisions which the Community has taken towards a reduction in its dependence on oil and towards a better world-wide energy balance. In addition to increasing the measures to obtain the best use of the Community resources in hydrocarbons and coal, nuclear electricity production programmes must be strengthened and accelerated whenever circumstances allow. On the occasion of its meeting in Strasbourg on 21st and 22nd June the European Council endorsed this policy with the statement: "Without development of nuclear energy in the coming decades no economic growth will be possible. Nuclear programmes must therefore be given strong fresh impetus".

Although it is certainly too early to see a general change in the public opinion of the different Member States

in favour of a stronger recourse to nuclear energy, there were signs at the turn of the year that a faster development in this area can be expected in the not too distant future.

At the end of the year development in the individual Member States towards the establishment of nuclear power programmes was as follows:

Electricité de France has now firmly established plans to develop its nuclear power programme so as to provide by 1985 about 40% of its electricity production from nuclear sources. It is the intention to have by that time an installed nuclear capacity of 37 000 MWe.

The programme of ENEL in Italy provides that in the period to 1990 ten nuclear power stations each of about 1000 MWe will be brought into service: three in 1988, four in 1989 and three in 1990. In addition there are reactors with a total of more than 3000 MWe in course of licensing or under construction.

The British government announced at the end of the year that the UK Generating Boards intend to order at least one nuclear reactor each year in the decade from 1982. This represents a programme of some 15.000 MWe over 10 years. Subject to safety clearance the first such reactor would be a PWR, construction of which could begin in 1982/83.

In the Federal Republic of Germany no additional projects have been announced besides the reactors in course of the licensing procedures or under construction. The present estimate is that in 1990 about 27.500 MWe will be on line. In Belgium, too, where currently four additional nuclear power stations are under construction, there were no further decisions taken. The programme thus provides for about a total of 5.450 MWe by 1984. The white paper of the Ministry of Economic Affairs suggests however two additional power stations of 1000 MWe each may be constructed

by the years 1989 and 1991.

In the remaining Member States the situation is open.

The nuclear power stations in operation in the Community have again in the year under review shown their reliability both technically and as regards production. In total there were at the year-end 57 nuclear power stations with a net capacity of 26.300 MWe in operation (that is about 25% of the total nuclear power installed in the world). Three new power stations were commissioned in 1979 and for one reactor decommissioning decided upon. Of the total electricity production in the Community amounting to 1.186 TWhs 10.7% was accounted for by nuclear energy. This is the equivalent to a consumption of 40 million tonnes of oil.

The percentage of electricity production from nuclear energy in the individual Member States in 1979 was:

B	D	F	I	NL	UK
21.8	11	16.4	1.4	5.3	11.9

France registered an increase of 30.7% and the Federal Republic of Germany of 9.8% compared with 1978. The United Kingdom has increased its nuclear production (+ 2.7%) whereas the production decreased in Belgium (- 8.9%), Italy (- 41%), and the Netherlands (- 14.1%).

The three nuclear power stations which became critical in 1979 were:

BWR	Phillipsburg	864 MWe
PWR	Bugey 4	900 MWe
PWR	Bugey 5	900 MWe

This additional nominal capacity of 2,664 MWe represents an increase in total nuclear MWe as at the end of 1978 of 10 %.

At the turn of the year nuclear power stations in operation or under construction in the Community and their nominal (planned) capacities (in GWe) were as follows:

	B	D	F	I	NL	UK	EC
in operation	1.7	8.8	8.4	1.3	0.5	8.1	28.8
under construction	3.7	8.0	22.0	2.0	-	3.7	39.5
TOTAL	5.4	16.8	30.4	3.3	0.5	11.8	68.3

The fuel requirements for the nuclear power stations in the Community with, as mentioned, a total net capacity of 26.300 MWe at the end of the year amounted to about 6500 tonnes of natural uranium and of ca. 3600 tonnes of separative work.

II.

NON-PROLIFERATION AND NUCLEAR FUEL SUPPLY

During the year under review the eight working groups of the International Fuel Cycle Evaluation (INFCE) completed their studies. Their reports and a summary and overview prepared by the Technical Coordinating Committee were received by the Final Plenary Conference of INFCE at the end of February 1980. It is not possible to comment on the study in this report, but it is worthwhile to record in this context that the study, in acknowledging the interdependence between nuclear fuel supply and non-proliferation policy, stressed the need for stability of supply as an essential element in the development of nuclear energy.

Direct results from this 2-years' comprehensive, technical and analytic study with regard to nuclear fuel supply and specific concrete actions related to supply assurance have not yet become apparent. It is further not possible to draw a conclusion that a common view was developed in the INFCE exercise on the especially controversial questions related to the so-called sensitive fuel cycle operations. These problems are likely, at least for the time being, to be dealt with bilaterally between supplier and consumer countries.

At present, the conditions for access to supply and for its use and disposal are characterized by a lack of uniformity. Not only do some supplier countries make the conclusion of a bilateral safeguards agreement a precondition for the delivery of nuclear fuel, but also there are further differences as regards the individual safeguards and non-proliferation conditions attached to the material.

One is bound to observe that this situation has an impact on the conclusion of supply contracts. Apart from the fact that, in some cases, the absence of a bilateral agreement constitutes an objective impediment of access to a source of supply, it would necessarily be reflected in the commercial decision making of consumers if nonproliferation conditions went beyond the obligations of exclusively peaceful use and subjection to IAEA safeguards (in the case of the Community in conjunction with Euratom safeguards).

There is undoubtedly a consumer preference in favour of natural uranium that is not subject to restrictive conditions and which does not imply a later, and unpredictable, involvement of third countries in decisions related to the fuel cycle. However, it seems up to now that the influence of such conditions results more in decisions of whether or not to purchase than, in view of the ready availability of uranium from all sources, in important differences in prices.

Increasingly the practical difficulties which arise from the consequences of companies having to administer nuclear material under different obligations and labels are becoming apparent. These relate particularly to the need for the tracing of origin, for example during industrial processing, or, in the case of subsequently derived products, to substitution and the observance of complex regulations. In this respect the emphatic demand of the industry is that no constraints other than conditions of peaceful use and IAEA safeguards be put on nuclear fuel, and that if such further restrictions become unavoidable their implementation will be subject to measures which are practical, unbureaucratic and economically acceptable.

The developments with regard to the non-proliferation conditions concerning transfers of nuclear fuel to the Community may be summarised as follows for the year under review.

The basis for transfers of US origin nuclear material is the US/Euratom Agreement for Co-operation and the Additional Agreement for Co-operation, both as amended. The Additional Agreement for Co-operation remains in force until December 31, 1995. As already stated in the Agency's Annual Report for 1978 the US Government is, under the terms of the US Nuclear Non-Proliferation Act of 1978, seeking to negotiate amendments to this agreement.

Subsequent upon the Commission's statement to the US Authorities in 1978, discussions on the agreements and related questions were continued in the year under review between the Commission and the U.S.A.

With regard to the Euratom/Canada agreement further positive experience was gained in connection with the interim arrangement for the handling of sensitive operations (reprocessing, enrichment beyond 20 % and storage of plutonium and highly enriched uranium). This interim arrangement runs to the end of 1980, and it is agreed between the parties that by this time either a new arrangement or an extension of that existing will be made. It should be stated that only these provisions are of an interim nature and the remainder of the Agreement for Co-operation with Canada, as amended by the exchange of letters in January 1978, is accordingly not due under the terms of the agreement to be renegotiated.

During the year under review negotiations were also commenced with Australia on the conclusion of a safeguards agreement, after the Council of Ministers had given the Commission a negotiating mandate in accordance with the provisions of Article 101 of the Euratom Treaty. As is well known the Australian government is seeking that deliveries of Australian natural uranium be made only under an agreement concluded between the parties concerned which determines the non-proliferation conditions governing the material delivered.

III

MAIN ACTIVITIES OF THE AGENCY

No major changes occurred in the main activities of the Agency in the year under review. In carrying out its tasks under the Euratom Treaty which, inter alia, entrusts to the Community the responsibility of ensuring that users in the Community receive a regular and equitable supply of nuclear fuel, the Agency concentrated its efforts on the following activities :

- Maintenance of its continuous review of the supply and demand situation of the Community and observation of the development of the market including the effect thereon of governmental policies such as those on nuclear energy programmes, exports and resources and conditions affecting supply. In order to improve this activity a review of the data collection and handling procedures in the Agency was initiated.
- Participation in the conclusion of contracts and related administration.
- Assistance and advice to customers in the field of retransfer consent procedures and the obtaining of export licences; there is increasing activity in this sector.
- Co-operation with the Commission's Services in the field of bilateral agreements between the Community and supplier countries.

No specific steps were undertaken at Community level towards stocks and stockpiling.

With regard to the supply and demand situation it can be said in general terms that supplies for the Community users were assured and that no major problems in the conclusion or implementation of contracts arose.

Although experience during the year showed again that the market for natural uranium and low enriched uranium, including enrichment services, normally should be sufficiently flexible to provide adequate supplies and allow scope for initiative and diversification, it was also clear that, because of the peculiarity of nuclear fuel, the market continued to operate

under heavy constraints which tend considerably to reduce freedom of manoeuvre . This means that for an assured supply to be possible the political and legal conditions applying to supply must at least be known to users and producers and must be stable and reliable. It may be added in this context that the view is held that more transparency is desirable and that the market mechanisms could be improved by more generally accessible information on the development of supply and demand and on marketing conditions.

The activity of the Agency concerning the conclusion of supply contracts can be summarized as follows :

1. Owing to the trend in the construction of nuclear power stations and in view of the general supply situation not many new long term supply contracts for natural uranium were concluded. On the other hand an appreciable number of smaller short term contracts were recorded. The Agency did not receive any direct orders for natural uranium procurement.
2. No new long term contracts for enriching services were concluded, but some were converted. Such conversion was achieved either by the change of US DOE long term fixed commitment contracts into adjustable fixed commitment contracts, or by the termination of US DOE requirements contracts and their replacement by Urenco contracts.
3. The conclusion of other contracts for the supply of special fissile material and NBS standards continued at normal levels.

In total the Agency participated in the conclusion of 90 contracts for supply of natural uranium, enrichment services and supply of special fissile material.

A considerable amount of time was spent in participation in the ongoing discussions on the future role of the Agency and the questions related to the provisions of Chapter VI of the Euratom Treaty. During the year the discussions took more definite shape when the Commission submitted a communication to the Council

of Ministers in June in which it set out its appreciation of the problems and on which it sought a fundamental discussion with the Council. Further, a memorandum on Chapter VI was submitted by the French Government under which, in accordance with the procedure of Article 76, the French Government is seeking an amendment to the provisions of Chapter VI. The Commission has appointed a group of high level experts from the Member States to discuss this question. The work of this group had not been terminated by the end of the year.

It cannot be denied that the present situation of continued discussion over its future role is not easy for the Agency, in particular because some uncertainties that have developed over the years in connection with the scope of the contracts to be concluded by the Agency continue to be unresolved. The industry too urges a clarification of the legal situation. The Agency further cannot, to the extent it would like and is requested by customers, concentrate on important questions relating to the supply of nuclear fuels to and the demand situation of the Community. The Agency therefore, in its different statements in the ongoing discussions, has underlined the need for an urgent clarification of the situation. There is no doubt, however, that until agreement is found with regard to the content and provisions of Chapter VI, the Agency will have to continue to carry out the tasks that are assigned to it and will apply the related procedures in accordance with the interpretation which has developed over the years.

THE SUPPLY OF NUCLEAR FUEL

1. NATURAL URANIUM SECTOR

General Assessment

The supply situation of the Community can be considered fairly satisfactory. The requirements of natural uranium under the definition of material needed to fulfil "feed" delivery obligations under enrichment contracts are covered by contracts running on average to the middle of the present decade. In addition, the delays in the nuclear programmes in the majority of Member States has lead to a building-up of stocks. The year under review has seen the conclusion of few long term contracts. There has been no change in the structure of supply. Australia has not yet become a contracting supplier to the Community. Utilities are following a policy of diversification towards not only sources of supply but also towards contractual partners and types of contracts.

At present a general view prevails, at least among the utilities, that the supply situation is relatively relaxed; one can detect signs that the available supply is exceeding the demand in the short to medium term. The question is, however, to know when the big discoveries in Canada and Australia will actually be put on the market. The trend shown by spot prices confirms the weakening tendency noted in last year's report. In effect there are more quantities of uranium available on the market than is sought and, taking account of inflation, spot prices have fallen. At the time of writing, the market is widely considered to be a buyer's market.

In this context it may be observed that it is not considered to be in the long term interest of utilities if the market should develop so that it no longer provided incentives for new investment. In general, it should be the

common objective of producers and consumers to maintain the equilibrium in the market by long term contracting, thus enabling further prospecting and the timely creation of additional production capacities and thereby also avoiding excessive market fluctuations detrimental to both sides of the industry.

It is difficult to put forward a view on the future determination of prices for long term contracts because of the variety of factors governing the relations between the contracting parties which are taken into account when determining the prices. In general the contracting parties tend to settle their different interests and perceptions concerning the development of prices for long term contracts by relatively sophisticated contract provisions. The model of a base price with escalation formulae seems to be giving way to a system of annual price negotiation subject to an escalated floor price, and sometimes a ceiling price. In the case of the parties not agreeing, most contracts provide for an arbitration mechanism to determine the price to apply.

Suppliers

There are no major new developments to be recorded as regards suppliers. The main producers continued to be:

<u>Country</u>	<u>Tonnes U production 1979</u>
Canada	6811
France	2360
Namibia	3800
Niger	3615
South Africa	4800
USA	16350

In all countries exploration efforts continued. New developments, in particular in Australia and Canada, are under construction or planned. It may be highlighted in this context that Community based companies have an important share in these developments.

In the year under review no delays in deliveries were noted.

Conclusion of Contracts

The number of contracts for the supply of natural uranium and concluded under the procedures of the Agency between 1 January and 31 December 1979 amounted to a total of 43. To this should be added 6 contracts relating to depleted uranium and thorium; that is a total of 49 contracts signed by 19 companies of the Community with suppliers from 9 countries. Of the 43 contracts for uranium, 26 related to "spot" transactions, that is to say contracts whose maximum duration is one year between the date of signature and the date of delivery. The other transactions related to short, medium and long term (not many in this latter category) purchases as well as lease operations.

Thirty four purchase or lease contracts were for quantities in excess of 10 t.^(*) of uranium. With regard to quantities the natural uranium contracts concluded in 1979 as known to the Agency covered more than 3,000 t. for delivery in 1979 and later, of which about a third was for delivery in 1979 under spot contracts. Ninety percent of the quantities contracted comes from countries outside the Community; more than two thirds of the total quantities contracted in 1979 were supplied from two producing countries.

Under contracts known to the Agency, deliveries of natural uranium for the account of companies in the Community amounted to more than 10,000 t. in 1979. According to the present state of contracts, deliveries will amount to approximately 7,500 t. in 1980, 5,500 t. in 1981 and 5,000 t. in 1982. From 1979 to 1984 inclusive three countries (outside the Community) will supply 70% of the quantities contracted.

(*) the abbreviation "t." used in this report denotes metric tons.

With regard to prices paid for deliveries in 1979, the Agency once again found that there are three different sets of prices : (1) the prices for deliveries under spot contracts, (2) the prices for deliveries under term contracts concluded before 1978, including those that had been renegotiated, and (3) prices for deliveries under term contracts concluded in 1978 and 1979, or whose prices were negotiated during this period. The price levels between these categories differed considerably thus underlining that the notion of a market price as a reference price in a price formula without detailed qualification is doubtful - the more so because access to information on the different prices varies considerably.

The average price of material supplied in 1979 under spot contracts signed by the Agency during that year was US \$ 44.5 per lb U_3O_8 . Towards the end of the year, however, this price was tending to decline to a level of about US \$ 41.50. Spot deliveries in 1980 may take place at prices of well under US \$ 40.

Prices paid for substantial deliveries in 1979 under term contracts concluded before 1978 (and in many cases renegotiated) were lower than US - \$ 30 per lb U_3O_8 .

The price of many deliveries under term contracts concluded in 1978 or 1979 or whose prices were negotiated in 1978/79 reached more than US \$ 40.

2. SPECIAL FISSILE MATERIALS SECTOR

General Survey

The market in special fissile materials and enriching services did not change substantially during 1979. As previously the USSR and USA were the Community customers' principal suppliers for enriching services, with the Community installations - Eurodif and Urenco gradually increasing their share according to the availability of their operational capacities. This latter tendency was assisted through the transfer by some power reactor operators of the coverage of their enrichment needs from a third country (USA) to a Community (Urenco) supplier. As a result of the delays in the realisation of nuclear power programmes scarcely any new long term contracts for the supply of enrichment services were made.

There were few sales and purchases of fissile plutonium. Apart from some limited consumption mainly in recycling test programmes concerning the use of mixed oxide fuel elements in light water reactors, the main interest of the industry was directed to assuring the supply of plutonium for the fast breeder programmes in the Community. It should be noted that related contracts and transfers, in particular involving plutonium stemming from irradiation in reactors outside the Community, met with some difficulties arising from the implementation of non-proliferation policy.

As in the natural uranium sector, inventories of enriched uranium will automatically increase due to the delays in the power programmes. So far, no general rule seems to have been established by the utilities concerned as to whether they will stock the excess inventory, try to consume it and thus diminish their requirements or dispose of it on the market.

In general, experience in the year under review endorsed the forecasts that most probably in the medium term excess capacity for enrichment services will develop. The industry, however, is confident that in the long term this will not influence their plans for further extensions of their capacities. A period of shortfall is not expected to follow a situation of excess capacity since investment in new capacity could be possible as and when required. Unlike the development of new natural uranium production capacity, which may require lead times of up to 10 years or more, the lead-time for developing new enrichment capacity is shorter than that for power station construction. Theoretically, therefore, the development of enrichment capacities could be achieved in step with the implementation of the power programmes.

As to the present situation with its tendency towards excess capacity it may be noted that absorption measures are being introduced. At this time it is, however, not possible to assess whether cushioning measures such as a reduction in the tails assay in order to use more separative work units will lead to a noticeable impact on demand for natural uranium.

Eurodif

1979 was the first year of production and sales of enriching services. During that year production from the first two units followed the programme established in 1973. Installed capacity available from 680 operating diffusion stages is thus 2600 t. swu/year . 1500 t. swu were sold in 1979.

Production capacity will rise in 1980 when the third unit is put into operation and 6000 t. of swus will be delivered.

Also in 1979 a special mode of operation was developed to enable the enrichment services of Tricastin to be used so as to avoid a premature accumulation of enriched uranium

at a European partner of Eurodif. The flexibility of the process allows depleted uranium to be enriched to the assay of natural uranium within the normal production cycle. This operation accounts for about 5000 t. swu. A Eurodif study of the development of the market shows that the 110 000 t. swu to be delivered by Eurodif will be absorbed within less than 10 years and that therefore the capacity will have to be increased, which is the purpose of the Coredif project.

Urenco

Urenco's principal activities during the year were the continuation of marketing and the continued installation and commissioning of new capacity.

Marketing has proved difficult in the current international nuclear climate of uncertainties. The separative work market is considered to be very much a buyer's market. Nonetheless, Urenco's portfolio has increased considerably over the year due to the take-over of several German contracts from US DOE.

The flexibility of the centrifuge technology has allowed Urenco to make adjustments in build-up rates to accommodate delivery changes. The contracts currently held require capacity to reach approximately 2000 t. sw/a by 1985.

Approximately 375 t. sw were produced during the year, of which 110 t. were delivered. The remainder will be required for deliveries due under major contracts which commence in 1980 and 1981. It is Urenco's policy that new plants will only be constructed against firm contracts.

Centrifuge installation in the cascade halls of the 200 t. swu/a plants at Almelo and Capenhurst continued. At the end of the year the two plants reached a total

capacity of 420 t. sw. Urenco says the plants have performed excellently at above 99 per cent capacity, centrifuge failures have again been well below 1 per cent. In addition the three pilot plants, totalling 60 t. swu/a, have continued to function, providing additional capacity and serving as test-beds for various experimental programmes. During the year construction of the next plant increments at Almelo and Capenhurst have progressed well. First sw production in these new plants is expected to start in 1981, full capacity of 640 t. swu/a will be reached by the end of 1982/beginning of 1983. In addition to the two existing sites a new site has been opened in the German town of Gronau.

Enrichment contracts with the US Department of Energy

As already mentioned no new long term enrichment contracts with the US DOE were concluded in 1979. The main activity, apart from the administration of existing contracts, was concerned with the conversion of long term fixed commitment contracts (LTFC) into the new form of adjustable fixed commitment contract (AFC).

Besides the specific technical and contractual questions relating to individual power stations, general agreement had to be found with the American authorities on a new provision in the standard form of contract to take account of recent experiences with regard to a change in US statutory export requirements. This was necessary in the case of contracts with the DOE because their contracts provide that delivery of the material and transfer of title and risk to such material take place in the United States and that the obtaining of the export licence is the sole responsibility of the customer. Accordingly, in 1978 when, after the enactment of the US Nuclear Non-Proliferation Act, for a certain time no export licences were issued, customers were confronted with a situation in which on the one hand they had to continue to adhere to the terms of the enrichment

contract (deliver feed, accept delivery of product, make payment etc.) but where, on the other hand, they did not actually receive the material. The new proviso, now developed in discussion between DOE and the Agency, provides inter alia, that the "customer shall have the right to terminate or suspend the contract in the event export to the Community of the enriched uranium to be delivered to the customer by DOE is not possible as a result of failure to meet statutory export requirements enacted into law by the US Government after the effective date of this contract, which are more restrictive than the government's statutory export requirements in effect as of the date of execution of this contract". It has been agreed further that the customer will not be assessed termination charges if DOE terminates the contract due to reasons related to the introduction of new US Government's statutory export requirements or pursuant to the NPT.

The new provision, however, clearly does not fully meet the concerns of customers on the uncertainties as to whether material contracted for will actually be received in due time. As long as supply may be prevented through a distinction being made between the supply contract, which binds both seller and buyer, and the export licence, issued unilaterally by the authorities of the seller's country, these uncertainties will persist.

Apart from conversion from LTFC into AFC the contractual situation with DOE is as follows.

Two LTFC contracts under which deliveries had taken place as contracted for in 1978 and 1979 expired at the end of the year. One contract was terminated because the corresponding nuclear power plant construction and operation was delayed. There are still in existence 5 LTFC and, as mentioned above, 4 AFC contracts with the US Department of Energy.

There is further one special (offset) agreement in existence under which product deliveries are to occur in 1980. Finally and apart from the three long-term so-called PDPI contracts for SENA, SENN and SELNI, there are thirteen requirements contracts still extant. In the case of two of these, the customers have no needs and they will therefore probably be terminated soon. Three others were (one partially) terminated in 1979, termination to take effect in approximately 3 years'time.

Corresponding new enriching contracts and an additional one have been concluded, under the Agency's procedures, by the utilities with Urenco. The reasons for this shift by the customers were principally diversity of supply and support for Community suppliers encouraged by the customers' affiliation to the enrichment company concerned. Of prime importance were considerations of security of supply which, inter alia, is presupposed by the industry structure in the Community, and which reflects certain doubts as to the reliability of an outside supplier.

In total, the Community customers received from US DOE in 1979 about 500 t. slightly enriched uranium containing about 2000 t. swu at a cost of approximately US \$ 167 million.

US DOE charges for enriching services were again increased during the period under review. The requirements price per unit of separative work rose from US \$ 83.15/swu (published price January 1, 1979) to US \$ 95.09/swu (ceiling price December 31, 1979), an increase therefore of 14%. Notwithstanding the ceiling concept this increase was greater than the increase in the "fixed commitment" price, which rose by approximately 12% from US \$ 88.65 to US \$ 98.95. It can be recorded that the requirements price has risen further since the year end to US \$ 98.30, the published price for the period January 1, 1980 to February 29, 1980, with

an estimated ceiling price of US \$ 101.52 thereafter.

The prices mentioned above apply to the contracts concluded by US DOE which provide for a firm commitment to purchase and deliver at the price to be fixed by the producer at the time of delivery. Other enrichment suppliers conclude more traditional commercial contracts including a firm price formula agreed upon between customer and supplier. Accordingly, these prices are not publicly available.

Export licences and transfer authorisations

The year under review provided further experience of the impact of the US Nuclear Non-Proliferation Act of 1978 (NNPA) on the nuclear fuel supply of and the nuclear industry in the Community. In general, the industry complains that the licence and approval procedures under the NNPA are too "bureaucratic" in terms of the paper that has to be produced for evidence etc., too lengthy so that industrial planning of operation is always endangered, and not reliable because the criteria are considered not to be precise and objective enough. The difficulties arise mainly in connection with the retransfer consent procedures (MB 10) and with regard to licences for the export of highly enriched uranium, whereas the licences for the export of low enriched uranium tend now to be issued on a more routine basis.

In a meeting, organized by the Agency, representatives of the industry had an opportunity to explain in detail their point of view to representatives of the US General Accounting Office which is preparing a report on the implementation of the NNPA. In this meeting generally the wish was expressed that the US authorities should increase their efforts to streamline their procedures and to make their decisions promptly and more predictably in order to provide a sound basis for the continuation of a fruitful cooperation that the industry had been enjoying for a long

time.

The Agency was again involved and, is still increasingly so, in assisting customers to obtain US export licences and transfer approvals.

As mentioned above, for low enriched uranium exports from the USA difficulties diminished within the period of review. There is however one exception: the US Nuclear Regulatory Commission issued during the year for non-Community customers, some "multiple reload licences" whose validity runs for several years, i.e. beyond the usual one year term. A corresponding application was also placed in August 1979 by a Community customer but had not been approved by the end of the year mainly because of the special provisions of the NNPA as regards exports to the Community.

As discussed in the Agency's report for 1978 the NNPA provides that the application of certain criteria for the licencing of exports to the Community can be waived by Presidential order on an annual basis thus making actual deliveries from one year to another conditional upon the exercise of this provision. Since the year end a solution to the problem has been found and the first multiple reload licence for exports under a Community contract has been granted.

Unfortunately, the same smooth operation has not yet been developed for highly enriched uranium (HEU) supplies and it must be feared that this situation will prevail for the time being in the future.

In effect, except for one export licence issued in October 1979 for 3.8 kg of HEU destined to transit through the Community, the Nuclear Regulatory Commission, as advised by the Executive Branch, saw fit only once to approve a bundle of 6 export licences for about 114 kg of HEU (85 of which being for final transferees in the Community.) As has been indicated in the Agency's 1978 report, 22 applications for HEU exports for nearly 1,400 kg were pending with US authorities at the end of 1978. Notwithstanding repeated interventions in the USA the balance at the end of 1979 was

worse: 32 licences for HEU exports to or through the Community were and are still pending for an amount of about 1,680 kg (i.e. 17 new applications for HEU exports were filed in 1979 increasing the existing backlog, since only 7 licences were issued). No short term fixed commitment contract for enriching services to produce HEU was concluded. The situation as described above is unlikely to change quickly, since the US authorities appear to maintain their intention to have the use of HEU in research applications reduced and replaced by material of lower assays (below 20% or 45% U 235) where feasible. Such feasibility has been the subject of discussions with the US authorities in the review period, which the Agency expects to continue with an uncertain outcome for individual cases.

Concerning approvals to transfer US origin materials to or from third countries, the relatively long lead times (generally 6 months and more) were not reduced in 1979, particularly in "major cases", such as to special transferees or for significant or "strategic" quantities of special fissile materials. New applications in 1979 numbered 35, and about 20 were still pending at the year end.

New contracts and other activities

The number of sales contracts for special fissile materials concluded in 1979 was 28, 17 of which were for intra-Community transactions. Sixteen additional contracts covered the supply of special isotopes and NBS standards. In the context of collaboration between US authorities and Community manufacturers of research reactor fuels several lease contracts for uranium with 20% and 45% U 235 were prepared in 1979 but had not been concluded at the year end.

The number of notifications under Article 75 of the Euratom Treaty (on transactions such as conversion of natural uranium, fabrication of fuel, reprocessing of irradiated fuel) has again been increasing during the period under review.

According to information received by the Agency under the notification procedure nearly all utilities in the Community have concluded contracts for the reprocessing of fuel that will cover their requirements in this respect for the forthcoming years. This demonstrates that most utilities in the Community are clearly opting for reprocessing instead of spent fuel storage.

ADVISORY COMMITTEE OF THE SUPPLY AGENCY

The bi-ennial appointment of members of the Committee took place in May. The Committee subsequently re-elected Mr. Bastrup-Birk as Chairman and Mr. Minnard as a Vice-Chairman and elected Mr. Waddams also as a Vice-Chairman to fill the vacancy caused by the resignation of Mr. Daniel. To assist it the Committee set up two working groups.

One group will have the task of recommending to the Advisory Committee actions which could be usefully taken by the Community to improve the supply of nuclear fuels, of up-dating estimates of installed nuclear power and the corresponding fuel requirements and of examining questions relating to stocks. The second group will be concerned with geological matters, in particular natural uranium prospecting programmes, and will advise on the selection of projects to receive Community financial assistance.

In view of the discussions on Chapter VI at Council level, the Committee held a special meeting to discuss the future role of the Supply Agency to provide, in particular, the point of view of the nuclear industry in the Community and of the utilities. The views presented and the conclusions reached form a valuable contribution to the deliberations on this topic.

Brussels, April 1980

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APPENDIX

NUCLEAR REACTORS IN THE EUROPEAN COMMUNITY

Reactor	Country	Type (x)	in operation	Net installed power
Calder Hall (BNFL)	UK	GG	1956 to 59	200
Chapelcross (BNFL)	UK	GG	1959 to 60	192
G3 Marcoule (CEA)	F	GG	1960	40
VAK (Kahl)	D	BWR	1961	15
Berkeley (CEGB)	UK	GG	1962	276
Bradwell (CEGB)	UK	GG	1962	250
Latina (ENEL)	I	GG	1963	153
Windscale (UKAEA)	UK	AGR	1963	32
Hunterston A (SSEB)	UK	GG	1964	300
Garigliano (ENEL)	I	BWR	1964	152
Trino Vercel. (ENEL)	I	PWR	1964	260
Chinon 2 (EDF)	F	GG	1965	210
Chinon 3 (EDF)	F	GG	1966	400
Hinkley Point A (CEGB)	UK	GG	1965	430
Trawsfynydd (CEGB)	UK	GG	1965	390
Dungeness A (CEGB)	UK	GG	1965	410
Sizewell A (CEGB)	UK	GG	1966	420
MZFR (Karlsruhe)	D	HWR	1966	51
BR 3 (Mol)	B	PWR	1966	10
SENA (Chooz)	F	PWR	1967	305
Winfrith (UKAEA)	UK	HWR	1967	92
EL 4 (Monts d'Arrée)	F	HWR	1967	70
Oldbury-on-Severn A (CEGB)	UK	GG	1967	416
AVR (Jülich)	D	HTR	1967	13
KWO (Obrigheim)	D	PWR	1968	328
GKN (Dodewaard)	NL	BWR	1968	52
St. Laurent 1 (EDF)	F	GG	1969	460
St. Laurent 2 (EDF)	F	GG	1971	515
Wylfa (CEGB)	UK	GG	1971	840
KWW (Würgassen)	D	BWR	1972	640
KKS (Stade)	D	PWR	1972	630

KNK II (Karlsruhe)	D	FBR	1977	19(**)
Bugey (EDF) Rhône	F	GG	1972	540
KEC (Borssele)	NL	PWR	1973	445
Phenix (Marcoule)	F	FBR	1973	233
PFR Dounraey (UKAEA)	UK	FBR	1974	200
Biblis A - RWE (Rhein)	D	PWR	1974	1089
Doel 1 (Schelde)	B	PWR	1974	395
Tihange (Meuse)	B	PWR	1975	870
Doel 2 (Schelde)	B	PWR	1975	395
Hinkley Point B 1	UK	AGR	1976	400 (*)
Hunterston B 1	UK	AGR	1976	500 (*)
Biblis B - RWE (Rhein)	D	PWR	1976	1178
GKN 1 Neckarwestheim	D	PWR	1976	791
KKB Brunsbüttel	D	BWR	1976	774
Hinkley Point B2	UK	AGR	1976	500 (*)
Fessenheim 1	F	PWR	1977	890
Hunterston B 2	UK	AGR	1977	500 (*)
Fessenheim 2	F	PWR	1977	890
KKI Ohu (Isar)	D	BWR	1977	870
Enel 4 Caorso (Pò)	I	BWR	1977	548 (*)
Bugey 2	F	PWR	1978	920
KWU Unterweser	D	PWR	1978	1230
Bugey 3	F	PWR	1978	900
Bugey 4	F	PWR	1979	900
Philippsburg 1	D	BWR	1979	864
Bugey 5	F	PWR	1979	900
				26293

- (x) GG = Gas graphite AGR = Advanced gas cooled reactor
 BWR = Boiling water reactor PWR = Pressurised water reactor
 HTR = High temperature reactor HWR = Heavy water reactor
 FBR = Fast breeder
- (**) Since 1977 equipped with a fast core
 (*) In process of reaching full power

