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**REPORT TO THE COMMITTEE
ON FOREIGN AFFAIRS
HOUSE OF REPRESENTATIVES**



LM097096

**Allocation Of Uranium
Enrichment Services To Fuel
Foreign And Domestic
Nuclear Reactors**

Energy Research and Development Administration
Department of State

**BY THE COMPTROLLER GENERAL
OF THE UNITED STATES**

ID-75-45

MARCH 4, 1975

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COMPTROLLER GENERAL OF THE UNITED STATES
WASHINGTON, D.C. 20543

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The Honorable Thomas E. Morgan
Chairman, Committee on Foreign Affairs
House of Representatives

Dear Mr. Chairman:

In response to your request of July 30, 1974, we are currently performing an indepth review of international agreements for peaceful cooperation in nuclear energy, both entered into and proposed. In discussions with the Committee staff, it was agreed that we should provide the Committee with interim reports on the specific issues outlined in your request.

This interim report is in response to your specific request for information concerning the sale of U.S. uranium enrichment services to foreign countries and its effect on AEC's ability to meet domestic demands. Consistent with the agreement reached with Committee staff, we are furnishing this report to you without the benefit of formal agency comments.

As the Committee staff is aware, the Department of State has not released to us certain classified documents that we had requested. We have been advised that because of the special sensitivity of these documents the Chief of the Committee staff may be given the opportunity to read them in lieu of providing them to GAO.

We do not plan to make this report available for general distribution or distribute it further unless we receive your authorization or you announce its contents publicly.

Sincerely yours,

Comptroller General
of the United States

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ABBREVIATIONS

AEC	Atomic Energy Commission
GAO	General Accounting Office
IAEA	International Atomic Energy Agency

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COMPTROLLER GENERAL'S
REPORT TO THE
COMMITTEE ON FOREIGN AFFAIRS,
HOUSE OF REPRESENTATIVES

ALLOCATION OF URANIUM
ENRICHMENT SERVICES TO FUEL
FOREIGN AND DOMESTIC NUCLEAR
REACTORS

Energy Research and
Development Administration
Department of State

D I G E S T

WHY THE REVIEW WAS MADE

The Chairman of the House Committee on Foreign Affairs requested GAO to review international agreements, both entered into and proposed, for peaceful cooperation in nuclear energy. Specific information was requested on the U.S. decision to enter into provisional uranium enrichment services contracts with Egypt and Israel at a time when domestic requests for such services were being held in abeyance by the Atomic Energy Commission (now Energy Research and Development Administration). ⁷⁴³

GAO's review included an analysis of the:

- Relationship between requests for enrichment services and uncommitted U.S. enrichment capacity.
- AEC's rationale for allocation of the uncommitted capacity.
- Emergence of foreign policy issues related to the supplying of enrichment services that the newly created Energy Research and Development Administration may face.

FINDINGS AND CONCLUSIONS

To honor recent Presidential commitments, in June 1974 the Atomic Energy Commission signed provisional contracts to provide uranium enrichment services to fuel one reactor in Egypt, one in Israel, and two in Iran. At that time the Commission was holding U.S. domestic requests for such services in abeyance, but it subsequently signed standard contracts for all pending domestic requests. (See p. 12.)

Relationship between requests and uncommitted capacity

The U.S. Government has three gaseous diffusion enrichment plants to provide domestic and foreign customers with uranium enrichment services needed to fuel reactors. (See p. 1.)

The Commission revised its enrichment service contracting criteria in May 1973 to firm up the demand for future enrichment services. June 30, 1974, was set as a deadline for potential customers to execute contracts for long-term enrichment services if the initial delivery of enriched fuel

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was needed between July 1, 1978, and June 30, 1982. (See p. 5.)

Under current operating conditions, the Commission estimated that the three plants could provide enrichment services to sustain operations of powerplants having a combined capacity of approximately 290,000 megawatts. By modifying operations at the three plants and by using more natural uranium feed for each unit of enriched uranium produced, the Commission estimated that it could increase its enrichment services capacity by 30,000 megawatts to about 320,000 megawatts. (See p. 7.)

At June 30, 1974, the Atomic Energy Commission had:

- contracts executed covering 273,000 megawatts for 208 domestic and 99 foreign reactors and
- contracts pending for 15 domestic requests for 16,000 megawatts and 78 foreign requests for 75,000 megawatts.

Thus, the demand on the Commission's enrichment services at June 30, 1974, for executed and pending contracts totaled 364,000 megawatts, or 44,000 megawatts more than its available capability. (See p. 7.)

Rationale for allocating uncommitted capacity

The Commission on June 9, 1974, recognizing the emerging capacity problem, suspended the signing of long-term enrichment services contracts except for

those covered by the President's Middle East commitments with Egypt, Israel, and Iran. These contracts were signed with the provision that the recipient country sign an Agreement for Cooperation on the civil uses of atomic energy. (See pp. 7 and 12.)

Historically, the Commission's policy had been to provide access to its uranium enrichment services on a nondiscriminatory and equitable basis for both U.S. and foreign customers. The intergovernmental Agreements for Cooperation state that foreign countries will have equitable access to U.S. enriching services. This language had been interpreted to the Congress and foreign governments as meaning access on a first-come-first-served basis for all. (See p. 8.)

However, had the strict chronological approach been followed, Western European countries would have received only 1 standard contract of 33 requested. Japan, on the other hand, would have received 25 standard contracts of 27 requested. One of the 15 potential U.S. customers would not have received a standard contract. (See p. 8.)

After a high-level interagency group had examined a number of options and the Commission had had further consultation with the State Department, it was determined that some modification in the chronological policy would be appropriate. At the same time, it was recognized that any deviation from this policy should also take

into account the status of the single U.S. request that would otherwise not receive a standard contract. (See p. 9.)

The Atomic Energy Commission modified the chronological approach as follows.

--Requests from Yugoslavia and Mexico were given preferential treatment because of prior U.S. commitments involving the International Atomic Energy Agency.

--Six standard contracts were shifted from Japan--one to the Puerto Rico Water Resources Authority, two to France, two to Germany, and one to Spain. (See p. 9.)

From August to October 1974, the Commission signed standard contracts for all 15 pending domestic requests and for 33 pending foreign requests. The remaining 45 pending foreign requesters were offered contracts conditioned upon a favorable determination by the Commission's regulatory staff (now the Nuclear Regulatory Commission) that plutonium produced as a byproduct in power reactors could be recycled and used to refuel reactors in an environmentally safe way. (See p. 9.)

The Commission also announced that it was terminating further long-term contracting for enrichment services and that it expected private industry to provide additional enriching services needed after 1982.

Timed with this announcement, former President Nixon issued a statement assuring those foreign customers offered conditional contracts that the United States would, in any event, fulfill these fuel requirements from U.S. supply sources. Subsequently, Atomic Energy Commission and U.S. Embassy officials stressed this assurance to fulfill conditional contracts offered to other governments and customers. (See p. 10.)

Emerging foreign and domestic issues

The Commission has offered conditional contracts to 45 foreign customers. These contracts would become effective only if there is generic approval of recycling plutonium as fuel by the Nuclear Regulatory Commission on or before June 30, 1975, or a mutually agreed later date.

Failure to meet the Presidential commitment to fulfill these conditional contracts on a permanent basis, after repeated assurances, would have an adverse effect on foreign relations and would jeopardize U.S. ability to continue to supply a significant portion of foreign enrichment demand.

There has been some opposition, including congressional criticism, to plutonium recycling. The Environmental Protection Agency recently announced that it should be delayed until adequate safeguards were developed.

If a favorable determination on plutonium recycling is not forthcoming, Atomic Energy Commission officials have stated that the United States still could fill these contracts. The Commission hoped that U.S. private industry would be able to supply the needed enriching services. Failing this, Commission officials have indicated that the existence of a U.S. Government contingency stockpile of enriched uranium could provide the ability to temporarily supply those fuel needs.

This would be only a stopgap measure until new U.S. enrichment capacity was available. Beyond these alternatives, the future availability of U.S. enrichment services to meet all domestic and foreign demands is uncertain at this time. (See p. 16.)

At present, with Government capacity fully contracted, there is not one firm commitment from the private sector to build and operate the needed large-scale enrichment plant.

If a private commitment is not forthcoming by about the middle of 1975, Atomic Energy Commission officials have indicated that contingency plans could be implemented for the Government to build another enrichment facility. This could be reflected in the fiscal year 1977 budget, which would require congressional approval. (See p. 17.)

The recent oil embargo and corresponding acceleration of foreign nuclear programs has led to increased activity in other countries to diversify their sources of supply for enrichment services, either by providing their own capability or by purchasing from the Soviet Union. The Atomic Energy Commission's announcement to terminate further long-term Government contracting for enrichment services together with the private sector's lack of a firm commitment to build has introduced uncertainty as to future U.S. supply and may have further encouraged the emergence of foreign supply sources.

As other nations find new sources for enrichment services, the United States may lose the significant balance-of-payment benefits from the sale of such services and from the sale of related equipment. It may also lose the leverage that a dominant supplier position provides in influencing international nuclear policies and in achieving U.S. objectives in the international nuclear arena, particularly nonproliferation of weapons. (See p. 18.)

AGENCY ACTIONS AND UNRESOLVED ISSUES

Consistent with the agreement reached with the Committee staff, GAO did not obtain formal agency comments on this report.

CHAPTER 1

INTRODUCTION

On July 30, 1974, the Chairman, House Committee on Foreign Affairs, requested GAO to make an indepth review of international agreements, entered into or proposed, for peaceful cooperation in nuclear energy. Specific information was requested on the U.S. decision to enter into provisional uranium enrichment services contracts with Egypt and Israel at a time when domestic requests for such services were being held in abeyance by the Atomic Energy Commission (AEC) ^{1/}.

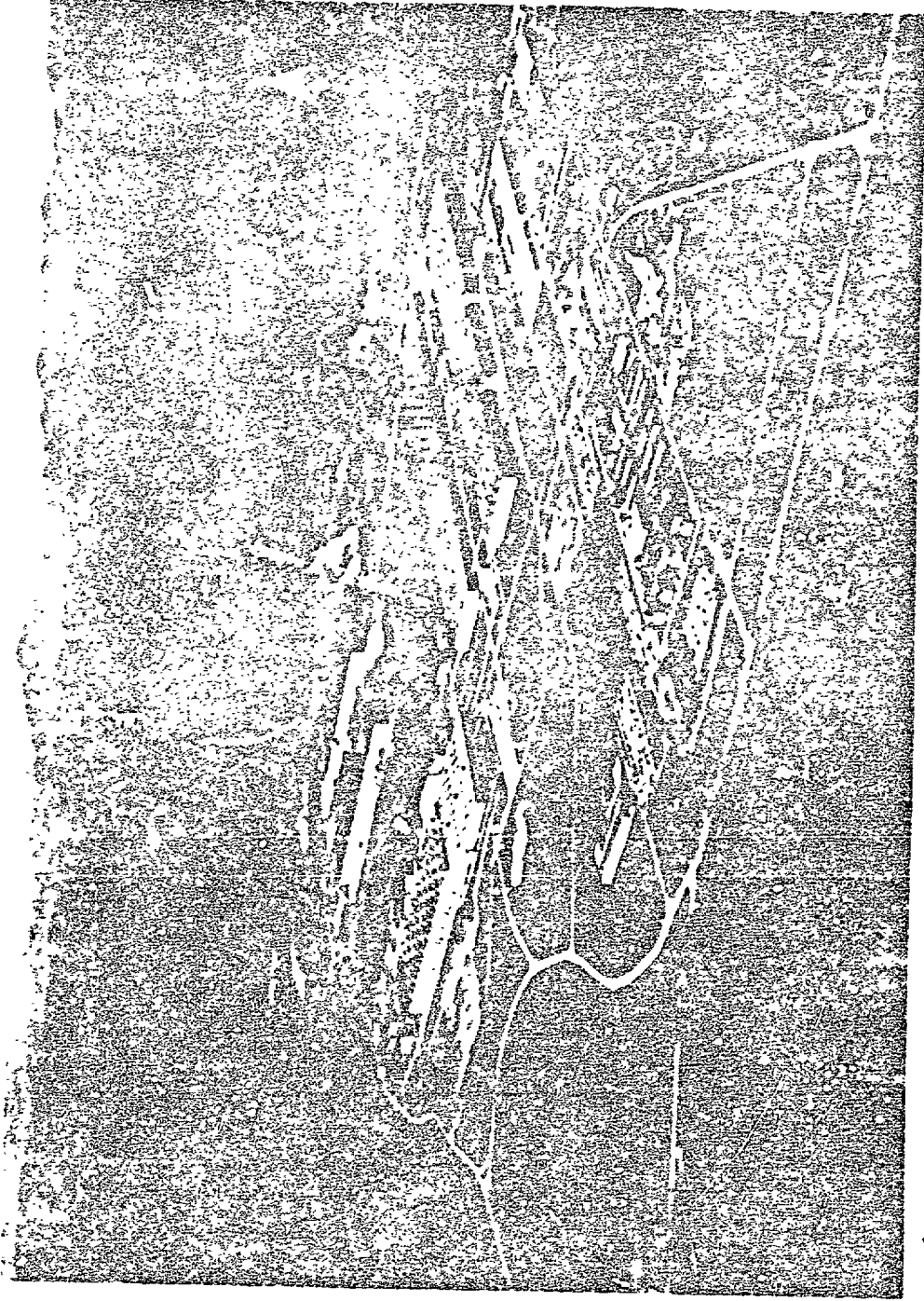
U.S. private industry sells nuclear reactors and equipment to foreign customers. AEC, under authority of the Atomic Energy Act of 1954, (42 U.S.C. 2011) sells the uranium enrichment services needed to fuel these reactors. To provide these services, AEC has three enrichment plants. Although originally built to meet national defense needs, the plants are now principally engaged in providing enriched uranium for foreign and domestic power reactors. They are operated under contract by private industry and are located at Oak Ridge, Tennessee; Paducah, Kentucky; and Portsmouth, Ohio.

In the enrichment process, AEC takes natural uranium normally supplied by the customer in the form of uranium hexafluoride and, through a gaseous diffusion process involving numerous separation stages, produces an enriched product containing a higher concentration of uranium-235 than the original feed material. Uranium-235 is the isotope of natural uranium needed to fuel nuclear reactors.

Natural uranium may be enriched to percentages varying from a little over its natural 0.7 percent content to over 90 percent, the percentage of enrichment depending on the planned end use of the uranium. Light water power reactors, the predominant form of nuclear reactor in the world today, use 2- to 3-percent enriched uranium while nuclear weapons or fuel for nuclear submarines require more than 90 percent enriched uranium.

In this decade more than 90 percent of the world's power reactors will rely on enriched uranium as their power source. Currently, the United States is the only Nation supplying enrichment services to other countries on a large scale.

^{1/}The recently created Energy Research and Development Administration and the Nuclear Regulatory Commission assumed the responsibilities of AEC on Jan. 19, 1975.



The U.S. gaseous diffusion plant at Oak Ridge, Tennessee, was the first such facility built in the world. The plant was in operation for over 20 years and cost \$4.9 million and covering about 600 acres, produces enriched uranium for nuclear power plants or in the form of uranium hexafluoride. (Credit: AFCC)

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During fiscal years 1973 and 1974, AEC revenues from supplying enrichment services were \$257 million and \$542.1 million, respectively.

	<u>1973</u>	<u>1974</u>
	(millions)	
Foreign customers	\$140.3	\$381.4
U.S. customers	<u>116.7</u>	<u>160.7</u>
	\$257.0	\$542.1

Revenues from foreign customers were abnormally high in these years due to special advanced sales to Japan for \$51 million in 1973 and \$270 million in 1974. According to AEC officials long-term sales to foreign customers will represent about 35 percent of AEC's future revenues from enriching service contracts.

For the United States to supply other countries with enrichment services, the Atomic Energy Act requires that an Agreement for Cooperation in the civil uses of atomic energy be entered into between the U.S. Government and another government or group of governments. Under the umbrella of an appropriate government-to-government Agreement for Cooperation, supply contracts can be entered into with the cooperating government or private entities within that country.

AEC's basic policies for supplying power reactor fuel abroad have been:

- The assurance of long-term availability of nuclear fuel for a period of time corresponding to the anticipated economic life of the facility being supplied.
- The principle of nondiscriminatory charges, terms, and conditions essentially identical to those applicable to customers in the United States.

Other nations possessing enrichment capabilities include France, the Soviet Union, and the United Kingdom. The existing enrichment capacity of both France and the United Kingdom is only sufficient to meet current internal needs without exporting significant quantities. The Soviet Union has offered enrichment services to a number of Western European countries and Japan at prices designed to be slightly below those of AEC and under conditions considered more flexible and attractive than those offered by AEC.

At this time, two European consortia are developing uranium enrichment capabilities. EURODIF, is a French-led group composed of France, Italy, Belgium, and Spain. Iran has also recently become involved through partial participation in the French share. URENCO is composed of the United Kingdom, the Netherlands, and West Germany. EURODIF plans to have the capability by the early 1980s to fuel 140 average nuclear powerplants. URENCO's plans are somewhat less firm, although it contemplates a similar capability by 1985.

SCOPE OF REVIEW

Information for this report was developed through reviewing pertinent records and talking with cognizant officials at AEC Headquarters and the Department of State.

CHAPTER 2

AEC ENRICHMENT CAPACITY

INSUFFICIENT TO MEET DEMANDS

In May 1973, AEC revised its contracting procedures for future enrichment services, under which long-term contracts for a minimum 10-year supply had to be signed 8 years in advance of initial delivery. The principal objective of this revision was to firm up the demand for enrichment services to achieve more realistic and reliable planning. (See app. II for the principal features of AEC's enrichment services contract.)

Previously, AEC had not required more than about a 1-year lead time between contract execution and initial delivery, so several potential customers needing initial deliveries in less than 8 years had not executed contracts. Thus, a transition period was established during which potential customers needing initial delivery of enriched uranium fuel

--before July 1, 1978, were to execute contracts with AEC by December 31, 1973,

--between July 1, 1978, and June 30, 1982, were to execute contracts by June 30, 1974.

Contracts under the revised criteria became available for signature by the customer in September 1973. By the December 31, 1973, deadline, AEC had executed 54 contracts under the revised criteria, 21 domestic and 33 foreign.

In March 1974, with June 30, 1974, deadline only a few months away, the AEC Office in Brussels reported a lack of European interest in signing long-term enrichment services contracts with the United States. On the other hand, the Japanese had submitted 24 requests for such contracts before April 30, 1974.

Major factors contributing to the European lack of interest in signing AEC fuel contracts were (1) the firming up of plans by the EURODIF and URENCO consortia to build uranium enriching plants, (2) the desire of European utilities to avoid long-term contracts with AEC so that they could order from EURODIF, URENCO, or other sources as soon as services were available, and (3) few European utilities had made firm commitments to build powerplants which would need fuel delivered during July 1978 through June 1982--the period for which AEC was accepting long-term contracts.

As of May 30, 1974, the AEC Office in Brussels had received indications that the European countries would request U.S. enrichment service contracts to fuel only seven reactors. After May 30, the contract situation changed rapidly, and, by the June 30, 1974, deadline, AEC had received 33 formal requests for enrichment services from Western Europe, including 10 from West Germany, 8 from France, and 7 from Spain.

It is impossible to completely explain this about-face in requests from European utilities for long-term AEC fuel contracts, but several factors may have contributed to this sudden rush to sign such contracts.

One possible reason for the German and British requests was the uncertainty that sprang up around the URENCO project. Revised estimates indicated that URENCO would not reach its projected 1980 enrichment capacity until 1982. Also, uncertainty existed over whether major uranium supply countries (United States, Canada, South Africa, and Australia) would continue to sell the necessary natural uranium feed on a long-term basis or would attempt to tie such sales to the purchase of enrichment services.

The French requests could be attributed to the fact that, with the acceleration of the French nuclear power program because of the oil crisis, the French share of EURODIF would not be sufficient to cover France's revised power program requirements, expected to be 50,000 megawatts by 1985. The French also might have been reluctant to place a larger percentage of their enrichment demand with the Soviets. Uncertainties as to EURODIF's ability to start up on schedule and to produce at its design level, at least during early operations, also contributed to the French decision to seek AEC contracts.

In addition to France, other western European countries stepped up their nuclear power programs as a result of the oil crisis, and this further contributed to the rapid increase in requests for enrichment services contracts.

AEC had estimated that, under current operating conditions, it could provide enrichment services to sustain the operations of powerplants having a combined capacity of approximately 290,000 megawatts. However, as of June 30, 1974, it had contracts (1) executed for 273,000 megawatts and (2) pending for 91,000 megawatts. Thus, the demand on AEC's enrichment services on June 30, 1974, for both executed and pending contracts totaled 364,000 megawatts.

Under its Uranium Enrichment Services Criteria required by the Atomic Energy Act and published in the Federal Register in May 1973, AEC may not enter into enrichment service contracts in excess of its available capability.

AEC Long-term Enrichment Services Contracts

	<u>Total mega- watts</u>	<u>Domestic</u>		<u>Foreign</u>	
		<u>Number of reactors</u>	<u>Mega- watts</u>	<u>Number of reactors</u>	<u>Mega- watts</u>
Existing con- tracts, June 30, 1974	273,000	208	205,000	99	68,000
Requests pending, June 30, 1974	<u>91,000</u>	<u>15</u>	<u>16,000</u>	<u>78</u>	<u>75,000</u>
Total	<u><u>364,000</u></u>	<u><u>223</u></u>	<u><u>221,000</u></u>	<u><u>177</u></u>	<u><u>143,000</u></u>

AEC estimated that, by modifying existing operations of the three enrichment facilities and using more natural uranium feed for each unit of enriched uranium produced, it could increase its enrichment services capacity by about 10 percent without significant economic penalties and without unnecessarily burdening the uranium supply industry. This would bring its effective enrichment capacity to about 320,000 megawatts, or about 44,000 megawatts less than that needed to fulfill all requests.

AEC also estimated that, through using plutonium as a fuel in U.S. nuclear power reactors, it could sustain the operations of additional powerplants having a combined capacity of 44,000 megawatts. However, before this could occur, it must be determined whether plutonium produced as a byproduct in power reactors could be recycled and used to refuel U.S. reactors in an environmentally safe way. AEC's regulatory staff had reached a preliminary conclusion that the use of recycled plutonium should be approved. After intergovernmental review and the receipt of public comment, the Nuclear Regulatory Commission will prepare a final environmental impact statement. Upon a favorable determination, public rulemaking procedures could be implemented. In the interim, as the final decision could not be prejudged, AEC's enrichment contracting capability had to be computed without assuming that plutonium recycling would be approved.

Effective June 9, 1974, AEC temporarily suspended signing long-term enrichment services contracts so that it could review the relationship between requested contracts and its uncommitted production capacity.

CHAPTER 3

AEC ALLOCATION OF ENRICHMENT SERVICE CONTRACTS

Historically, AEC policy has been to provide nondiscriminatory and equitable access to its uranium enrichment services for both domestic and foreign customers. Intergovernmental Agreements for Cooperation state that foreign countries will have "equitable access" to U.S. enriching capacity. This language has been interpreted to the Congress and foreign governments as meaning access on a first-come-first-served basis for all customers, foreign and domestic, of U.S. services.

Reasons for this policy include:

- Plans giving obvious preference to domestic utilities could be perceived as inconsistent with U.S. goals of equity in the international energy resource supply.
- Any plan, other than that based on chronological sequence, could be perceived as deliberately favoring one utility, domestic or foreign, at the expense of another.
- The United States should be able to assure foreign governments that it will be a dependable source of enrichment services. Any attempt to make a preferred distribution would necessarily undermine the strength of U.S. assurance of dependability.
- The United States has emphasized the policy of non-discrimination in its international nuclear transactions and this policy is a major asset in achieving U.S. objectives.

ALLOCATION PROCESS

As of June 30, 1974, AEC had 93 requests pending for enrichment services. Had the first-come-first-served policy been followed, using the 320,000 megawatt contracting limit, standard contracts would have been offered to only the first 46 requests received, including 14 of the 15 pending domestic requests, and conditional contracts ^{1/} would have been allocated to the remainder. However, this would have meant that Western European countries would have received only 1 standard

^{1/}Conditioned upon a favorable determination of plutonium recycling. Except for this provision, and the subsequent timing of the down payment, the terms and requirements of this type of contract are the same as the standard long-term enrichment contract.

contract of 33 requested. Japan, on the other hand, would have received 25 of 27 standard contracts requested, and 1 domestic customer would not have received a standard contract. (App. III lists chronologically all foreign and domestic requests pending as of June 30, 1974.)

During AEC's contract suspension period, intensive inter-agency discussions were held on whether the first-come-first-served policy followed by the United States in the past continued to be equitable or whether alternative methods of distributing the contracts, which might be more equitable, should be followed.

At an interagency meeting, high-level officials of the Department of State, AEC, Office of Management and Budget, National Security Council, and Council on International Economic Policy examined a number of options and recommended continuing the first-come-first-served policy, i.e., by order of the date on which the contract was completely negotiated and ready for signature by the customer.

After further AEC consultation with the Department of State on this matter, it was determined that a degree of redress of this situation would be appropriate. At the same time, it appeared that any adjustment from the strict chronological approach involving foreign customers should also recognize the status of the single domestic request that would have otherwise received a conditional contract.

On August 6, 1974, AEC lifted contract suspension by announcing that it was signing standard contracts for the 15 pending domestic requests and for 33 pending foreign requests and offering conditional contracts to the remaining 45 pending foreign requests.

The Chairman of AEC testified that the chronological approach would have resulted in an inequitable distribution of AEC's remaining capacity and that, to rectify the imbalance, five standard contracts were shifted from Japan--two to France, two to Germany, and one to Spain. In addition, the one domestic request was shifted to a standard contract taken from the allocation for Japan.

The 78 foreign requests for U.S. enrichment services were finally allocated as shown below.

<u>Country</u>	<u>Standard contracts</u>	<u>Conditional contracts</u>
Brazil	0	2
France	2	6
Germany	2	8
Greece	0	1
Iran	0	6
Italy	1	1
Japan	19	8
Korea	0	2
Mexico	2	0
Netherlands	0	1
Portugal	0	2
South Africa	2	0
Spain	1	6
Taiwan	2	0
Thailand	1	0
United Kingdom	0	2
Yugoslavia	<u>1</u>	<u>0</u>
Total	<u>33</u>	<u>45</u>

Appendix IV lists domestic and foreign customers offered standard contracts and appendix V lists those offered conditional contracts.

AEC also announced that, after completing these contracts, it was terminating further long-term contracting for enrichment services from AEC capacity. It expects private industry to provide additional enriching services needed after 1982.

Timed with the AEC announcement, former President Nixon issued a statement on August 6, 1974, assuring those foreign customers offered conditional contracts that the United States would, in any event, fulfill the fuel requirements from U.S. supply sources. This strong Presidential statement was intended to remove the distinction, for all practical purposes, between standard and conditional contracts. U.S. Embassies in the countries involved were instructed to stress to the host governments this assurance of supply.

In corresponding with customers offered conditional contracts, AEC officials reiterated the President's assurance that the United States would fulfill the fuel requirements covered by those contracts from U.S. supply sources.

Contracts under auspices of
International Atomic Energy Agency

In the allocation process, requests for enriching services from Mexico and Yugoslavia were given preferential treatment because of prior commitments involving the International Atomic Energy Agency (IAEA). ^{1/}

As member nations, Mexico and Yugoslavia requested IAEA assistance in obtaining U.S. nuclear power reactors and fuel for them under the authority of the Agreement for Cooperation in the civil uses of atomic energy between the United States and IAEA. The United States does not have bilateral Agreements for Cooperation with either country.

Under the auspices of IAEA, Mexico is purchasing from U.S. manufacturers two 675-megawatt reactors (Laguna Verde I and II) and Yugoslavia is buying one 665-megawatt reactor (Krsko). To fuel these reactors, Mexico and Yugoslavia each entered into bilateral contracts with AEC for supplies of uranium enrichment services.

These long-term contracts implement trilateral supply agreements between the United States, IAEA, and Mexico or Yugoslavia. These trilateral supply agreements specify that AEC is willing to provide enrichment services for the three reactors through IAEA, pursuant to the US-IAEA Agreement for Cooperation and under terms and conditions to be set forth in the bilateral contracts. The trilateral supply agreements were signed on February 12 and June 14, 1974, for Laguna Verde I and II, respectively. The trilateral supply agreement for Krsko was signed on June 14, 1974.

The trilateral supply agreements state that IAEA provides no guarantees or assumes no financial responsibility for the supply of enrichment services by AEC to Mexico and Yugoslavia.

On August 14, 1974, AEC executed two standard contracts with Mexico and one with Yugoslavia because of the prior U.S. commitment to trilateral supply agreements. On AEC's strict chronological basis for allocating the contracts, Yugoslavia would have received a standard contract and Mexico would have been offered only conditional contracts.

^{1/}IAEA is composed of 105 nations and is under the auspices of the United Nations. Its basic objective is to accelerate and enlarge the contribution of atomic energy to peace, health, and prosperity throughout the world.

Until these supply agreements were signed, AEC had never agreed to supply enrichment services for a nuclear power reactor through the IAEA. However, in the past AEC had supplied small quantities of enriched uranium for research projects under the U.S.-IAEA Agreement for Cooperation.

CONTRACTS WITH
MIDDLE EAST COUNTRIES

During the contract suspension period, AEC signed provisional contracts to provide enrichment services to fuel one reactor in Egypt, one in Israel, and two in Iran. Because these contracts were signed to honor President Nixon's Middle East commitments, they were not included in the allocation process.

At the time the contracts were signed, AEC estimated they represented U.S. revenues for the first 10 years of deliveries amounting to about \$39 million each for the Egyptian and Israeli reactors and about \$70 million each for the Iranian reactors.

Egypt

On June 26, 1974, AEC signed a provisional contract to provide enrichment services to Egypt to fuel one 600-megawatt power reactor to be purchased from U.S. private industry. On June 14, while on his Middle East trip, President Nixon committed the United States to the signing of an enrichment contract with Egypt by June 30, 1974. This was AEC's deadline for contracting for initial deliveries between July 1, 1978, and June 30, 1982. Initial fueling for this reactor was set for February 1980.

The contract contains a provision requiring the United States and Egypt to bring into force an Agreement for Cooperation in civil uses of atomic energy by September 30, 1975, or such later date as may mutually be agreed. An Agreement for Cooperation is required by law before either the nuclear reactor or the enrichment services can be provided to a foreign country. Without such an agreement the contract will automatically be terminated.

Because of the President's commitment, the contract with Egypt was exempted by AEC from the temporary suspension of contract signing then in effect. As of January 15, 1975, no Agreement for Cooperation had been completed although discussions have been underway.

Israel

On June 26, 1974, AEC signed a provisional contract with Israel to provide enrichment services sufficient to fuel a 600-megawatt power reactor to be purchased from U.S. private industry. Initial fuel delivery is set for 1980 or 1981.

One provision of the contract requires the United States and Israel to first sign a new Agreement for Cooperation in the civil uses of atomic energy by September 30, 1975, or such later date as may be mutually agreed or the enrichment contract will be terminated. The 1955 U.S.-Israel Agreement for Cooperation is limited to research purposes and is due to expire in 1975. Under this agreement, the United States has supplied Israel with small quantities of enriched uranium and other special nuclear material for research purposes.

As part of the "even-handed" approach, President Nixon, during his Middle East trip, pledged that the United States would sign an enrichment contract with Israel by June 30. As of January 15, 1975, no new Agreement for Cooperation had been signed. Israeli interest reportedly is waning, but discussions are continuing according to AEC officials.

Iran

On June 30, 1974, AEC and Iran signed two provisional fuel contracts with initial delivery set for 1979. As with Egypt and Israel, the two Iranian contracts based on a Presidential commitment made in May 1974, were signed during AEC's contract suspension period. In addition, Iran had requested enrichment services for six other reactors, but the AEC offered conditional contracts for them.

The 1969 Agreement for Cooperation is due to expire in 1989. It provides for the transfer of enriched uranium to Iran for use in research reactors or experiments and limits to approximately 6 kilograms the amount of U.S. enriched uranium that can remain in the custody of Iran at any one time.

Negotiations for a new bilateral Agreement for Cooperation, which would allow Iran to purchase U.S. power reactors and sufficient enriching services to fuel them, are scheduled to begin late in January 1975. AEC's standard contracts stipulate that implementation is contingent upon successful negotiation of the new Agreement for Cooperation. Should the new Agreement not be in force by September 30, 1975, or unless otherwise agreed, the enrichment contracts would terminate.

Originally, each standard contract was for fueling one reactor having a power range of 600 to 800 megawatts; but, upon request by Iran just before execution of the contract, the power range was increased to 1,000 to 1,200 megawatts. In requesting the change, Iran intended to fuel four reactors in the 600-megawatt range with the enriched uranium provided under these two contracts. AEC contracts, however, are intended to cover a single reactor. (There is no appreciable difference in the enrichment services needed to sustain two 600-megawatt reactors or one 1,200-megawatt reactor for 10 years.)

In August 1974 Iran was notified that AEC's one contract for one reactor policy would have to apply to these contracts. Iran was then given the opportunity to modify the two standard contracts to cover two 600- to 800-megawatt reactors. Iran, however, decided not to renegotiate and thereby its contracts continue to cover two reactors in the 1,000- to 1,200-megawatt range.

CONTRACTS WITH
DOMESTIC UTILITIES

At the time AEC was signing provisional enrichment services contracts with Egypt, Israel, and Iran, it had 15 domestic and 78 foreign requests pending. However, by August 14, 1974, AEC had executed standard contracts for all 15 pending domestic requests.

One domestic request was given preferential treatment, because if AEC had continued to sign contracts on a strict chronological basis only 14 of the 15 pending domestic requests would have received standard contracts. The Puerto Rico Water Resources Authority would have been offered a conditional contract if the first-come-first-served policy had been used. Domestic reactors to be fueled under these new contracts are as follows.

<u>Utility</u>	<u>Number of reactors</u>
Delmarva Power and Light	2
Detroit Edison	1
Northern States Power	1
Portland General Electric	2
Public Service Electric and Gas	4
Public Service of Oklahoma	1
Puerto Rico Water Resources Authority	1
South Carolina Electric and Gas	1
Washington Public Power Supply System	<u>2</u>
Total	<u>15</u>

Although AEC has contracted to meet all known domestic requests for enrichment services through 1982, future domestic requests for such services will be filled from new private or Government plants. See page 17 for discussion of private industry's entry into the enrichment market.

BEST DOCUMENT AVAILABLE

CHAPTER 4

FOREIGN AND DOMESTIC POLICY ISSUES

Several emerging foreign and domestic issues are involved in the continued supply of U.S. uranium enrichment services to foreign customers, including:

- U.S. ability to honor the Presidential commitment to fulfill conditional contracts.
- Need for new U.S. enrichment services plants to fuel future reactors.
- Maintenance of U.S. leverage, as a dominant supplier Nation, to influence future developments in the international nuclear field.
- Long-range effects on U.S. balance of payments.

PRESIDENTIAL COMMITMENTS

AEC has offered conditional contracts to 45 foreign customers which would become effective only if there is generic approval of recycling plutonium as fuel by the Nuclear Regulatory Commission on or before June 30, 1975, or a mutually agreed later date. Failure to meet the Presidential commitment to fulfill these conditional contracts on a permanent basis, after repeated assurances, would have an adverse effect on foreign relations and would jeopardize the ability of the United States to continue to supply a significant portion of the foreign enrichment demand.

There has been some opposition, including congressional criticism, to plutonium recycling, and the Environmental Protection Agency recently announced that recycling should be delayed until adequate safeguards were developed. It should also be noted that there are presently no reprocessing facilities in operation in the United States, although three plants could be operational by 1977 or 1978.

If a favorable determination on plutonium recycling is not forthcoming, AEC officials have stated that the United States could still fill these contracts. AEC hopes that U.S. private industry will be able to supply the needed enriching services. Failing this, AEC officials have indicated that the existence of a U.S. Government contingency stockpile of enriched uranium provides AEC with the ability to temporarily supply those fuel needs. This would be only a stopgap measure until such time as new U.S. enriching capacity was available. However, beyond these alternatives,

the future availability of U.S. enrichment services to meet all domestic and foreign demands is uncertain at this time.

The Chairman of AEC testified that in no event, without appropriate executive and congressional concurrence, would AEC enter into an enriching services contract which would require construction of additional Government capacity to deliver services under the contract.

NEED FOR NEW ENRICHMENT SERVICES CAPACITY

Since 1971 the U.S. Government has been looking to private industry to provide new enrichment facilities. Though industrial in nature, enrichment is the only segment of the nuclear fuel cycle not in the private sector. In May 1972, AEC and the Joint Congressional Committee on Atomic Energy agreed that primary responsibility for future U.S. uranium enrichment services should be transferred to the private sector. Programs designed to acquaint private industry with the enrichment business and to transfer classified technology, under proper controls, were established and have been continuing for approximately 1-1/2 years.

At present the Government has reached the limit of its available long-term enrichment capacity and there is not one firm commitment from the private sector to build and operate a gaseous diffusion uranium enrichment plant. This is primarily because of the large capital investment. The only prospective private venture is studying the feasibility of constructing such a plant at an estimated cost of \$3 billion. Originally this venture was a consortium of three major U.S. companies; however, two companies have recently withdrawn, principally for financial reasons. The remaining company has been seeking other sponsors, including such foreign sources as Japan, West Germany, France, and Iran. According to AEC officials, another U.S. company has recently expressed an interest in joining the consortium, and indications are that foreign sponsors may be forthcoming. It should be noted that the leadtime on a new enrichment facility is about 8 years and that, according to an AEC official, as much as 60 percent of the plant's output might be used to fulfill foreign needs.

Six other U.S. companies are presently studying the centrifuge process, a promising technology for application in future plants, either as owner/operators of centrifuge facilities or as manufacturers of components for such plants. AEC has requested companies to submit plans by April 1, 1975, for constructing demonstration centrifuge enrichment facilities together with estimates of appropriate Government assistance, which would have to be authorized by the Congress.

It is generally agreed, however, that the long leadtime requirement for building a large-scale enrichment plant, coupled with the need for further development and commercial demonstration of the centrifuge technology, precludes the possibility of the next large increment of capacity being based on the centrifuge process.

The Federal Energy Administration, in its November 1974 Project Independence Task Force Report on Nuclear Energy, stated that:

"Considering the present and immediate future, there is reason for concern over the ability of industry to provide enough new uranium enrichment capacity to supplement the output of government-owned facilities.

"An early decision is needed on the means to provide an increased uranium enrichment capability and the role of the Federal Government in this effort should be quickly resolved in view of a lead time on the order of 8 years for a new enrichment facility."

If a private commitment is not forthcoming by about the middle of 1975, AEC officials have indicated that contingency plans could be implemented for the Government to build another enrichment facility. This could be reflected in the fiscal year 1977 budget, which would require congressional approval.

MAINTENANCE OF LEVERAGE IN INTERNATIONAL NUCLEAR FIELD

The recent oil embargo and corresponding acceleration of foreign nuclear programs has led to increased activity in other countries to diversify their sources of supply of enrichment services, either by providing their own enrichment capabilities or by purchasing from the Soviet Union. AEC's announcement to terminate further long-term Government contracting for enrichment services together with U.S. industry's lack of a firm commitment to build facilities has introduced uncertainty as to future U.S. supply and may have further encouraged the emergence of foreign supply sources.

Since the 1950s the United States has been the major supplier of enriched uranium for the world's nuclear power programs. This has contributed significantly to its ability to influence international nuclear policies, particularly nonproliferation of weapons. As other nations find new sources for enrichment services, the United States may lose the leverage that a dominant trading position provides in achieving such U.S. objectives in the international nuclear arena.

LONG-RANGE BALANCE-OF-PAYMENTS EFFECTS

The sale of uranium enrichment services at reasonable prices helped create a world market for U.S. nuclear equipment and services. Balance-of-payments benefits provided by the sale of enrichment services (\$381 million in FY 1974) together with the sale of reactors and other related services are substantial and help to offset the high cost of imported oil.

During the next 25 years the sale of reactors, parts, maintenance services, and enrichment services represents an estimated trillion-dollar market which emphasizes the importance of maintaining a strong U.S. position in the uranium enrichment field.

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CHIEF OF STAFF

Congress of the United States
Committee on Foreign Affairs

House of Representatives
Washington, D.C. 20515

July 19, 1974

The Honorable Elmer B. Staats
Comptroller General of the United States
Washington, D.C.

Dear Mr. Staats:

As you may know, the Committee on Foreign Affairs has directed its Subcommittees on International Organizations and Movements and the Near East and South Asia to conduct a series of hearings on foreign policy implications of the export of nuclear technology to the Middle East. In addition to that inquiry, the full committee has pending before it a resolution of inquiry (H. Res. 1189 and 1219) requesting the President to furnish the House of Representatives certain information regarding the proposed nuclear agreements with Egypt and Israel. Finally, apart from the Committee's ongoing deliberations in this area, an amendment to the Atomic Energy Act which would require that such proposed nuclear agreements be referred to the House Foreign Affairs and Senate Foreign Relations Committees for their comments and recommendations will be offered when H.R. 15582, enabling Congress to approve or disapprove nuclear agreements for peaceful cooperation, is considered by the full House.

In connection with these activities, the Committee will be in need of a broad range of information in the field of nuclear agreements. I would like to request, on behalf of the Committee, that the General Accounting Office undertake an in-depth study of the international agreements for peaceful cooperation in nuclear energy both entered into and currently proposed by the United States.

It is my understanding that the GAO has already initiated a survey in this area with emphasis on the role of the International Atomic Energy Agency. In addition to this aspect of the agreements, the committee is also interested in the GAO's analysis of the following issues:

1. The effectiveness of bilateral safeguards imposed by the United States in agreements presently in force;

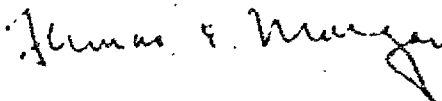
Committee on Foreign Affairs

2. The additional safeguards proposed by the United States with regard to the proposed agreements with Egypt and Israel;
3. The financial arrangements for such agreements; and
4. The decision to enter into provisional atomic fuel supply contracts with Egypt and Israel when domestic requests for such fuel are being turned down by the Atomic Energy Commission.

It would be appreciated if the Committee were kept informed about the progress of this study. The staff of the Committee will be available to consult with your staff with regard to the development of the requested study.

With best wishes, I am

Sincerely yours,



Chairman

TEM:rbnd

PRINCIPAL FEATURES OF AEC'S LONG-TERM
FIXED-COMMITMENT CONTRACT

Since May 1973 the fixed-commitment contract has been AEC's primary contract vehicle for supplying long-term enrichment services for nuclear power reactors. These new contracts replaced a less commercial requirements-type contract. At the present time, 93 domestic plants and 50 foreign plants are still being fueled under requirements-type contracts.

Under the fixed-commitment contract, enrichment services to be provided are specified in terms of fixed definite quantities on a specified schedule over the life of the contract. Under the requirements-type contract, AEC assumed obligation for meeting customer needs up to a stated ceiling amount of enrichment services; the customer was not committed to any amount beyond the minimum actually required to fuel the reactor.

Principal features of the fixed-commitment contract for supplying enriched uranium abroad are as follows.

DURATION

Supply contracts for powerplants must be executed 8 years in advance of initial delivery, for a minimum period of 10 years. These contracts may be for periods as long as 30 years but, for foreign customers, may not extend beyond the term of the covering Agreement for Cooperation. This Agreement can be extended as appropriate to insure a fuel supply to cover the life of the reactor.

CHARGES

Charges for enrichment services, in accordance with the Atomic Energy Act, as amended, are to be established on a basis of recovery of Government costs over a reasonable period of time. Applicable charges for enrichment services are those in effect at the time the enriched uranium is delivered to the customer.

The current enrichment charge under the long-term, fixed-commitment contract is \$42.10 per separative work unit. About 100,000 separative work units of enrichment are required to prepare enough uranium for the annual replacement requirement of a 1,000-megawatt reactor. The charge will be increased 2 percent semiannually beginning July 1, 1975.

PAYMENTS

Materials and services furnished by AEC for nuclear power applications are supplied on a cash basis. The customer is

APPENDIX II

required to make an advance payment for enrichment services determined in accordance with a formula applied to the gross megawatts of the reactor. The advance payment must be made to AEC in three annual installments of equal amounts, the first due upon contract execution and the remaining two no later than the first and second anniversary dates of contract execution.

Any other amounts due under the contract are normally due within 30 days after issuance of invoices for materials or services supplied. In the event of payment delays, interest charges are incurred at the annual rate established by AEC.

Customers offered conditional contracts by AEC are not required to make advance payments until requested by AEC, subsequent to the generic authorization of plutonium recycling. Advance payments received from customers that were subsequently offered conditional contracts were returned.

DELIVERIES

The customer must specify in writing 315 days before the month of delivery, the month enriched uranium is to be delivered and the amount. At least 180 days before the firm delivery date, the customer must notify AEC of the specific quantities and assays of enriched uranium to be delivered. Unless otherwise agreed, feed must be delivered to AEC at least 90 days before date of delivery of the enriched product.

All uranium feed delivered to AEC must be in the form of uranium hexafluoride conforming to AEC's established specifications.

TERMINATION

The customer may terminate the contract at any time by written notification to AEC. Upon termination of the contract by AEC, the customer must pay a termination charge based on applicable charges in effect at the time. In lieu of termination, the customer may assign the contract if authorized by AEC.

AEC may terminate the contract at no cost to the Government upon reasonable notice to the customer, if the enrichment services specified in the contract become available from a U.S. commercial source on terms and conditions, including charges, which AEC considers reasonable and non-discriminatory. This provision is included in anticipation of the development of private U.S. enriching services, while still assuring the customer that he will be able to obtain from the United States the desired services on reasonable terms.

CHRONOLOGICAL LIST OF
DOMESTIC AND FOREIGN REQUESTS FOR
ENRICHMENT SERVICES AS OF JUNE 30, 1974

<u>Country or U.S. utility</u>	<u>Facility name</u>	<u>Gross mega- watt range</u>	<u>Contract offered or prepared for offer--1974</u>
Northern States Power	Tyrone-1	1,176	Mar. 22
Delmarva Power and Light	Summit-1	787	Apr. 5
Delmarva Power and Light	Summit-2	787	Apr. 5
South Carolina E & G	Sumner-2	950	Apr. 9
Public Service of Oklahoma	Black Fox-1	985	May 10
South Africa	Koeburg-1	840 to 1,040	May 16
South Africa	Koeburg-2	840 to 1,040	May 16
Japan	Tokyo-9	1,100	May 17
Japan	Tokyo-10	1,100	May 17
Japan	Tokyo-11	1,100	May 17
Japan	Tokyo-12	1,100	May 17
Japan	Tokyo-13	1,100	May 17
Japan	Tokyo-14	1,100	May 17
Japan	Tokyo-15	1,100	May 17
Japan	Tokyo-16	1,100	May 17
Japan	Tokyo-17	1,100	May 17
Japan	Tokyo-18	1,100	May 17
Japan	Tokyo-19	1,100	May 17
Italy	EXEL-5	900 to 1,050	May 28
Portland General Electric	Boardman-1	1,313	May 29
Detroit Edison	Greenwood-2	1,086 to 1,296	May 29
Japan	Koeruriku-2	640 to 840	May 29
Japan	Koeruriku-3	700 to 900	May 29
Japan	Chubu-4	900 to 1,100	May 29
Japan	Chubu-5	1,000 to 1,200	May 29
Japan	Chubu-6	1,000 to 1,200	May 29
Washington Public Power Supply System	WPPSS-4	1,260	May 31
Washington Public Power Supply System	WPPSS-5	1,316	May 31
Japan	Kansai N-1	1,000 to 1,200	May 31
Japan	Kansai N-2	1,000 to 1,200	May 31
Japan	Kansai N-3	1,000 to 1,200	May 31
Japan	Kansai N-4	1,000 to 1,200	May 31
Japan	Kansai N-5	1,000 to 1,200	May 31
Japan	Kansai N-6	1,000 to 1,200	May 31
Japan	Hokkaido-1	500 to 600	June 3
Japan	Hokkaido-2	500 to 600	June 3
Taiwan	Taipower-5	800 to 1,000	June 3
Taiwan	Taipower-6	800 to 1,000	June 3
Thailand	Ao-Phai-1	600 to 675	June 3
Japan	Shikoku-3	700 to 900	June 4
Yugoslavia	Krsko	665	June 7
Public Service Electric and Gas	Atlantic-1	1,212	June 11
Public Service Electric and Gas	Atlantic-2	1,212	June 11
Portland General Electric	Boardman-2	1,313	June 12
Public Service Electric and Gas	Hope Creek-1	1,118	June 13
Public Service Electric and Gas	Hope Creek-2	1,118	June 13
Korea	Asan-1	600 to 800	June 13
Korea	Asan-2	600 to 800	June 13
Brazil	Angra-2	1,000 to 1,200	June 14
Brazil	Angra-3	1,000 to 1,200	June 14

APPENDIX III

<u>Country or U.S. Utility</u>	<u>Facility name</u>	<u>Gross nega- watt range</u>	<u>Contract offered or prepared for offer--1974</u>
Greece	PPC-1	400 to 600	June 14
Japan	JAPCO-4	1,000 to 1,200	June 14
Japan	EPDC-1	626 to 826	June 17
Portugal	Portuguese Unit-1	650 to 850	June 24
Portugal	Portuguese Unit-2	650 to 850	June 24
Spain	ENUSA-1	850 to 1,000	June 24
Spain	ENUSA-2	850 to 1,050	June 24
Spain	ENUSA-3	900 to 1,100	June 24
Spain	ENUSA-4	900 to 1,100	June 24
Spain	ENUSA-5	900 to 1,100	June 24
Spain	ENUSA-6	1,000 to 1,200	June 24
Spain	ENUSA-7	1,100 to 1,300	June 24
Netherlands	Nether- lands-3	900 to 1,100	June 25
West Germany	BASF-1	780 to 820	June 25
West Germany	RWE-1981 (C)	1,200 to 1,300	June 25
West Germany	Bayerwerk-81	1,300	June 25
West Germany	RWE-1981 (B)	1,200 to 1,300	June 25
West Germany	RWE-1983 (B)	1,200 to 1,300	June 25
West Germany	RWE-1984 (A)	1,200 to 1,300	June 25
Italy	ENEL-6	980 to 1,180	June 25
West Germany	VEW-A	1,100 to 1,300	June 25
West Germany	WYHL-2	1,250	June 25
France	BJGEY-3	960	June 25
France	BJGEY-4	960	June 25
France	BJGEY-5	960	June 25
France	Jampierre-1	960	June 25
France	Fessenheim-2	960	June 25
France	Gravelines-1	960	June 25
France	Tricastan-1	960	June 25
France	Tricastan-2	960	June 25
United Kingdom	CEGB-A	1,150 to 1,350	June 25
United Kingdom	UK-1	1,150 to 1,350	June 25
West Germany	RWE-1981(A)	1,200 to 1,300	June 25
Iran	Iran-3	600 to 800	June 25
Iran	Iran-4	600 to 800	June 25
Iran	Iran-5	800 to 1,000	June 25
Iran	Iran-6	800 to 1,000	June 25
Iran	Iran-7	800 to 1,000	June 25
Iran	Iran-8	800 to 1,000	June 25
Mexico	Laguna Verde-1	675	June 26
Mexico	Laguna Verde-2	675	June 26
Puerto Rico Water Resources Authority	PRWRA-2	800 to 1,000	June 28
West Germany	VEW-B	1,100 to 1,300	June 28

APPENDIX IV

AEC ENRICHMENT SERVICES STANDARD CONTRACTS

EXECUTED SINCE AUGUST 6, 1974 (As of Jan. 3, 1975)

<u>Country or U.S. utility</u>	<u>Reactor</u>	<u>Date-- 1974</u>	<u>Gross mega- watt range</u>
Yugoslavia	KRSKO	Aug. 14	665
Mexico	Laguna Verde-1	Aug. 14	675
Mexico	Laguna Verde-2	Aug. 14	675
Northern States Power	Tyrone-1	Aug. 12	1,176
Delmarva Power and Light	Summit-1	Aug. 12	787
Delmarva Power and Light	Summit-2	Aug. 12	787
South Carolina Electric and Gas	Summer-2	Aug. 12	950
Public Service of Oklahoma	Black Fox-1	Aug. 12	985
South Africa	Koeburg-1	Aug. 16	840 to 1,040
Do. Do.	Koeburg-2	Aug. 16	840 to 1,040
Japan	Tokyo-9	Aug. 14	1,100
Do. Do.	" -10	Aug. 14	Do.
Do. Do.	" -11	Aug. 14	Do.
Do. Do.	" -12	Aug. 14	Do.
Do. Do.	" -13	Aug. 14	Do.
Do. Do.	" -14	Aug. 14	Do.
Do. Do.	" -15	Aug. 14	Do.
Do. Do.	" -16	Aug. 14	Do.
Do. Do.	" -17	Aug. 14	Do.
Do. Do.	" -18	Aug. 14	Do.
Do. Do.	" -19	Aug. 14	Do.
Italy	ENEL-5	Sept. 9	900 to 1,050
Portland General Electric	Boardman-1	Aug. 12	1,313
Detroit Edison	Greenwood-2	Aug. 12	1,086 to 1,286
Japan	Hokuriku-2	Aug. 14	640 to 840
Do.	Hokuriku-3	Aug. 14	700 to 900
Do.	Chubu-4	Aug. 14	900 to 1,100
Do.	Chubu-5	Aug. 14	1,000 to 1,200
Do.	Chubu-f	Aug. 14	1,060 to 1,200
Washington Public Power Supply System	WPPSS-4	Aug. 12	1,260
Do.	WPPSS-5	Aug. 12	1,316
Japan	Kansai N-1	Aug. 13	1,000 to 1,200
Do.	Kansai N-2	Aug. 13	Do.
Do.	Kansai N-3	Aug. 13	Do.
Spain	ENUSA-III	Aug. 16	900 to 1,100
W. Germany	BASP-1	Sept. 9	790 to 820
Do.	RWE-1981 (A)	Aug. 30	1,200 to 1,300
Taiwan	Taipower-5	Aug. 14	800 to 1,000
Do.	Taipower-6	Aug. 14	Do.
France	BUGEY-3	Oct. 16	960
Do.	Fessenheim-2	Oct. 16	960
Thailand	Ao-Phai-1	Aug. 14	600 to 675
Puerto Rico Water Resources Authority	PRWA-2	Aug. 12	800 to 1,000
Public Service Electric & Gas	Atlantic-1	Aug. 12	1,212
Do.	Atlantic-2	Aug. 12	1,212
Portland General Electric	Boardman-2	Aug. 12	1,313
Public Service Electric & Gas	Hope Creek-1	Aug. 12	1,118
Do.	Hope Creek-2	Aug. 12	1,118

APPENDIX V

AEC ENRICHMENT SERVICES CONDITIONAL CONTRACTS OFFERED
AND DATES OF THOSE EXECUTED AS OF JANUARY 3, 1975

<u>Country or U.S. utility</u>	<u>Reactor</u>	<u>Date-- 1974</u>	<u>Gross mega- watt range</u>
Korea	Asan-1	Nov. 25	600 to 800
Do.	Asan-2	Nov. 25	600 to 800
Japan	JAPCO-4	Nov. 12	1,000 to 1,200
Greece	PPC-1	Oct. 31	400 to 600
Brazil	Angra-2	Sept. 18	1,000 to 1,200
Do.	Angra-3	Sept. 18	1,000 to 1,200
Japan	EPDC-1		626 to 824
Do.	Kansai N-4	Sept. 17	1,000 to 1,200
Spain	ENUSA-I	Sept. 20	850 to 1,050
Do.	" -II	Sept. 20	850 to 1,050
Do.	" -IV	Sept. 20	900 to 1,100
Do.	" -V	Sept. 20	900 to 1,100
Do.	" -VI	Sept. 20	1,000 to 1,200
Do.	" -VII	Sept. 20	1,100 to 1,300
Portugal	Portuguese Unit-1	Dec. 9	650 to 850
Do.	" -2	Dec. 19	650 to 850
Netherlands	Netherlands-III		900 to 1,100
Japan	Kansai N-5	Sept. 17	1,000 to 1,200
Do.	Kansai N-6	Sept. 17	1,000 to 1,200
W. Germany	Bayerwerk-31		1,300
Do.	RWE-1981 (B)	a/Dec. 20	1,200 to 1,300
Italy	ENEL-6		990 to 1,180
W. Germany	D/RWE-1983 (B)		1,200 to 1,300
Do.	RWE-1984 (A)		1,200 to 1,300
Do.	VEW-A		1,100 to 1,300
Do.	c/WYHL-II	Oct. 15	1,250
Japan	Hokkaido-1		500 to 600
Do.	Hokkaido-2		500 to 600
France	BUGEY-5	Oct. 15	960
Do.	Dampierre-1		Do.
Do.	BUGEY-4		Do.
Do.	Gravelines-1		Do.
Do.	Tricastin-1		Do.
Do.	Tricastin-2		Do.
W. Germany	RWE-1981 (C)		1,200 to 1,300
United Kingdom	CEGB-A		460 to 660
Do.	UK-1		460 to 660
Iran	Iran-3		600 to 800
Do.	" -4		600 to 800
Do.	" -5		800 to 1,000
Do.	" -6		Do.
Do.	" -7		Do.
Do.	" -8		Do.
Japan	Shikoku-3	Nov. 21	700 to 900
W. Germany	VEW-B		1,100 to 1,300

a/ Greenwood-2 assigned.

b/ Initial core of Fermi assigned to GKN with contract CES/EO/740. New contract for 1983 (B) excluding first core to be provided.

c/ Assignment of initial core of Forked River contract under preparation. New contract for WYHL-II excluding first core to be provided.