

July 1988

# NUCLEAR WASTE

## DOE Should Base Disposal Fee Assessment on Realistic Inflation Rate



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United States  
General Accounting Office  
Washington, D.C. 20548

Resources, Community, and  
Economic Development Division

B-202377

July 22, 1988

The Honorable John S. Herrington  
The Secretary of Energy

Dear Mr. Secretary:

As a part of our fifth annual audit of the Department of Energy's (DOE) efforts to implement the Nuclear Waste Policy Act of 1982 (NWPA), as amended (42 U.S.C. 10101), we are reviewing DOE's annual assessment of the fee charged electric utilities to pay for the cost of the nuclear waste disposal program. A report on our overall findings will be issued to the Congress next year. We believe, however, that there is one aspect of DOE's assessment—the treatment of inflation in assessing fee adequacy—that warrants your early attention in conjunction with the upcoming 1988 assessment.

## Results in Brief

As required by the NWPA, DOE is to annually determine whether the waste disposal fee will produce sufficient revenues to offset the total estimated costs of the waste disposal program. In its June 1987 assessment report, in which it analyzed inflation rates of 0 to 4 percent, DOE recommended that the fee remain unchanged even though its analysis showed that at an inflation rate of 4 percent, which is in line with both the historic and forecast rates for 25-year periods, the current fee would result in end-of-program deficits in 2085. These deficits range from \$21 billion to \$76 billion (1986 dollars), depending on the scenario used.<sup>1</sup> Thus, had DOE based its fee adequacy determination on the 4 percent inflation rate, as we believe it should have, DOE would have had to propose a fee increase to the Congress to ensure that revenues would cover program costs.

The 1988 assessment will include revised cost estimates resulting from program changes called for by the 1987 amendments to NWPA. Although uncertainties about program costs remain, taken together, the changes are expected to reduce total costs. Thus, DOE may be able to begin using a realistic inflation rate in determining fee adequacy in 1988 without proposing a major fee increase. Accordingly, this is an opportune time

<sup>1</sup> Although DOE analyzed other scenarios, the scenarios discussed in this report are limited to the two-repository system authorized by the 1982 act (see subsequent discussion). For a detailed discussion of the various scenarios analyzed, see Nuclear Waste: A Look at Current Use of Funds and Cost Estimates for the Future (GAO/RCED-87-121, Aug. 31, 1987).

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for DOE, as we recommend in this report, to begin using a realistic inflation rate estimate in determining the fee needed to produce sufficient revenues to recover total program costs.

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## Background

NWPA established a comprehensive national program for the permanent disposal of nuclear waste in underground repositories. The waste is being temporarily stored at the nuclear reactor sites. The act required DOE to develop, site, construct, and operate one repository and to select a site for a second repository. In accordance with the act, in May 1986 DOE recommended, and the President approved, the selection of three sites as candidates for the first repository. Prior to December 22, 1987, when the Nuclear Waste Policy Amendments Act of 1987 was enacted, DOE was preparing geologic study (site characterization) plans for the three first repository site candidates and proceeding with the process of selecting a site for a second repository.<sup>2</sup>

The 1987 amendments significantly altered the waste disposal program. Although some changes will increase costs, overall the changes called for by the amendments are expected to decrease total costs. Among other things, the amendments directed DOE to characterize only the Yucca Mountain, Nevada, repository site candidate and postpone action to identify a second repository for about 20 years. According to a DOE preliminary estimate, the 1987 amendments could result in savings of about \$8 billion.

To finance the program, NWPA established a Nuclear Waste Fund, composed of payments made by generators and owners of nuclear waste, which will ensure that the costs of carrying out the activities of waste disposal are borne by the persons responsible for generating the waste. Under various assumptions, DOE's 1987 estimates of total program costs through decommissioning of the repositories in 2085 range from \$27.5 billion to \$35.7 billion (1986 dollars).

NWPA established the fee that commercial generators of nuclear waste are to pay into the Nuclear Waste Fund at 1 mill (one-tenth of a cent) per kilowatt hour (kwh) of electricity generated. The act, however, requires DOE to annually review the fee to determine whether it is adequate to recover all program costs. If, based on its assessment, DOE determines that the fee is too high or too low, it is to propose a revised

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<sup>2</sup>The amendments were contained within the Budget Reconciliation Act for fiscal year 1988 (Public Law 100-203).

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fee and immediately transmit the proposal to the Congress. The proposed fee would be effective after a period of 90 days unless either House of Congress disapproves it.<sup>3</sup>

DOE's Office of Civilian Radioactive Waste Management (OCRWM) administers the nuclear waste management program and is responsible for making the annual assessments of the waste disposal fee. In the 5 years since NWPA was enacted, OCRWM has not proposed a revised fee to the Congress.

In making our review, we interviewed OCRWM officials and reviewed the (1) annual assessment reports issued by OCRWM and (2) the contractor studies done in conjunction with OCRWM's assessments.

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## A Realistic Inflation Estimate Should Be Used in Assessing Fee

OCRWM's annual determination as to whether the fee collected from commercial generators of nuclear waste is adequate to cover the cost of the nuclear waste disposal program should be based on, among other things, realistic estimates of inflation. Although OCRWM, in its June 1987 assessment of fee adequacy, concluded that the 1 mill fee was adequate, supporting analyses showed that the fee was adequate only when inflation was assumed to be 0 percent or, in cases involving the least costly repositories, did not exceed 2 percent. Moreover, OCRWM's analyses showed that at an average annual inflation rate of 4 percent (the highest inflation rate OCRWM tested) the 1 mill fee per kwh would result in end-of-program fund deficits for even the least expensive repository combinations analyzed.

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## DOE's Treatment of Inflation Has Changed

We believe that a program cost estimate that includes a provision for price changes based on a realistic estimate of inflation should be used by OCRWM in a base case to determine fee adequacy. In its first annual assessment made pursuant to the NWPA, DOE used such a base case in reaching a conclusion about the adequacy of the fee.<sup>4</sup> The first assessment used a base case that assumed an inflation rate of 3 percent in estimating projected costs and a nominal interest rate of 5 percent in

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<sup>3</sup>The Supreme Court found unconstitutional other legislation providing a similar congressional disapproval mechanism. In that instance, the Court removed the disapproval mechanism from the act. See *Immigration and Naturalization Service v. Chadha*, 462 U.S. 919 (1983).

<sup>4</sup>See *Report on Financing the Disposal of Commercial Spent Nuclear Fuel and Processed High-Level Radioactive Waste* (DOE/S-0020/1, July 1983).

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projecting interest earnings on fund balances. On this basis, DOE projected that the 1 mill fee would produce an end-of-program fund balance of \$2.5 billion (1982 dollars).

Subsequently, however, OCRWM revised the way it treats inflation in determining whether the fee is adequate. In projecting end-of-program fund balances, OCRWM now begins with a real interest rate projection of 3 percent—the difference between projected inflation and nominal interest rates—to estimate real interest earnings, and uninflated constant-year dollars (or 0 percent inflation rate) to estimate costs. OCRWM also uses inflation rates of 2 and 4 percent along with the real interest rate of 3 percent to project fund balances.

Although the findings and conclusions presented in OCRWM's latest assessment report appear to rely heavily on the analysis using 0 percent inflation and 3 percent real interest rates, OCRWM officials told us that this was not considered to be a base case. Instead, they said that they analyzed inflation rates of 2, 3, and 4 percent coupled with real interest rates of 1 and 3 percent to determine when it would be necessary for OCRWM to begin indexing the fee to inflation. They said that the use of various inflation and interest rate scenarios make up an "envelope of cases" upon which OCRWM's fee adequacy determination is made.

In its latest assessment report, OCRWM recommended that the fee remain at 1 mill per  $k_{wh}$  for 1987. OCRWM made the recommendation on the basis of its conclusion that no immediate increase was needed to ensure that revenues from fees plus interest earned on fund balances will be sufficient to offset estimated program costs.<sup>5</sup> One of the principal findings cited in support of this conclusion—that the margin of revenues over costs varied among the cases analyzed, with some showing the fee as adequate and others showing the fee producing substantial margins—was based on analyses that assumed a 0 inflation rate. As discussed below, however, OCRWM's analysis showed that the fee would result in fund deficits at a 4 percent inflation rate.

OCRWM's analyses testing the sensitivity of its fund balance projections to inflation rates of 0, 2, and 4 percent show that the fund balance projections are extremely sensitive to variations in the assumed inflation rate. Assuming 0 percent inflation, OCRWM's analysis showed that the

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<sup>5</sup>See Nuclear Waste Fund Fee Adequacy: An Assessment (DOE/RW-0020, June 1987).

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1 mill fee would result in end-of-program fund balance surpluses ranging from \$9 billion to \$111 billion (1986 dollars), depending on the scenario used. At a 2 percent inflation rate, the fee would result in balances ranging from a deficit of \$42 billion to a surplus of \$31 billion. At a 4 percent inflation rate the fee would result in fund deficits ranging from \$21 billion to \$76 billion.

On the basis of both historical averages and long-range forecasts, we believe that the 4 percent inflation rate is more realistic than the others OCRWM used. For example, the annual inflation rate for the 25-year period ending in 1986, as measured by the Gross National Product Deflator, averaged 5.3 percent, while interest yields on 3-year and 10-year federal government securities averaged 7.5 and 7.7 percent, respectively. Also, one major economic forecasting firm, Wharton Econometrics, estimates that the annual inflation rate will average between 4.3 and 5.1 percent for the 25-year period from 1986 to 2011 and another, Data Resources Inc., estimates the rate will average between 4.1 and 6.8 percent for the 25-year period from 1987 to 2012. According to an OCRWM official commenting on a draft of this report, it should be pointed out that the inflation rate averaged only 3.7 percent over the 1929-87 period.

OCRWM concluded from its analyses that the fee would need to be increased at a later date for some scenarios if inflation continues at a rate as low as 2 percent. OCRWM suggested that automatically adjusting the fee by indexing it to the rate of inflation could provide a means of avoiding a fund balance deficit.<sup>6</sup> Using inflation rates of 2, 3, and 4 percent, OCRWM analyzed when it would be necessary to begin indexing the fee to ensure full cost recovery. According to its analysis, if inflation averages either 2 or 3 percent a year, the fee would not have to be increased for certain low-cost scenarios. For other scenarios, the fee would have to be indexed beginning as early as 1988 and as late as 2003. At a 4 percent inflation rate, the fee would have to be indexed between 1988 and 2004 for all scenarios used.

In our opinion, the Congress will have to amend the NWPA before OCRWM could implement an indexing system that would adjust the fee without the annual congressional review process required by the NWPA. The NWPA currently requires OCRWM to propose an adjustment to the fee when it

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<sup>6</sup>For a detailed discussion of how an inflation-indexed fee could help achieve adequate program financing, see *Nuclear Waste Disposal: Achieving Adequate Financing*, Congressional Budget Office (August 1984).

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determines that one is warranted and to submit its proposal to the Congress; the proposed fee does not become effective, by law, for another 90 days.

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## Conclusions

The NWPA requires OCRWM to annually assess whether the fee prescribed by the 1982 act, as amended, will provide sufficient revenues to cover the cost of the nuclear waste management program. To do this effectively requires the use of realistic estimates of inflation to project program costs. Although OCRWM analyzed the potential effects of various rates of inflation upon fee adequacy and discussed the results of its analyses in its most recent assessment report, the report showed that the 1 mill fee will produce sufficient revenues to cover costs for all scenarios that were used only when a 0 percent inflation rate is assumed. OCRWM's analyses showed that an inflation rate of 4 percent would result in end-of-program deficits ranging from \$21 billion to \$76 billion (1986 dollars), depending on the scenario used. The 4 percent inflation rate, the highest used by OCRWM in its analyses, is below both the actual average for the last 25 years and that forecast for the next 25 years by two major economic forecasting firms.

In its latest assessment, OCRWM recognized that the fee would have to be increased if inflation continued, and suggested that the fee could be adjusted automatically by indexing it to inflation. Although the fee could be indexed to inflation, current legislation would preclude a fee change without the 90-day congressional review process.

We believe that OCRWM should compare projected revenues with projected costs that are developed using a realistic inflation rate estimate. The sensitivity of OCRWM's projections to inflation could continue to be tested by using inflation rates that are both above and below the inflation rate used in the base case. Also, if the Congress authorizes an indexing system, the base case inflation estimate could be used to determine when the system should be implemented.

Using realistic inflation estimates is important to help ensure that the costs of disposing of the waste are borne by the persons responsible for its generation. If current fees are set too low because costs are underestimated, OCRWM loses the opportunity to ensure that current users of nuclear generated electricity pay their fair share of the cost of the program.

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In making this year's assessment, OCRWM will be recognizing a number of program changes called for by the 1987 amendments to NWPA. Although considerable uncertainties about program costs remain, taken together, the changes called for by the 1987 amendments are expected to result in a decrease in total program costs. Thus, we believe that this is an opportune time for OCRWM to revise its assessment methodology to use a realistic base case inflation estimate because OCRWM may be able to do so without having to propose a major increase to the 1 mill per kwh fee.

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## Recommendation

We recommend that the Secretary of Energy use a realistic base case inflation rate estimate in determining the waste disposal fee needed to produce sufficient revenues to recover total program costs.

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## Comments of Agency Officials and Our Evaluation

In an April 8, 1988, meeting and in subsequent discussions, OCRWM officials expressed disagreement with our recommendation. In their opinion, the current method of analyzing several different inflation rates to determine if and when an indexing system should be implemented is more appropriate because of the considerable uncertainties in the program, one of which is inflation. (See app. I for a more detailed discussion of the officials' comments.)

We believe that legislative authorization will be required to implement an indexing system that would adjust the fee without the congressional review process called for by the NWPA. Absent such authority, judging whether the fee is too high or too low should depend on the projected end-of-program fund balance, with a negative balance indicating that the fee is inadequate. In our opinion, projecting end-of-program fund balances could be best done by comparing projected revenues with projected program costs that are developed using a realistic inflation estimate.

Agency officials also said that should OCRWM determine at some point that an indexing system was appropriate, it would obtain authorization by seeking congressional approval through the annual assessment process as required by the NWPA. We believe that to implement the type of indexing system being proposed by the officials would require amending the NWPA.

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This work was done under the general direction of Keith O. Fultz, Senior Associate Director. Other major contributors to this report are listed in

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appendix II. We are sending copies of this report to congressional committees with oversight of DOE's nuclear waste activities and other interested parties. As you know, 31 U.S.C. 720 requires the head of a federal agency to submit a written statement on actions taken on our recommendations to the Senate Committee on Governmental Affairs and the House Committee on Government Operations not later than 60 days after the date of the report and to the House and Senate Committees on Appropriations with the agency's first request for appropriations made more than 60 days after the date of the report.

Sincerely yours,

A handwritten signature in cursive script that reads "J. Dexter Peach". The signature is written in black ink and is positioned above the printed name and title.

J. Dexter Peach  
Assistant Comptroller General

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## Abbreviations

DOE	Department of Energy
GAO	General Accounting Office
kwh	kilowatt hour
NWPA	Nuclear Waste Policy Act
OCRWM	Office of Civilian Radioactive Waste Management

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# Comments of Agency Officials and Our Evaluation

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In an April 8, 1988, meeting and in subsequent discussions, OCRWM officials commented on a draft of this report and told us that, in their opinion, the draft report did not accurately characterize OCRWM's methodology. In particular, they said that our draft report incorrectly stated that OCRWM's conclusion on fee adequacy relied on a base case that assumed a 0 inflation rate. While acknowledging that its assessment report could lead to this interpretation, the officials said that in practice OCRWM's conclusion was based on an "envelope of cases" which included inflation rates of 2, 3, and 4 percent and real interest rates of 1 and 3 percent to determine when it would be necessary for OCRWM to begin indexing the fee to inflation to ensure full recovery of program costs. Thus, they said that our draft report did not adequately recognize OCRWM's position that, if inflation continues, the fee would have to be increased and that this could be done through indexing. We have revised the draft report, including our proposal that future assessments of fee adequacy be based on program cost estimates that include provision for inflation, to recognize these comments.

In addition, the officials said that two other major factors entered into OCRWM's decision not to recommend a fee increase. First, OCRWM is reluctant to recommend a fee increase because of the high degree of uncertainty about estimated program costs which, in turn, is due to uncertainty over the final design, construction, and operation of the waste system. Second, OCRWM is concerned about apportioning program costs equitably among users over time. They said, for example, that with over \$2 billion now in the waste fund there is concern by utilities and others that the 1 mill fee has resulted in overcharging past and current users.

Agency officials disagreed with our recommendation that the effects of inflation be accounted for by using a base case inflation estimate. OCRWM officials said that it is more appropriate to analyze an envelope of cases to properly assess the adequacy of the fee. According to the officials, the use of a base case inflation rate would not be appropriate because of the considerable uncertainties of the program, one of which is inflation. They noted, in particular, the long period of time the program covers, about 100 years, and the difficulty in selecting a single base case to use in projecting costs over this time.

Moreover, according to the officials, a legislative amendment to NWPA would not be needed to implement an inflation indexing system. They said that should OCRWM determine at some point that indexing the fee to

inflation was appropriate, it would obtain authorization by seeking congressional approval through the annual assessment process as required by the NWPA.

They said that if the Congress did not disapprove of DOE's proposal, then once initiated, automatic adjustments to account for inflation would continue each year thereafter without the need for additional congressional approval because the fee, in real terms, would not change. They also said that DOE would, of course, continue making its annual assessments of fee adequacy based on total costs and revenues and recommend additional adjustments in the future as appropriate.

NWPA requires the Secretary of Energy to determine whether the fee is too high or too low and, based on this determination, to propose to the Congress necessary adjustments in accordance with NWPA requirements. We believe that a judgment about whether the fee is too high or too low should depend on the projected end-of-program fund balance. DOE itself actually stated this quite clearly in its 1987 assessment report, saying that ". . . If the final program balance is projected to be positive, then the fee is judged adequate to ensure full cost recovery. If the projected final program balance is estimated to be negative, then the fee would be judged inadequate. . . ."

In our opinion, projecting end-of-program fund balances could be done best through the use of a realistic base case inflation estimate and appropriate sensitivity analyses. Future uncertainties make it difficult to estimate inflation rates far into the future; however, because the assessment is made annually the inflation rate estimate could also be adjusted annually if warranted. Moreover, we do not believe that uncertainties about program costs should delay fee adjustments because such uncertainties will remain for some time and it would not be appropriate to delay an adjustment until they are eliminated.

Regarding the matter of equity, we believe that judgments on fee adequacy or equity should not be based solely on the amount of money in the fund. In fact, it should be expected that the fund will have large surpluses in the early years of the program, when expenditures are relatively small, as contrasted with later years, when large expenditures for construction and operation of the repositories will occur. Also, we note that the 1982 act requires OCRWM to propose a fee adjustment not only when the fee is determined to be too low but also when it is too high.

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**Appendix I**  
**Comments of Agency Officials and**  
**Our Evaluation**

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Lastly, we disagree with the officials' statement that a legislative amendment to NWPA would not be needed to implement an inflation indexing system. Because of the Supreme Court decision referred to earlier in footnote 3, some uncertainty exists as to whether the mechanism in the law for congressional review of fee changes is constitutional. Moreover, OCRWM would use the annual assessment process not merely to change the fee but also to change the statutory fee-setting mechanism by, in effect, writing in an inflation adjustment clause. The NWPA requires that any fee change, regardless of whether or not the fee, despite the change, remains the same in a real or economic sense, be submitted to the Congress for the 90-day review period. If OCRWM wants to avoid the congressional review process for fee changes based on an inflation index, it should ask the Congress to amend the NWPA.

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# Major Contributors to This Report

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