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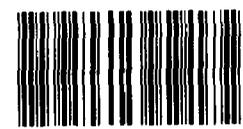
BY THE U.S. GENERAL ACCOUNTING OFFICE

**Report To The Chairman, Subcommittee On
Energy Conservation And Power
House Committee On Energy And Commerce**

**Information On DOE's Costing And
Pricing Of Uranium Enrichment
Services**

The Department of Energy (DOE) provides domestic and foreign customers with enriched uranium for use as commercial nuclear power reactor fuel. Competition from foreign enrichment suppliers and from a secondary market of surplus enriched uranium has led to a significant decline in DOE's enrichment sales. During a March 1, 1984, hearing before the subcommittee, GAO commented on a number of DOE initiatives and proposals designed to improve the uranium enrichment program's viability.

This report addresses topics raised during that hearing and presents information on (1) DOE's historic pricing policy and practices associated with providing uranium enrichment services, (2) the historical annual enrichment costs and prices, (3) the accumulated profit or loss reported in the enrichment program's financial statements, (4) the implications for recovering DOE's cost of providing enrichment services at the \$135 ceiling price provision contained in the new enrichment services contract, and (5) details on GAO's efforts to obtain information from DOE on the ceiling price provision.



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RESOURCES, COMMUNITY,
AND ECONOMIC DEVELOPMENT
DIVISION

B-207463

The Honorable Richard L. Ottinger
Chairman, Subcommittee on Energy
Conservation and Power
Committee on Energy and Commerce
House of Representatives

Dear Mr. Chairman:

In your letter of March 22, 1984, you expressed interest in obtaining more detailed information on questions raised about the Department of Energy's (DOE's) uranium enrichment program during a recent hearing by your subcommittee¹. You requested that we provide information concerning five topics for use during consideration of DOE's fiscal year 1985 budget request. The topics are:

- DOE's historic pricing policy and practices;
- historical annual separative work unit² costs and prices;
- the accumulated profit or loss reported in the enrichment program's financial statements;
- the implications for recovering DOE's cost of providing enrichment services at the \$135 per separative work unit ceiling price contained in the new enrichment services contract being offered by DOE; and
- details of GAO efforts to obtain information from DOE on the ceiling price.

Information on each of these topics is contained in appendix I.

¹On March 1, 1984, J. Dexter Peach, Director, GAO's Resources, Community, and Economic Development Division testified before the Subcommittee on Energy Conservation and Power, House Committee on Energy and Commerce.

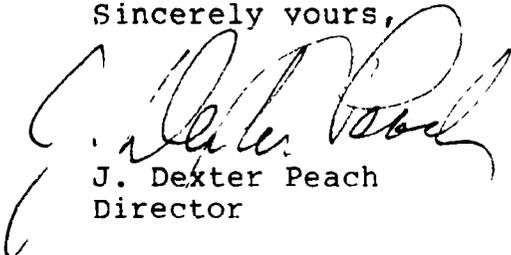
²The capacity of plants used for producing enriched uranium is defined in terms of separative work units. Such units are a measure of the amount of effort expended to separate a given amount of natural uranium into two components--one having a higher concentration of fissionable uranium-235.

In considering this information it is important that it be viewed within the context of the fundamental problems which have developed over the last several years for the uranium enrichment program. The market environment in which DOE's program must operate today is considerably different from the one existing at the time the full-cost recovery requirement for DOE's program was established. The lower prospects for growth in the nuclear power industry coupled with foreign competition and the emergence of a secondary market for enriched uranium are all affecting the program. With prices that in the past few years have been the highest in the world, the program's competitive position has been steadily deteriorating.

As indicated in our testimony some of DOE's initiatives to cope with this situation and stem any further deterioration in the program may conflict with the enrichment program's cost recovery requirement. Consequently, we believe that the executive branch and the Congress together will need to reexamine the fundamental purpose and structure of the uranium enrichment program. Such a reexamination must consider our nation's objective for serving the domestic and international uranium enrichment markets and provide adequate flexibility in pricing policies to allow effective competition with foreign suppliers.

As requested by your office, we did not obtain official agency comments on this report. Unless you publicly announce its contents earlier, we plan no further distribution of this report until 10 days from the date it is issued. At that time, we will send copies to the Director, Office of Management and Budget; the Secretary of Energy; and interested committees and Members of Congress. Copies will also be made available to others upon request.

Sincerely yours,



J. Dexter Peach
Director

GAO'S RESPONSE TO QUESTIONS CONCERNING DOE'S URANIUM
ENRICHMENT PROGRAM RAISED DURING THE MARCH 1, 1984, HEARING
BEFORE THE SUBCOMMITTEE ON ENERGY CONSERVATION AND POWER
HOUSE COMMITTEE ON ENERGY AND COMMERCE

In a letter dated March 22, 1984, the Chairman, Subcommittee on Energy Conservation and Power, House Committee on Energy and Commerce, requested additional information concerning questions raised about the Department of Energy's (DOE's) uranium enrichment program during a recent subcommittee hearing¹. The Chairman asked that we provide information on five topics for use by the subcommittee during its review of DOE's fiscal year 1985 budget request. The topics are:

- DOE's historic pricing policy and practices;
- historical annual separative work unit² costs and prices;
- the accumulated profit or loss reported in the enrichment program's financial statements;
- the implications for recovering DOE's cost of providing enrichment services at the \$135 per separative work unit ceiling price contained in the new enrichment services contract being offered by DOE; and
- details of GAO efforts to obtain information from DOE on the ceiling price.

This appendix includes the objective, scope, and methodology of our work; an overview of DOE's uranium enrichment program; and the information requested by the Chairman. The overview identifies the problems the program has faced during the last few years, explains the actions taken by DOE to cope with the situation, and thus provides a framework within which the information can be evaluated.

¹On March 1, 1984, J. Dexter Peach, Director, GAO's Resources, Community, and Economic Development Division testified before the Subcommittee on Energy Conservation and Power, House Committee on Energy and Commerce.

²The capacity of plants used for producing enriched uranium is defined in terms of separative work units. Such units are a measure of the amount of effort expended to separate a given amount of natural uranium into two components--one having a higher concentration of fissionable uranium-235.

OBJECTIVE, SCOPE, AND METHODOLOGY

The objective of our work was to provide information on the five questions in the Chairman's letter. To provide the specific information requested, we updated information developed earlier in response to a subcommittee request of July 25, 1983. That request asked us to review DOE's new enrichment contract and the enrichment program's costing, pricing, and marketing practices.³

We interviewed program officials at DOE's Office of Uranium Enrichment in Germantown, Maryland, and DOE's Oak Ridge Operations Office in Oak Ridge, Tennessee. We reviewed DOE's annual financial reports for fiscal years 1971 through 1983, DOE's new enrichment services contract, and other DOE documents showing projections of program costs and sales. Additionally, we met with an official from Arthur Andersen & Co., a public accounting firm which has been consulting with DOE on enrichment matters.

We used information contained in DOE's annual financial statements to determine the historical average enrichment costs and prices since fiscal year 1971. We also used information contained in the financial statements to analyze costs associated with DOE's enriched uranium inventory valuation practices. To analyze the effect of the \$135 ceiling price on DOE's ability to recover the government's costs, we used DOE program documents which showed projected future financial statements and information on DOE's pricing practices. We reviewed the Arthur Andersen & Co.'s consultant report⁴ as part of our evaluation of the depreciation and uranium feed accounting modifications. We also considered the Uranium Enrichment Services Criteria in our evaluation of the accounting modifications.

As requested by the subcommittee Chairman's office, we did not obtain official agency comments on the report. Our audit work was primarily carried out during the period August 1983 through April 1984. Except as noted above, we performed our work in accordance with generally accepted government auditing standards.

³DOE's Allocation of Costs for Uranium Enrichment Services, GAO/RCED-84-64, Nov. 15, 1983. Lost DOE Sales to the Secondary Enriched Uranium Market Have Resulted in Reduced Revenues, GAO/RCED-84-76, Jan. 26, 1984.

⁴Report on Accounting and Economic Considerations of the Uranium Enrichment Services Activity, September 1983.

OVERVIEW OF DOE'S URANIUM
ENRICHMENT PROGRAM

Uranium enrichment is a process used to increase the concentration of the fissionable uranium-235 isotope found in natural uranium to the levels required for the uranium to be used in various applications. Since 1969, the federal government--through the former Atomic Energy Commission, the former Energy Research and Development Administration, and now DOE--has operated enrichment plants primarily to enrich customer-owned uranium for use as a fuel in domestic and foreign nuclear power reactors. DOE's plants also provide enriched uranium for research and defense applications.

DOE's existing uranium enrichment capacity consists of three plants located at Paducah, Kentucky; Portsmouth, Ohio; and Oak Ridge, Tennessee. These plants use a uranium enrichment technology known as gaseous diffusion and have the capacity to produce about 27 million separative work units of enriched uranium per year. Currently, DOE estimates that in fiscal year 1984, it will produce about 12 million separative work units and in the future, operate the plants at less than half of their total capacity.

In addition to the three gaseous diffusion enrichment plants, DOE is building a new enrichment facility in Portsmouth, Ohio. The new facility will utilize a different enrichment technology, known as gas centrifuge, which requires significantly less electricity to operate. DOE believes the gas centrifuge facility will be cheaper to operate than the existing gaseous diffusion plants and will, therefore, enable DOE to stabilize its enrichment prices. DOE is also developing two other enrichment technologies--advanced gas centrifuge and atomic vapor laser isotope separation--which, according to DOE, have the potential of reducing enrichment costs and prices to a level substantially below that possible from either the existing gaseous diffusion plants or the gas centrifuge plant now under construction. If successful, DOE expects to utilize one or more of these advanced technologies for producing enriched uranium in the early 1990's.

In providing enrichment services to its customers, DOE is required under section 161(v) of the Atomic Energy Act of 1954, as amended (42 U.S.C. 2201(v)), to price such services so that the government's enrichment costs will be recovered over a "reasonable period of time." The intent of recovering costs over a reasonable period of time is to prevent sharp fluctuations in the prices charged under this program. Ten years was initially established as being a reasonable period and over the years it has been accepted as such by DOE and cognizant congressional committees. Thus, enrichment prices have been adjusted annually by DOE to reflect the projected costs of providing enrichment services over the ensuing 10-year period.

The United States originally held a monopolistic position in the enriched uranium market. However, the market environment in which DOE must compete has changed dramatically over the last several years. Competition from foreign suppliers reduced DOE's share of the foreign market from 100 percent in the mid-1970's to its current level of about 35 percent. Beginning about the same time, reduced consumer demand for electricity and concern over nuclear proliferation, health, and safety issues caused many domestic and foreign nuclear powerplants to be delayed or cancelled. This situation caused many utilities, both foreign and domestic, to be committed to enrichment services they no longer needed and, according to DOE estimates, a worldwide surplus of about 39 million separative work units now exists. This, in turn, has led to the emergence of a secondary market in which utilities holding surplus inventories have been willing to sell to other utilities generally at discounted prices. Some DOE customers have terminated deliveries under their DOE contracts and purchased enriched uranium on the secondary market to take advantage of these discounts.

During the 1980's, DOE's prices for enrichment services, which currently range from \$138.65 to \$149.85 per separative work unit, have generally been the highest in the world. Foreign suppliers reportedly are providing comparable services at prices ranging from \$100 to \$117 per separative work unit and prices on the secondary market are even much lower with some transactions taking place at prices as low as \$90 per unit.

As discussed in our January 1984 report on the secondary market, the changing environment in which DOE's enrichment program has had to operate has led to a deterioration in the U.S. share of the enrichment market. Since 1979, DOE has lost about \$5 billion in enrichment sales. About 70 percent of this loss was due to customers who terminated their contracts with DOE to sign contracts with foreign suppliers. Nearly 30 percent is attributable to customers who terminated in order to take advantage of discounts offered on the secondary market. Furthermore, our report stated that it was quite likely that if current price discounts continue to be offered on the secondary market, DOE could lose an additional \$3 billion in sales through fiscal year 1988.

In order to help curtail the continuing deterioration of its market share, DOE developed and has begun to implement a new strategy for the uranium enrichment program. According to DOE, that strategy includes (1) offering a new contract that is more responsive to customer needs and provides a degree of price stability, (2) reducing the program's costs, and (3) planning to finance future investments by private sector contributions as much as possible.

On January 18, 1984, DOE began offering its new contract to existing and prospective customers. The new contract,⁵ called the utility services contract, contains a number of provisions which DOE officials say will enable it to retain its current customers and obtain new business, thereby strengthening the program's competitive position in the worldwide enrichment market. One of the provisions of the new contract is a guaranteed ceiling price of \$135 per separative work unit. Except for annual adjustments for power costs and inflation, DOE must provide 10 years notice to change the ceiling price. DOE officials believe this price, in conjunction with other contract provisions, will enable DOE to be competitive in the enrichment market.

As discussed in our March 1 testimony, DOE has begun to reduce program costs. Its fiscal year 1985 budget request proposes accomplishing this by reducing production levels, decreasing research and development activities, and deferring construction beyond the first two buildings of the planned eight-building gas centrifuge enrichment plant until after fiscal year 1985. Concerning future program investments, DOE stated in Senate hearings⁶ on its fiscal year 1985 budget request that it planned to present specific recommendations to the Congress on increasing private sector financing in the enrichment program.

Our testimony before the subcommittee also discussed changes DOE had under consideration concerning its accounting for certain program costs (hereafter referred to as accounting modifications). DOE was considering these accounting modifications as a way to reduce its costs so that the enrichment prices could be within the \$135 ceiling contained in the new enrichment contract. We stated that while the changes have a basis in accounting theory and practice, most of them would result in the transfer of enrichment costs currently being recovered from the enrichment customer to the government. Thus, we pointed out that the changes raise questions with regard to the program's cost recovery requirement. Subsequent to the hearing, DOE implemented two of the accounting modifications--a partial write-off of the undepreciated value of

⁵In addition to the new contract, DOE basically has three other contract types--the long-term, fixed-commitment; the adjustable, fixed commitment; and the requirements contracts. Prices under these contracts for fiscal year 1984 are \$138.65 for the two fixed-commitment contracts and \$149.85 for the requirements contracts. For fiscal year 1985 they will be \$153 and \$157, respectively.

⁶On March 22, 1984, DOE's Assistant Secretary for Nuclear Energy testified before the Subcommittee on Energy Research and Development, Senate Committee on Energy and Natural Resources.

the existing enrichment plants and a revaluation of the natural uranium used in the enrichment process--which according to DOE will enable it to stay within the \$135 per separative work unit ceiling price. (The details of these modifications are discussed on pages 15 through 17 of this appendix.)

While DOE believes the accounting modifications are necessary to offer enrichment services at a competitive price given the current market situation, we believe, as stated at the hearing, DOE should have fully disclosed the modifications and their effect to the Congress as they often have in the past. This is particularly important in that the modifications represent major program changes. For example, when the long-term, fixed-commitment contract was introduced in 1973, the Uranium Enrichment Services Criteria⁷ was amended to eliminate a ceiling charge which was not in the new contract. The criteria was also amended in 1979 to permit DOE to recover, through its prices, imputed interest on the natural uranium needed for enrichment services.

Because of the market changes and the constraints imposed by cost recovery pricing in the current market environment, we stated during the hearings that, in addition to fully disclosing the accounting modifications and their effect, a need exists for the executive branch and the Congress to reexamine the fundamental purpose and structure of the uranium enrichment program.

⁷The Atomic Energy Act of 1954, as amended, requires DOE to establish criteria setting forth the terms and conditions under which enrichment services are to be provided. Such terms and conditions are embodied in a document entitled Uranium Enrichment Services Criteria.

GAO RESPONSES TO SUBCOMMITTEE QUESTIONS

Question 1: Please provide for the record a discussion of DOE's historic pricing policy and practices as required by Section 161(v) of the Atomic Energy Act of 1954, as amended.

GAO response

The price DOE charges to enrich customer-owned uranium for use as a fuel in domestic and foreign nuclear power reactors is governed by the Atomic Energy Act of 1954, as amended. In 1964, section 161(v) was added by the Private Ownership of Special Nuclear Materials Act, which allowed customers to own enriched uranium beginning in 1969. Prior to this act, the former Atomic Energy Commission leased enriched uranium to utilities operating nuclear power reactors. Section 161(v) originally required that enrichment prices provide reasonable compensation to the government. It still requires DOE to establish criteria setting forth the terms and conditions under which enrichment services shall be made available and that DOE submit any criteria changes to the Congress for a 45-day review period.

The intent of reasonable compensation was that the charge be based generally upon the cost of doing necessary processing of separative work in the government's diffusion plants. Initially, DOE established pricing criteria designed to recover its costs averaged over a 10-year period. However, in 1970, DOE sought to amend its criteria so that its prices would approximate those charged by a hypothetical commercial enrichment plant. The former congressional Joint Committee on Atomic Energy, however, felt that this would have resulted in DOE making a profit. This concerned the committee because it believed that enrichment prices should not recover more than the government's actual costs. Further, the committee stated that reasonable compensation was based on the fundamental concept that the prices charged should recover appropriate government costs averaged over a period of years to provide a stable pricing situation. The committee felt that "reasonable compensation" was insufficiently specific to reflect this purpose.

To clarify the statutory requirement, the Congress amended the act in 1970 to change "reasonable compensation" to the current requirement that prices for enrichment services be based on the recovery of the government's costs over a reasonable period of time. Thus, even though the wording of section 161(v) has changed, congressional intent--recovery of government costs over a reasonable period of time--has been the same since the inception of the program. DOE has commonly referred to this policy as full cost recovery because the price does not represent a profit or a loss to the government, but rather a recovery of the costs the government has or will incur in providing enrichment services.

The Uranium Enrichment Services Criteria established by DOE sets forth the components of costs that are included in the price of enrichment services. The cost of separative work includes: electric power, other operating costs, depreciation, imputed interest on the unrecovered government investment, and other costs incurred in providing enrichment services like DOE administrative costs and enrichment plant security costs. DOE, as a matter of practice, has determined that 10 years is a reasonable period of time.

The methodology DOE used until recently to establish an enrichment price was to project, for the ensuing 10-year period, (1) the costs for each of the enrichment components plus the cost of DOE's beginning enriched uranium inventory and (2) separative work unit sales and the number of units in the ending enriched uranium inventory. DOE then divided the total projected cost plus cost of beginning inventory by the units of sales plus units in ending inventory for the 10-year period. The result provided an average price per separative work unit which, in the past, was what DOE charged its adjustable, fixed-commitment contract customers. Customers having requirements contracts, which, according to DOE, represented a greater risk to the government because of flexibilities contained in the contract, were charged more than the average price.

With the introduction of the new utility services contract in January 1984, coupled with the \$135 per separative work unit ceiling price, DOE now believes the U.S. position in the worldwide enrichment market will be strengthened. Basically, rather than computing an average price, DOE has decided to reduce costs for pricing purposes to the ceiling price level by making two accounting modifications which are discussed on pages 15 through 17. Additionally, DOE now believes those customers not converting to the new contract are more likely to cancel their requirements and adjustable, fixed-commitment contracts and therefore represent a risk to DOE. Thus, DOE will charge these customers \$22 and \$18 more, respectively, than the \$135 unit ceiling price. We did not evaluate the basis or reasonableness of these additional charges.

Question 2: Mr. Peach's testimony indicated that the new utility services contract offers a ceiling price for uranium enrichment services that is considerably lower than DOE's current full costs of providing these services. Please provide the historical total costs and prices by year for the uranium enrichment program beginning with the program's fiscal year 1971 financial statements. Include in your answer a discussion of DOE's statement that it currently costs \$100 per separative work unit to produce enriched uranium, with the remainder of the price comprising "paper" costs.

GAO response

In accordance with section 161(v) of the Atomic Energy Act of 1954, as amended, DOE established the Uranium Enrichment Services Criteria which identify the cost components to be recovered through the uranium enrichment services price. The components can generally be categorized as either production or nonproduction costs. Production costs include electric power, direct labor, depreciation of the enrichment plants and equipment, and other costs directly related to the production of enriched uranium. Nonproduction costs include imputed interest⁸ on the government's investment and other indirect program operating costs such as the costs for DOE administration and research and development activities. Together, production and nonproduction costs comprise DOE's total cost of providing enrichment services. Any proposed changes to the criteria must be submitted, for a period up to 45 days, to those congressional committees having jurisdiction over DOE's uranium enrichment program. It should be noted, however, that the act and its legislative history are very general as to what specific actions necessitate a criteria change.

The following table shows DOE's annual separative work unit production and nonproduction costs since 1971. These costs are added together to show the total annual costs of providing a separative work unit which can then be compared with the average annual selling price per unit.

⁸GAO has long supported the inclusion of imputed interest as a cost of government-funded programs engaged in the performance of services or sales of property outside the government (Title 2, subsection 16.8(e) of GAO's Policy and Procedures Manual for Guidance of Federal Agencies). Imputed interest is an interest cost assigned to a particular in-house government investment alternative representing the cost of U.S. Treasury borrowings. Actual interest expenditures may not be incurred by the individual agency undertaking the activity. However, since the money used in the activity is not available to the Treasury for alternative programs, the Treasury resorts to borrowed funds and, in the process, incurs an interest expense.

Annual Comparison of Total
Separative Work Unit Costs and Average Selling Prices

<u>Fiscal year</u>	<u>Production costs</u>	<u>Nonproduction costs</u>	<u>Total costs^a</u>	<u>Average selling prices^b</u>
	------(per separative work unit)-----			
1971	\$ 23.61	\$ 10.40	\$ 34.01	\$ 26.71
1972	24.79	6.52	31.31	30.49
1973	24.46	7.29	31.75	32.53
1974	27.01	10.04	37.06	36.99
1975	34.10	10.08	44.17	46.36
1976	42.65	11.74	54.39	60.30
1977	46.60	14.83	61.44	68.23
1978	55.64	45.87	101.51	84.29
1979	60.32	40.65	100.97	95.60
1980	70.41	68.27	138.68	120.58
1981	86.98	100.80	187.78	112.81
1982	101.70	72.96	174.65	135.39
1983	98.90	82.89	181.79	143.90
Average	\$ 54.19	\$ 36.44	\$ 90.63	\$ 84.89

^aAmounts may not total due to rounding.

^bThese prices were calculated by dividing the total revenue from the sale of separative work by the total separative work units sold in each year. The prices differ from DOE's published prices because in a given year (1) DOE's actual prices may have changed, and (2) DOE had more than one contract in effect, each having a different price.

Source: Prepared by GAO using DOE's annual Uranium Enrichment Program Financial Statements.

The table shows that, on a per-separative-work-unit basis, DOE's total costs of providing enriched uranium for 9 of the 13 years since fiscal year 1971 were higher than the average selling price. This situation was particularly apparent during the last 3 years, when the average costs were almost 40 percent higher than the selling prices.

The table is also useful in addressing DOE's comment that it currently costs \$100 per separative work unit to produce enriched uranium with the remainder of the ceiling price (\$35) comprising "paper" costs. With regard to production costs the table shows that it cost about \$100 per unit (\$98.90) to produce enriched uranium in fiscal year 1983. However, the nonproduction costs (which DOE apparently considers "paper" costs) for 1983 of \$82.89 exceed the \$35 figure cited by DOE.

Question 3: If the response to Question 2 indicates that historically the average total costs per unit produced has exceeded the average sale prices of units sold during each of those years, why do the financial statements for this program continue to show no significant losses in the accumulated profit or loss for this program?

GAO response

The table used for responding to Question 2 (see p. 10) shows the total cost and average price for a separative work unit for each of the years between 1971 and 1983. The table also shows that for the 13-year period the average total cost was \$90.63 and the average price was \$84.89. On the basis of this information, it would seem likely that DOE has not recovered all of its enrichment costs through the prices charged and that its financial statements would show an accumulated loss. However, DOE's financial statements for fiscal year 1983 show an accumulated profit of about \$37 million. Our review of the program's past financial statements shows that DOE's method of valuing its enriched uranium inventory contributes to this apparent anomaly.

A number of different inventory valuation methods are recognized by generally accepted accounting principles. DOE uses one of these, known as the weighted-average cost method, for valuing its enriched uranium inventory. Under this method, DOE divides the total cost of beginning inventory plus current-year production costs by the total number of separative work units included in these two categories. Since, historically, current-year production costs have been higher than the costs associated with beginning inventory, this method has reduced the value placed by DOE on the cost of units sold. Because this method combines the higher costs of current production with lower past production costs, some current costs are included in DOE's ending enriched uranium inventory and represent costs that are yet to be recovered. The following example uses data contained in DOE's fiscal year 1983 financial statements to illustrate the effect of the weighted-average cost method.

Computation Showing DOE's Financial Statement
Valuation of Separative Work Units Available for Sale

	<u>Number of separative work units</u>	<u>Total production cost</u>	<u>Average production cost per separative work unit</u>
	----- (thousands) -----		
Beginning inventory for fiscal year 1983	24,544	\$1,762,237	\$ 71.80
Fiscal year 1983 production	<u>10,486</u>	<u>1,037,077</u>	\$ 98.90
Separative work units available for sale	<u>35,040^a</u>	<u>\$2,799,314</u>	<u>\$ 79.89</u>

^aThis will not total because the separative work units available for sale include 10,000 units that DOE acquired without associated production costs as part of a contract termination with one of its customers.

Source: Prepared by GAO using DOE's fiscal year 1983 Uranium Enrichment Program Financial Statements.

As the table shows, DOE's use of this method allowed it, in fiscal year 1983, to value the production costs of units sold at \$79.89 while the current cost of units produced in that year was \$98.90. In the financial statements, the \$79.89 cost of units sold figure was used to calculate the program's profit or loss instead of the higher current year cost of \$98.90.

Question 4: GAO raised questions about the guaranteed \$135 ceiling price contained in DOE's new contract. Please discuss DOE's latest price calculations, the proposed changes currently under consideration with regard to depreciation and cost of uranium feed, and whether or not such changes require submission to Congress for review prior to implementation. Please evaluate the effect of the \$135 ceiling price on the government's ability to recover its costs over a 10-year accounting period, and identify any uncertainties or insufficiencies which may exist in the data required to perform these calculations.

GAO response

The following sections discuss DOE's latest price calculation, the accounting modifications DOE recently made to reduce the separative work unit price to \$135, failure to disclose these changes to the Congress prior to their implementation, the impact of the ceiling price on DOE's ability to recover its costs over a reasonable period of time, and our observations about the adequacy of DOE's data in this area.

DOE's latest enrichment price calculation

DOE's latest price is derived from a base calculation for fiscal year 1985 which reflects enrichment cost and demand projections for the 10-year period from fiscal year 1985 through fiscal year 1994. DOE's base calculation per separative work unit is \$161.91. Since DOE only recently provided us with information concerning how it made this base calculation and how the accounting modifications discussed on page 15 through 17 reduce that base to the \$135 ceiling price, we have not determined the sufficiency of the data used. We have listed the cost components of this calculation in the following table.

Components of DOE's 10-Year Enrichment Costs
(Fiscal Year 1985 through Fiscal Year 1994)

	(billions)	(per separative work unit)
Electric power	\$ 9.982	\$ 52.20
Other operating costs	3.642	19.05
Depreciation	2.005	10.49
Imputed interest	10.862 ^a	56.80
All other costs	<u>4.469</u>	<u>23.37</u>
Total	<u>\$30.960</u>	<u>\$161.91</u>

^aBased on a 10-1/2 percent interest rate.

DOE calculated the \$161.91 base per separative work unit by dividing total projected enrichment costs of \$30.96 billion by

191.22 million separative work units in projected sales and ending enriched uranium inventory.

In developing its 10-year demand forecast for the fiscal year 1985 base calculation DOE made several assumptions about the new contract and the secondary enriched uranium market. DOE assumed that 75 percent of its current customers would convert to the new contract, but that these customers would buy only the minimum amount required from DOE, or 70 percent of their annual enrichment needs. DOE assumed that the remaining 30 percent of each customer's annual requirements would be met from secondary market purchases, foreign sources, or the customer's own excess inventories. DOE also assumed that the 25 percent of its customers that do not convert to the new contract would cancel their deliveries of DOE enriched uranium and buy on the secondary market, from foreign sources, or use their own excess inventories.

In addition to the demand aspect of the \$161.91 base calculation, DOE considered the following changes in computing it:

- DOE plans to change the operating mode of the diffusion plants, beginning in fiscal year 1985, to use larger amounts of natural uranium feed and lesser amounts of more costly electric power. Since a given quantity of enriched uranium can be produced by using different combinations of natural uranium feed and electric power, DOE can change its production operations to use more of one and less of the other. According to DOE, by using more of its stockpiled natural uranium feed and less power, production costs can be lowered and the price of DOE enrichment services reduced. Furthermore, because no cash outlays would be required to obtain the already stockpiled natural uranium feed, this operational change could also, in the short term, improve the program's cash flow by reducing cash outlays for power.
- DOE has accelerated the initial production date for the new gas centrifuge plant currently under construction from 1988 to 1986. The price calculation assumes the plant will be a four-building advanced gas centrifuge facility using more efficient centrifuge machines, known as Set V machines, costing about \$6.5 billion instead of the \$7.4 billion once planned for an eight-building facility using less efficient Set IV centrifuge machines.
- DOE is currently doing research and development work on the advanced gas centrifuge and atomic vapor laser isotope separation technology. DOE plans to select one of these technologies in 1985, about 2 years earlier than previously planned. If DOE does this, it could reduce the amount of

research and development costs now included in the price of enrichment services. The earlier fiscal year 1985 selection, for example, is expected to reduce research and development costs in that year by about \$39 million. Depending on which technology is selected, additional portions of the \$981-million research and development expenditure once planned for the next 10-year period, and included in the current enrichment price, may be eliminated.

Accounting modifications

At the time of the March 1, 1984, hearing, DOE was considering two accounting modifications--depreciation and natural uranium inventory valuation--to reduce its enrichment costs to stay within the \$135 per separative work unit ceiling price. However, DOE had not provided us with an official explanation of how it planned to provide enrichment services at or below the \$135 ceiling price and still recover its enrichment costs. On April 4, 1984, DOE stated that the Assistant Secretary for Nuclear Energy had approved the modifications and provided us with an official explanation of how they would be used to reduce enrichment costs to the \$135 ceiling price.

Depreciation

DOE has invested a total of \$3.9 billion in its existing enrichment facilities. By the end of fiscal year 1983, DOE had depreciated \$1.9 billion, and \$2 billion remained to be depreciated. Of the \$2 billion in undepreciated assets, \$1.5 billion represents the cost of improvements DOE made to the gaseous diffusion plants to make them more efficient for commercial customers. Depending on the facility components involved, DOE estimates indicate that the remaining value will be fully depreciated between the years 2000 and 2020.

DOE currently depreciates the diffusion plants using the straight-line method. This method essentially allocates the depreciation expense equally over the useful life of the plant and equipment. DOE treats its yearly depreciation expense as part of the total cost for providing enrichment services and, as such, as a cost that must be recovered through the enrichment price.

Although DOE plans to continue using the straight-line method to depreciate the gaseous diffusion plants, it is now reducing the amount of depreciation costs to be recovered through the enrichment price. For the 10-year pricing period fiscal years 1985-94, DOE will be charging only about 40 percent of its annual depreciation expense to the total cost of providing its enrichment services, rather than 100 percent as it does now. Thus, the net

effect is that the remaining 60 percent of the unrecovered government investment, or \$1.2 billion, plus associated imputed interest will not be recovered. DOE estimates that this modification reduced the \$161.91 base calculation by about \$10 per separative work unit.

DOE's rationale for excluding these depreciation costs is that it is only obligated to recover "appropriate" depreciation. Since the plants are currently operating at about 40 percent of their full capacity and DOE expects them to operate on an average of about 40 percent during the 10-year pricing period, DOE believes it should include only that portion of the total depreciation expense in the price. We note that there are other ways of adjusting the depreciation of an asset having excess capacity. An alternative would be to base the adjustment on the plant and equipment which is presently idle. DOE information indicates that in fiscal year 1983, 74 percent of the plant and equipment was used to operate at about 40 percent of capacity. Thus, the amount of depreciation remaining to be recovered under this method would be about \$1.48 billion (74 percent of \$2 billion), rather than the \$800 million (40 percent of \$2 billion) DOE currently plans to recover.

Although DOE has made adjustments to the amount of plant and equipment to be depreciated, it has not adjusted the useful service life of the remaining assets to reflect the introduction of advanced enrichment technologies and planned production levels. Since these technologies are likely to make the existing gaseous diffusion plants obsolete before they are fully depreciated, a shortened depreciation period may be more appropriate. While this would have the effect of increasing DOE's enrichment cost and probably its price, it would better match the remaining cost of the assets with the revenues to be generated from their use.

Uranium feed inventory revaluation

The second modification DOE is making is to revalue its uranium feed inventory in calculating its price. As of September 30, 1983, DOE had a uranium feed inventory valued at about \$1.6 billion based on acquisition cost. Since 1977, DOE has been valuing this inventory at the average current market price for enrichment pricing purposes. On April 4, 1984, DOE announced a change in its basis for valuing the uranium inventory for pricing purposes from the current market price to its acquisition cost. According to DOE, the current market price is about \$40 per pound, while its acquisition cost is about \$9 per pound.

By valuing the uranium feed inventory at the lower cost, DOE is also able to reduce its direct production costs. Since the enrichment plants can use different combinations of electric power and uranium feed to produce enriched uranium, DOE will for the

immediate future, be able to use more of the less costly uranium feed inventory and less of the expensive electric power. As discussed earlier, the change in the value of the feed inventory plus associated imputed interest will enable DOE to reduce its costs of producing enriched uranium. According to DOE, this modification will reduce the \$161.91 base calculation by about \$17 per separative work unit. (This \$17 reduction along with the \$10 depreciation reduction discussed on page 15, combine to reduce the \$161.91 base calculation to the \$135 ceiling price.)

DOE's revaluation of its natural uranium inventory relates to sections 63 and 161(m) of the Atomic Energy Act of 1954, as amended. These sections require the selling price or value for uranium feed to (1) provide reasonable compensation to the government and (2) not discourage the development of private sources of supply. In a November 18, 1977, report,⁹ we said that to provide reasonable compensation to the government, uranium should be valued at the market price existing at the time it is sold. We recommended that the government gradually increase the price of all uranium sold from its stockpile until it equaled the current market price, and that the price be reviewed periodically to keep it in line with the market price. We also stated that it may become necessary for the government to replace this material to meet future military and research needs and that there may be a difference between what DOE is receiving for its uranium and what it might have to pay to replace it. Documents provided by DOE indicate that it will have to replace its feed inventory in the early 1990s. The cost of uranium at that time will probably be higher than the \$9 per pound acquisition cost DOE now plans to value it at, given that the current market price is about \$40 per pound.

Prior congressional review of accounting modifications

The Atomic Energy Act of 1954, as amended, requires DOE to establish criteria setting forth the terms and conditions under which enrichment services are to be provided. The act also states that any proposed changes to the criteria must be submitted, for a period up to 45 days, to those congressional committees having jurisdiction over DOE's uranium enrichment program. This requirement provides the Congress with additional oversight concerning the circumstances under which DOE provides enrichment services, and allows the Congress time to review and comment on proposed changes.

⁹Uranium Enrichment Policies and Operations: Status and Future Needs, EMD-77-64, Nov. 18, 1977.

In the past, DOE has notified the Congress of such changes. For example, as discussed on p. 6, when DOE offered it long-term, fixed-commitment contract in 1973, the criteria was changed to eliminate the ceiling price because the new contract did not have one. Another example is the criteria change made in 1979 which allowed DOE to recover, through its price, imputed interest on natural uranium inventories needed to provide enrichment services.

In the current instance DOE believes that the two accounting modifications it made do not require revisions to either the law or the criteria. In the case of the depreciation write-off, the criteria state that the cost of separative work to be recovered in the price should include the "appropriate" depreciation of enrichment plants. Since 1975, DOE has included 100 percent of its annual depreciation expense as a cost of separative work in its price calculations. While in a strict legal sense DOE could argue that it has the latitude to redefine "appropriate" depreciation costs as a mechanism to lower its enrichment price, we believe that major program changes, particularly those which involve the writing off of the government's capital assets, would warrant full disclosure to the Congress including information on the effects such changes would have on the unrecovered government investment in the enrichment program.

DOE's revaluing of its uranium feed at its acquisition cost in effect, redefines what is reasonable compensation to the government. As with the depreciation modification, "reasonable compensation" is not clearly defined in the Atomic Energy Act of 1954, as amended. As such, from a legal standpoint, DOE again could argue that it has sufficient latitude to make this change without seeking prior congressional approval or input. However, we believe that DOE should have fully disclosed this modification and its effect to the Congress as it has done with other major program changes in the past.

A \$135 ceiling price may cause an enrichment program shortfall

At the time of the hearing, DOE had not provided us or the Congress with sufficient information to properly evaluate its ability to recover the government's enrichment costs given the \$135 per separative work unit ceiling price. However, we testified that the ceiling price could hinder DOE's ability to satisfy the program's requirement for recovering its enrichment costs over a reasonable period of time because DOE's current costs are substantially greater than the ceiling price (see discussion on p. 9) and because DOE could not explain how the ceiling prices would recover its costs. As discussed earlier, the methodology DOE used until recently to establish an enrichment price was basically to

project, for the ensuing 10-year period, the costs of providing enrichment services and divide this by its projected sales for the period.

As indicated earlier, since the hearing, DOE implemented two accounting modifications to reduce its costs to a level that it believes will permit it to operate within the \$135 ceiling price. However, information provided by DOE program officials, which assumes these modifications have been made, indicates that DOE will not recover its costs over the 10-year pricing period. The information shows a projected accumulated program loss of about \$3.3 billion in 1994 at the end of the 10-year pricing period, and a breakeven point in 2017.

Question 5: Mr. Peach states in his testimony that DOE has been unable to provide us (GAO) with an explanation as to how the \$135 per separative work unit ceiling price will permit recovery of its costs. Please detail the efforts made by GAO to produce such information from DOE.

GAO response

On December 20, 1983, DOE released a draft of a new uranium enrichment services contract for comment. Our review of that draft revealed that the contract had a ceiling price of \$135 per separative work unit, even though the then current enrichment price was higher. Since DOE's enrichment prices traditionally have been calculated from the projection of enrichment costs and sales over the ensuing 10-year period, we asked DOE for the documentation supporting the new ceiling price contained in the draft contract. DOE told us that the backup documentation could not be provided until the contract was in final form.

DOE offered the new contract in final form on January 18, 1984. At that time, we again requested the information, but DOE stated it was part of the fiscal year 1985 budget request which had not been submitted to or approved by the Office of Management and Budget. Without such approval, DOE did not believe we had a right to see such information. On February 6, 1984, DOE's budget request was released but DOE still would not provide us with documentation supporting the new ceiling price. DOE stated that, in order to stay within the contract ceiling price, it was now considering modifying the way the program accounted for costs. On February 16, 1984, we again requested documentation of the ceiling price but were told that the accounting modifications were still under consideration and had not yet been approved by DOE's Assistant Secretary for Nuclear Energy. As such, during the subcommittee's March 1, 1984, hearing, we reported on our inability to obtain the information necessary to comment on the viability of DOE's new contract price. After the March 1 hearing, we continued to request this information from DOE but were not

provided it until DOE publicly released its fiscal year 1985 enrichment prices on April 4, 1984.

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