

EURATOM SUPPLY AGENCY

Brussels, 29 March 1974

ANNUAL REPORT OF THE EURATOM SUPPLY AGENCY FOR THE CALENDAR YEAR 1973General

The Supply Agency's operative sphere has been widened considerably by the accession of the three new Member States - Denmark, Ireland and the United Kingdom - to the Community on 1 January 1973. The Agency has had initial contacts and has held numerous talks of an informative nature with the competent authorities and institutions of these new Member States and with the government and private undertakings in their territory which are to be considered to be "users" or "producers" within the meaning of the provisions of Chapter VI of the Euratom Treaty. The purpose of these talks was for the Agency to make clear to the persons concerned the Euratom Treaty provisions on nuclear fuel supplies, the regulations and other notices issued thereunder and their interpretation and implementation, and to answer the many questions addressed to the Agency on this subject. These contacts and talks are to be continued and their scope expanded.

The accession of the three new Member States has necessitated an amendment to Articles V (Capital) and X (Advisory Committee) of the Statutes of the Supply Agency. The Council Decision of 8 March 1973, published in the Official Journal of the European Communities No. L 83/20 of 30 March 1973, fixed the capital at 3 200 000 u.a. and increased the number of members of the Advisory Committee to thirty three. Owing to the complicated and protracted Council procedure for appointing the members of the Advisory Committee, it was unfortunately impossible to convene this body during the calendar year 1973. The first meeting of the newly constituted Committee will be held early in 1974.

On 24 July 1973 the bilateral agreement on cooperation between the Kingdom of Denmark and the United States expired. Under an agreement between the Kingdom of Denmark, the United States of America

and the European Atomic Energy Community of the same date, nuclear fuels supplied by the USAEC which come within Denmark's responsibility were incorporated in the agreement for cooperation between Euratom and the USA. The materials concerned are to be used exclusively for research purposes and comprise approximately 120 kg uranium containing 32.6 kg U²³⁵, 172 g plutonium, 1 g U²³³, 17 kg natural uranium and 30 kg uranium tails.

I. Natural uranium and other source materials

In all, nineteen uranium supply contracts were concluded in 1973, thirteen of them under the "simplified procedure" which expired on 31 December 1973. Thirteen contracts cover quantities ranging from one to thirty-six tonnes. The materials supplied were basically for research or for quantitative increases in or the qualitative blending of revolving stocks with fuel-element fabricators. Five contracts were signed with nuclear power plant operators. In one case the Agency purchased 110 tonnes of uranium in the form of UF₆ for its own account. This material was used for an in-situ toll-enrichment contract with the USAEC for the purpose of acquiring the bulk of the enriched uranium located in the Community leased by the USAEC. This transaction will be enlarged upon elsewhere in this report.

Five contracts under the simplified procedure related to supplies of monazite.

Supply contracts totalled 8 841 tonnes of natural uranium and about 10 300 tonnes of monazite.

The trend towards higher prices noted in the annual report for 1972 continued during the year under review. In particular, the transactions carried out towards the end of the year provided very clear evidence of price increases as compared with the previous year. The devaluation of the US dollar caused Community producers to tender only in their national currencies or in the currency of the country of origin.

The price of 1 kg of uranium in the form of UF₆ in the transactions carried out in 1973 covering future years moved as follows:

<u>Year of delivery</u>	1973	1974	1975	1976	1977	1978	1979	1980
US\$/kg U in the form of UF ₆	16.50	15.25	16.50	17.40	18.---	19.70	20.50	21.---
	17.---	-21.25	21.75	24.20	25.---	26.---	-27.---	27.---

It must be stressed that the prices quoted are only approximate. Account must also be taken of the fact that the contracts concluded early in 1973 were mainly the outcome of bids submitted during August-November 1972, when the producers were in keen price competition with each other. This situation came to an end early in 1973, so that the major producers are now bidding at virtually the same price. In some contracts further factors of uncertainty arise from the conversion of \$/lb U₃ O₈ into \$/kg U in the form of UF₆ and from the conversion of contract prices into US dollars. The figures used were: \$1 = DM 2.67 = FB 40 = FF 5; £1 = \$2.29. Only in three instances were there fixed-price contracts for 1980-82. The producers are not offering fixed prices as from 1979; instead they are offering price-escalation clauses or new price agreements based on world-market prices. Initially the users were disinclined to accept such bids, and hence no long-term contracts were signed.

Towards the end of 1973 the producers showed a marked reluctance to bid, which would apparently indicate that they expect a further sharp rise in prices. The repercussions will not begin to make themselves felt until the early part of 1974. However, all the signs are already pointing to a switch from a buyers' to a sellers' market.

It is not possible to give particulars regarding the origin of the uranium, since the main suppliers in the Community fulfil their supply obligations through widely varying forms of collaboration or

other commitments. It is, however, noteworthy that for the first time an American supplier was able to enter into a transaction with a Community reactor operator.

II. Enriched uranium

An addendum to the Additional Agreement for Cooperation between Euratom and the USA was signed on 20 September 1972 and came into force on 28 February 1973.

The maximum quantity of U²³⁵ available to the Community was increased by supplement to the Euratom Cooperation Act (US) of 14 August 1973. The new ceiling makes it possible for the fuel-cycle requirements of the Community's total nuclear generating capacity of 35 000 MWe to be met as well as for 25 000 Kg of U²³⁵ to be supplied for other purposes, i.e., research, fuel element fabrication and the chemical reprocessing of irradiated fuel elements for non-member countries.

A. Toll enrichment

On 8 December 1972 the USAEC announced its decision to suspend the signing of any further toll-enrichment contracts until new enrichment services criteria had been published. As a result, the negotiations being carried out on behalf of five nuclear power plants in the Community were broken off. Shortly afterwards the new criteria and guidelines for the USAEC's intended contract policy were published in draft form and forwarded to American and non-American users for their views. The Agency summarized the comments of Community users in a written submission to the Joint Committee on Atomic Energy. Furthermore, it had the opportunity, with vigorous backing from the delegation of the European Communities in Washington, to put forward the point of view of European users to the USAEC itself and to the Joint Committee.

The new enrichment services criteria came into force on 9 May 1973 and in the Autumn of the same year the USAEC drew up its revised supply contracts, the new conditions in which are basically the following:

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- (1) For nuclear power plant operators there will only be so-called "long-term, fixed-commitment" contracts including or (for nuclear power plants already in operation) excluding first-core supplies.
- (2) In principle, the contract - apart from any transitional arrangements - must be concluded eight years before the first delivery of enriched uranium.
- (3) An advance payment must be made when the contract is signed. For a 1 000 MWe reactor the payment will be \$ 3 300 000, one-third of which is to be paid on signature of the contract and one-third in each of the two succeeding years.
- (4) The contract must cover deliveries for a period of at least ten years. The maximum period is 30 years.
- (5) The customer must take delivery of the annual quantities specified in the annexes to the contract even if he has no need of them.
- (6) The contract can only be terminated without charge if 10 years' notice is given. If less notice than this is given, charges of up to 53.7% of the amount of separative work contracted for will be made.
- (7) If the customer's requirements increase he can obtain more enriched uranium for the same amount of separative work by means of a change in the U235 content of the tails, subject to additional natural uranium being supplied.

The USAEC has developed a short-term contract valid for up to three years to accommodate research reactors and meet the requirements of fuel-element fabricators.

For nuclear power plant operators unable to adhere to the eight-year time-limit the USAEC has introduced two transitional periods:

- (1) first enriched uranium requirement before 30 June 1978: contract to be concluded by 31 December 1973;
- (2) first enriched uranium requirement before 1 July 1978 and 30 June 1982: contract to be concluded by 30 June 1974.

These new conditions met with little favour among Community users and have been a factor in speeding up (a) the programme for creating an enrichment capacity in the Community itself and (b) taking of the relevant decisions to construct.

Since the conditions and the time-limits imposed for conclusion of the contracts were felt to be too rigid, the European Nuclear Power plant operators began to look for ways of filling gaps in their supply arrangements until European enrichment facilities could be brought on stream. This point will be discussed in more detail below.

In the final analysis, only three German electricity supply undertakings out of a total of 13 nuclear power plant operators were prepared to enter into the new-type contracts with the USAEC by 31 December 1973. In addition one short-term agreement covering fuel-element fabrication for research reactors and an additional agreement covering a further quantity of material for the Caorso Nuclear Power Plant were concluded. The main provisions of the contracts in question may be summarized as follows:

<u>Nuclear power plant</u>	<u>Duration</u>	<u>Kg separative work</u>
1. Unterweser	1974 - 95	1.573.644 (for the first 10 years of delivery of product, with U + Pu recycling)
2. Isar	1974 - 85	947.144 (with U + Pu recycling)
3. Grohnde	1978 - 95	1.061.300 (for the first 10 years of delivery of product, with U + Pu recycling)

These nuclear power plant operators made down payments of \$ 3.935.000 on signing the contracts.

The short-term contracts provide in respect of fuel-element fabrication for 25.237 kg separative work for 1974 and in the case of Caorso an additional amount of 24.000 kg separative work for 1973.

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In addition, the Agency concluded an "in-situ" toll-enrichment contract with the USAEC covering 137 243 kg separative work for the purpose of acquiring the bulk of the leased material in the Community by 30 June 1973.

A change has also occurred in the USAEC's pricing policy. With effect from 9 August 1973, the charge per kilogramme of separative work rose from \$ 32 to \$ 36, and will increase automatically by at least 1% on 1 January and 1 July of each calendar year. The USAEC charges a supplement of \$ 2.5 per kilogramme of separative work on the basic price of \$ 36 for supplies under earlier requirements contracts.

The USAEC has also reserved the right unilaterally to increase charges still further and to bring these higher rates into effect sixty days after publication thereof in the United States Federal Register.

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In March 1973 a number of German electricity supply undertakings were able, through the Agency of the Düsseldorf company Rohstoff-Einfuhr GmbH, acting for one of the Soviet export organisations and with the cooperation of the Supply Agency, to enter into negotiations with the Soviet Techsnabexport organization for the provision of toll-enrichment services. Later on in 1973 interested parties in Belgium and Italy entered into similar negotiations.

By the end of 1973 the following contracts had been concluded:

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Nuclear power station	Kg/separative work	Tails content	Delivery period	
1. RWE Biblis B	269 392	0.29%	1974/75	Option up to 1995
2. RWE Mülheim-Kärlich	284 356	0.28%	1976/77	Option up to 1995
3. GKN Neckarwestheim	617 554	0.3%	1974/80	Option up to 1995
4. KKW revolving stock	23 097	0.28%	1974	
5. HEW Krümmel	548 000	0.25- 0.35%	1976/80	Option up to 1985
6. GfK Niederaichbach	7 562	0.25%	1975	Option up to 1978
7. Bayernwerk Grafenrheinfeld	283 819	0.28%	1976/77	
8. NUKEM reserve stock	1 350 000	0.2- 0.3%	1976/80	
9. Synatom	1 300 000	0.2- 0.3%	1979/85	

It was not possible to sign the contract covering Italy's requirements during the year under review.

The Soviet contracts for the provision of toll-enrichment services had the following advantages over the USAEC's conditions:

1. No advance payment on signature of the contract;
2. No time-lapse between signature of the contract and initial delivery;
3. Customer able to choose the U²³⁵ content of the tails in the range 0.2-0.3%, and in one instance 0.25-0.35%;
4. Greater flexibility as regards supplies and degree of enrichment;
5. No minimum term of the contract;
6. More favourable charge per kg/separative work;
7. Options granted on extension of contracts.

Furthermore, Technabexport has expressed its readiness to accept uranium concentrate as a feed material and to provide the relevant conversion services.

The payment conditions are not so favourable as those of USAEC, since the customer must provide a banker's guarantee or confirmed letter of credit. Also the customer does not have any opportunity to be present at the weighing and sampling but must be represented by a Soviet State institution. Delivery of the feed material to Techsnabexport and of the enriched uranium to the customer is free Russian frontier railway station or free Russian port.

The first supplies of enriched uranium are to be expected in early April 1974.

The Community's electricity supply undertakings were glad to avail themselves of this source of supply in order to avoid long-term ties with the USAEC throughout the eighties and to be able to resort to one of the European enrichment facilities around 1980-82. Since both URENCO and EURODIF have adopted firm decisions to build, and published programmes on the development of their supply capacities at the end of 1973, the above-mentioned electricity supply undertakings' refuelling requirements can be covered by these new enrichment plants.

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It must be mentioned in connection with toll-enrichment that Ultra Centrifuge Nederland (UCN) has received an order for 510 kg 2.8% enriched uranium for the Dodewaard nuclear power plant (to be delivered in early 1974).

Negotiations have been successfully completed between the Commissariat à l'Energie Atomique (French Atomic Energy Commission) and the Belgian electricity supply undertaking Synatom on the supply of 400 000 kg separative work over the period 1978-79, which will enable orders thereafter to be placed with EURODIF when it commences production. The contract will be signed early in 1974.

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In all, the following contracts were concluded during 1973:

- 1. With USAEC
 - Five contracts covering a total of 3 631 323 kg separative work and one in situ contract covering 137 243 kg separative work
- 2. With Technabexport 5 188 780 kg separative work
nine contracts covering
- 3. With UCN 510 kg 2.8% enriched uranium
One contract covering

The following imports were effected in 1973 under the earlier toll-enrichment contracts concluded with the USAEC:

0.7-5%

Country	kg uranium	kg U ²³⁵	Enrichment costs in \$	kg natural uranium
Belgium	38 503	2 180	9 128 000	390 115
West Germany	172 334	3 899	15 652 000	690 224
Italy	105 533	2 527	11 970 000	453 977
Netherlands	3 199	88	390 000	16 063

5-93%

West Germany	144	134	972 000	25 909
France	338	315	2 550 000	57 133
Total	370 051	9 143	40 662 000	1 633 421

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B. Contracts involving extended terms of payment

During 1973 the following quantities were imported for the three Community nuclear power plants which had concluded contracts involving extended terms of payment under the Joint Nuclear Power Programme:

Garigliano:	12 735 kg U
Trino Vercellese:	10 670 kg U
Sena:	13 500 kg U

The inventories for these three nuclear power plants were:

		<u>Value</u>
Garigliano:	63 529 522 kg U	US\$ 9 480 527
Trino Vercellese:	72 210 020 kg U	US\$ 21 736 748
Sena:	59 972 059	US\$ 14 880 264

The values for burn-up and interest (user charges) were as follows:

Garigliano:	£ 3 684 704
Trino Vercellese:	£ 3 229 159
Sena:	£ 4 637 436

It must be noted that, owing to increased charges introduced by the USAEC on 14 August 1973, a new credit line had to be fixed for SENA. This gave rise to protracted negotiations with the USAEC.

C. Purchase contracts

During the year under review a total of nine transactions were carried out under the existing Master Sales Agreement with the USAEC and under separate purchase contracts concluded with the USAEC by the Agency.

These were as follows:

<u>0.7-20%</u>	<u>Contracts</u>	<u>kg U</u>	<u>kg U²³⁵</u>	<u>Value in US\$</u>
B	1	148 000	12 728	138 991.57
D	3	144 798	13 066	145 488.78
NL	2	143 159	5 630	53 430.94

<u>20-93%</u>	<u>Contracts</u>	<u>kg U</u>	<u>kg U²³⁵</u>	<u>Value in US\$</u>
D	1	2 853	2 569	32 536.44
F	1	2 345	1 949	24 599.57
I	1	7 957	6 167	77 642.57

The total value of these purchases is US\$472 689.87.

D. Lease contracts

In March 1973 the USAEC announced, as expected, its decision to discontinue leasing enriched uranium as from 30 June 1973. New leasing requests could therefore only be made for supplies up to 30 June 1973; during the first six months of 1973 four such requests were agreed to by the USAEC. The USAEC offered the following alternatives as regards leased material in the possession of the various users on the appointed deadline:

1. The leased material could be returned to the USAEC in the form of UF₆ by 31 December 1974 at the latest;
2. The leased material could be purchased from the USAEC by 31 December 1974 at the rates applying on the day when the purchase price, as published in the Federal Register, was paid.

This decision on the part of the USAEC involved Community lessees in considerable difficulties. They were all public or private research institutes, universities, laboratories and other experimental facilities. Return of the leased material by 31 December 1974 would in many cases have meant not only breaking off the tests in progress, but also heavy expenditure to meet processing, conversion and transport costs. In most instances the funds required for immediate purchase of the leased material were not available. Since, however, it was already known that the charge per SWU would go up from \$32 to \$36 on 14 August 1973, and by 1% every six months thereafter, and also that further increases in USAEC charges could not be ruled out, any purchase in the course of the financial year 1974 could only be made at a considerably higher price.

This situation prompted the Agency to propose the formation of a voluntary association of Community users on the following basis: On 30 June 1973, (i.e., at the old price) the Agency bought the leased material in the Community from the USAEC under an "in-situ" toll-enrichment contract. This means that the Agency procured on the open market via calls for tender an amount of natural uranium corresponding to the amount of leased enriched material. This natural uranium was delivered to the USAEC on 30 June 1973. On the same date, the Agency paid the USAEC for the number of separative work units involved in the leased enriched material.

The total quantities required for this transaction were 113 404.107 kg natural uranium at a price of \$2 138 621.86¹) and 390 390 kg enriched uranium as feed material as well as 137 293.146 kg separative work valued at \$ 4 393 380.67.

In order to finance this transaction, the Agency obtained a loan from the Banque de Bruxelles for a year, the interest on which was equivalent, by special arrangement with the bank, to the USAEC's user charge of 7 1/2% p.a.

This transaction offered the following advantages to lessees in the Community:

1. No account needed to be taken of the obligation to return material to the USAEC by 31 December 1974, nor of the attendant costs.
2. The earliest that funds to meet the cost of acquiring the leased material had to be requested was for the financial year 1974.
3. The acquisition by the Agency at 30 June 1973 resulted in a price of \$ 32 SWU and not the higher price expected for 1974.
4. The natural uranium was acquired by the Agency at the most favourable market price, which was considerably lower than the price calculated for direct purchase from the USAEC of \$ 23.46 per

¹ Payment was made in FB, converted at the rate of FB37.87 per US\$.

kg uranium in the form of UF₆.

It will not be possible to pinpoint the cost saving achieved by Community users until the USAEC selling price is fixed on 31 December 1974. It will, however, exceed 20%.

This appreciable saving caused the majority of users to join in the transaction proposed.

In all, leased material covered by 107 existing lease contracts signed by twenty two lessees was taken over.

The obligations towards the Banque de Bruxelles will be discharged during the first six months of 1974 as laid down in the contract.

During 1973 Community users paid, in total, the following amounts to the USAEC:

for use charges	for burn-up and losses
\$455 380.75	\$313 615.07

These can be broken down by countries as follows:

Belgium	\$ 79 831.21	\$112 596.75
West Germany	187 409.69	16 628.65
France	8 569.78	7 637.16
Italy	116 282.19	27 394.08
Netherlands	63 287.88	149 358.47

The three new Member States, namely, Denmark, Ireland and the United Kingdom have not been included, since they were still leasing material under bilateral agreements with the USA.

On 31 December 1973 a total of 3 451.360 kg U, in widely varying degrees of enrichment and valued at about \$3 511 493, was still on lease in the Community under the Euratom-US agreement.

The breakdown by countries is as follows:

Belgium	0.301 kg U, valued at about \$	73 128
West Germany	3 292.698 kg U	\$1 780 563
France	3.04 kg U	\$ 53 278
Italy	123.735 kg U	\$1 550 340
Netherlands	31.586 kg U	\$ 120 000

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The following figures were shown by the (separately maintained lease accounts for the Eurochemie and Eurex reprocessing plants on 31 December 1973:

Eurochemie:	1 647.024 kg U, valued at about \$2 867 240
Eurex:	140.082 kg U, valued at about \$ 990 080

III. Plutonium

The situation as regards plutonium during 1973 underwent no fundamental changes compared with the previous year. Only in isolated instances were larger quantities negotiated. The price in the Community rose slightly above those fixed in contracts signed in 1972, i.e., to about \$7-8/g Pu fissile.

Up to \$17 was asked for smaller quantities to particular specifications but there were no buyers at these prices.

In the USA greater amounts are offered at lower prices, in some cases less than \$5/g fissile - mainly, it is true, in the form of nitrate - and this has the effect of keeping prices down on the Community plutonium market. The reason lies in the USAEC's still outstanding decision on authorizing plutonium recycling. At the moment, therefore, the American electricity supply undertakings have no use for the plutonium by-product of irradiated and reprocessed fuel elements. The USAEC regulation that plutonium may only be transported in the form of nitrate is considered, by the producers involved, to be a further handicap, particularly since additional reprocessing is required after fairly lengthy storage periods owing to the increasing americium content.

The following transactions were carried out in 1973:

A. Intra-Community:

User	<50 g fissile, No of transactions	>50 g fissile, No of transactions	Quantity of kg Pu, fissile	Origin
Belgium	2	2	7.8	B/F/UK
West Germany	3	-	-	-
France	3	4	213.773	D/B/F/UK
Italy	-	1	3.-	F
UK	-	1	6.-	B
Total	8	8	230.573	-

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B. Exports to non-member countries:

Origin	<50 g fissile, No of transactions	>50 g fissile, No of transactions	No of kg Pu, fissile	Recipient
Belgium	1	--	--	USA
UK	--	1	31.8	USA

IV. Transfers to and from non-member countries

Transfers of special fissile materials of American origin to and from non-member countries during 1973 totalled 168, breaking down as follows:

	Exports to	Imports from
Argentina	1	--
Australia	1	--
Austria	15	1
Canada	1	1
India	2	1
Israel	1	--
Japan	3	1
Norway	3	1
Spain	2	--
Sweden	25	8
Switzerland	4	1
Taiwan	2	--
USA	19	75
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Total	79	89
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In general, these consisted of exchanges of small amounts of special fissile materials between research institutes for irradiation and other test purposes.

There were also industrial exports for the conversion or fabrication of pellets or fuel elements for MTRs or nuclear power plants on behalf of non-member countries, i.e.:

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	Transactions	Quantity	
Belgium	1	app. 10 kg U	}
West Germany	12	app. 117 476 kg U	
France	7	app. 72 kg U	

) in varying degrees of enrichment

V. Intra-Community transfers

The continuously expanding activities of the Community's nuclear industry have given rise to increasing turnovers in this sector too. The majority of these transactions concern intermediate or final processing orders or contracts for the reprocessing of irradiated fuel elements. In most cases the Agency is not involved, since, under Article 75 of the Euratom Treaty, the provisions of Chapter VI do not apply. Unfortunately the undertakings in the Community do not fully discharge their obligation to notify as laid down in Article 75, so that the Agency is still not in a position to provide reliable information on the number and volume of such transactions.

In several cases, however, even scrap from fuel element fabrication was traded between the various fabricators or between fabricators and reactor operators. The relevant supply contracts were concluded via the Agency. In some cases the Agency was able to refer holders of surplus material to Community buyers.

Altogether twenty five contracts were concluded within the Community in 1973.

VI. Summary

The following is a rundown of the transactions in which the supply Agency participated in 1973:

Natural uranium	19
Enriched uranium	3
Monazite	5
Enriched uranium	
Toll enrichment	
(a) USAEC	6
(b) Technabexport	9
(c) UCN	1

Purchase contracts with the USAEC	9
Lease contracts	4
Plutonium	13
Transfer authorizations for US material:	
(a) Import	79
(b) Export	89
Intra-Community transfers	25
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Total number of transactions	267
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Euratom Supply Agency,

Director-General

F. OBOUSSIER