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DR#0438-3

DOE/IG-0253

U.S. Department of Energy
Office of Inspector General

March 1988



Report on

Integration of Defense Waste Into the Civilian Repository Program

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United States Government

Department of Energy

memorandum

DATE: March 24, 1988

REPLY TO
ATTN OF: IG-1

SUBJECT: INFORMATION: Report on "Integration of Defense Waste Into the Civilian Repository Program"

TO: The Secretary

BACKGROUND:

The subject report is provided to inform you of our findings and recommendations.

DISCUSSION:

Following the President's decision to co-locate defense and civilian waste in underground repositories, the Office of Civilian Radioactive Waste Management (Waste Management) began developing a method to compute a fee for defense waste disposal. The purpose of this audit was to determine whether its proposed fee calculation method would result in an accurate and fair allocation of costs to both civilian and defense owners of nuclear waste.

Our review of the methodology originally proposed by Waste Management for computing defense waste fees disclosed that repository costs could be more accurately allocated. The cost allocation method used is significant because it could make a difference of \$200 to \$300 million in the amount paid by either civilian or defense waste owners into the Nuclear Waste Fund. In addition, we found that a fee schedule and interest accrual dates had not been established for defense waste. Waste Management estimated that about \$70 million in interest is due from the Office of Defense Programs. Waste Management concurred with our recommendations and has initiated corrective actions.

for Charles L. Layton
John C. Layton
Inspector General

Attachment

cc: The Under Secretary
Director, Office of Civilian Radioactive Waste Management
Director of Audit Liaison

MASTER

JP

U.S. DEPARTMENT OF ENERGY
OFFICE OF INSPECTOR GENERAL

INTEGRATION OF DEFENSE WASTE
INTO THE CIVILIAN REPOSITORY PROGRAM

Report No.: DOE/IG-0253
Date of Issue: March 24, 1988

Capital Regional Office
Germantown, MD 20874

INTEGRATION OF DEFENSE WASTE
INTO THE CIVILIAN REPOSITORY PROGRAM

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OFFICE OF INSPECTOR GENERAL
CAPITAL REGIONAL OFFICE
GERMANTOWN, MD 20874

INTEGRATION OF DEFENSE WASTE
INTO THE CIVILIAN REPOSITORY PROGRAM

Audit Report No.: DOE/IG-0253

PART I

EXECUTIVE DIGEST

INTRODUCTION AND PURPOSE OF AUDIT

The Nuclear Waste Policy Act of 1982, Public Law 97-425, (Waste Act) signed on January 7, 1983, established a comprehensive national program for the safe management, storage, and permanent disposal of highly radioactive nuclear waste in deep underground repositories. The Waste Act states that: (1) two repositories will be required if total waste to be emplaced exceeds 70,000 metric tons of uranium; (2) all owners of waste must be charged equivalent fees; and (3) all participants will pay the appropriate fees to the Nuclear Waste Fund (Waste Fund) before disposal of waste in the repository. It also stipulated that defense high-level nuclear waste (defense waste) could be included in the repositories if it were deemed in the best interest of the Government. Acting on the Secretary of Energy's recommendation, the President, on April 30, 1985, ordered that defense waste be included within the repository system. Thus, the Department of Energy's (DOE) Office of Defense Programs (Defense Programs) became subject to applicable provisions of the Waste Act.

In December 1987, Congress passed the Nuclear Waste Policy Amendments Act of 1987. This Act stipulated the site for the first repository and changed some of the other program requirements.

The Waste Act established a fee for disposal of civilian nuclear spent fuel of 1 mil per kilowatt hour of net electricity generated. This is a provisional rate subject to adjustment by the Congress. Adjustments are made when the annual fee adequacy report, required by the Waste Act, shows that the fee is insufficient to cover the full costs of the

repository program assigned to civilian waste owners. At the time of our review, no adjustments had been made.

Following the decision to co-locate defense and civilian waste, the Office of Civilian Radioactive Waste Management (Waste Management) began developing a method to compute a fee for defense waste disposal. Defense waste is less radioactive and gives off less heat than civilian waste, and it is not primarily a product of electrical generation. Waste Management concluded therefore that the 1 mil per kilowatt hour fee levied for civilian spent fuel would not be applicable to defense waste. Accordingly, it studied various other methods for determining an equivalent fee.

The purpose of this audit was to determine whether the fee calculation method proposed by Waste Management would result in an accurate and fair allocation of costs to both civilian and defense owners of nuclear waste.

SCOPE OF AUDIT

We reviewed Waste Management's proposed cost allocation plans to be used in calculating fees for defense waste disposal. We also evaluated Waste Management's actions toward developing a defense waste fee payment schedule. The review was conducted at the Headquarters offices in Washington, D.C., and Germantown, Maryland, from September 1986 through December 1987. An exit conference was held on February 24, 1988, with the Associate Director, Office of Resource Management.

Our examination was made in accordance with generally accepted government auditing standards which included tests of internal controls and compliance with laws and regulations to the extent necessary to satisfy the scope of the audit.

OBSERVATIONS AND CONCLUSIONS

Waste Management had taken positive and timely action to collect fees and related interest for disposal of civilian waste. With respect to defense waste, it had established a fee calculation

method, but had not yet established a fee payment schedule nor collected any fees for defense waste disposal.

To determine a fee for defense waste disposal equivalent to the civilian waste fee, it is necessary to establish cost accounting procedures that would equitably allocate various types of program costs between defense and civilian waste. No single basis can be used to allocate these various costs. Although certain indirect development and evaluation costs will benefit the entire program, other direct costs, such as construction, relate only to specific types of repositories and vary depending on which type of repository is considered. Accepted accounting practices and cost principles require that cost methods consider the benefits each participant receives from the costs incurred by each function or subdivision of the repository program.

In a December 2, 1986, Federal Register Notice of Inquiry, Waste Management issued for comment a proposed fee calculation method for defense waste. Our review disclosed that repository costs could be more accurately calculated, resulting in a more appropriate allocation between defense and civilian waste. The cost allocation method used is significant because it could make a difference of \$200 to \$300 million in the amount paid by either civilian or defense waste owners into the Waste Fund. Also, the Notice did not contain a fee payment schedule or interest accrual dates to determine when payments for defense waste are due or when interest on deferred or late payments is to accrue. Waste Management has estimated interest due on defense waste to be about \$70 million through Fiscal Year 1987.

Our review did not disclose any material internal control weaknesses. Since the scope of the review was limited, it would not necessarily disclose all material internal control weaknesses that may exist.

MANAGEMENT REACTION

The Office of Civilian Radioactive Waste Management concurred with both findings and the respective recommendations. Management's comments and the auditor's responses are contained in Part III of this report.

Office of Inspector General

PART II

FINDINGS AND RECOMMENDATIONS

1. Cost Allocation Plans for Defense Fee Calculation

FINDING

Waste Management's originally proposed cost allocation plan, published for comment in the Federal Register Notice of Inquiry on December 2, 1986, did not allocate costs in the most equitable manner between defense and civilian waste owners, as required by the Waste Act. In that Notice, the cost allocation plan was oversimplified and, depending on the types of repositories eventually chosen, could result in either civilian or defense users being overcharged by \$200 to \$300 million.

RECOMMENDATIONS

We recommend that the Director, Office of Civilian Radioactive Waste Management:

1. Allocate construction and operation costs using repository-specific factors, instead of averages; and
2. Allocate development and evaluation costs using factors that do not depend solely on geologic formations and, where possible, allocate these costs specifically to the first or second repository.

MANAGEMENT REACTION

The Office of Civilian Radioactive Waste Management concurred with the finding and recommendations and initiated corrective action. Details of management's comments and our responses are provided in Part III.

Details of Finding

The Waste Act requires participants in the nuclear waste repository program -- civilian owners of nuclear waste and DOE's Defense Programs -- to be charged "equivalent" fees for nuclear waste disposal in proposed repositories. In implementing the

Waste Act, Waste Management established fees for civilian waste disposal based on the amount of electricity generated by nuclear fuel. Since defense nuclear fuel is not primarily used for electrical generation, Waste Management proposed another method for calculating an equitable fee for defense waste. Waste Management's proposed fee calculation method was published for comment in a Federal Register Notice of Inquiry on December 2, 1986.

We examined Waste Management's proposed fee calculation method. Its proposal was based on the fact that two repositories will be needed and cost allocation must result in equitable fees. The proposal also recognized that equal volumes of defense and civilian waste require different amounts of space in a repository because the two types of waste emit different amounts of heat and radiation and that the space requirements for waste vary depending on the rock formation chosen.

Waste Management estimated cost data for each repository using the report, "Analysis of the Total System Life-Cycle Cost for the Civilian Radioactive Waste Management Program," April 1986 (Total System Life-Cycle Cost). Three primary cost allocation factors were used in the proposed fee calculation method. First, costs related to the use of repository space were allocated using areal dispersion (the percentage of space in the repository used for defense and civilian waste, respectively). Second, costs related to waste handling were allocated using piece count (the percentage of canisters used for defense and civilian waste). Third, costs related to special waste handling facilities in the first repository were allocated using the percentage of each type of waste handled by those facilities. Since two repositories would be needed, Waste Management considered three different examples of repository combinations (or pairs) built in different rock formations: basalt/salt, basalt/tuff, and tuff/salt.

Our review questioned the allocation method for two of the cost categories in Waste Management's fee calculation method: construction and operation costs, which are direct costs incurred specifically for a particular repository, and development and evaluation costs, which are indirect costs incurred regardless of which types of repositories are built. In responding to our concerns, Waste Management officials stated that

allocation plans had been simplified for presentation in the original Federal Register Notice. Later, officials informed us that they allocated costs more accurately, taking our recommendations into consideration. These revisions were published in the final Notice issued in August 1987.

Allocation of Repository Construction and Operation Costs

Waste Management's fee calculation method allocated construction and operation costs between defense and civilian waste using areal dispersion and other factors described above. These factors, which are specific for each repository (repository-specific factors), vary depending on the rock formations chosen. For example, in the basalt repository, Management estimated that defense waste would require 13.1 percent of the total available space (areal dispersion) while in the salt repository, it would require 4.6 percent. If such specific percentages were used for each repository, they would provide a fairly equitable distribution of construction and operation costs between defense and civilian waste. However, Waste Management's proposed fee calculation method averaged the factors for the two proposed repositories. This resulted in defense waste being allocated 8 percent of costs that relate to repository space in a basalt/salt repository pair.

Because of the difference in costs between the two repositories, using average factors is likely to distort the cost allocation. This is illustrated in the following chart, which shows the allocation of underground development costs, a cost element within the construction and operation category.

COMPARISON OF DEFENSE FEE CALCULATIONS
UNDERGROUND DEVELOPMENT
(in millions)

Waste Management Calculation:
(Using average factors)

	<u>Cost</u>	<u>Factor</u>	<u>Total</u>
Basalt Repository	\$1,255	x .08	= \$100
Salt Repository	890	x .08	= <u>71</u>
Total			<u>\$171</u>

Proposed Alternate Calculation:
(Using repository-specific factors)

	<u>Cost</u>	<u>Factor</u>	<u>Total</u>
Basalt Repository	\$1,255	x .131	= \$164
Salt Repository	890	x .046	= <u>41</u>
Total			<u>\$205</u>
Difference			<u>\$ 34</u>

Costs used in the illustration were developed by Waste Management in its Total System Life-Cycle Cost report. As the illustration shows, using average factors for a basalt/salt repository pair could underestimate the defense fee for underground development by \$34 million. We further calculated that the defense fee could be understated by \$15 million for a basalt/tuff pair, or overstated by \$4 million for a tuff/salt pair for this same cost element.

Other cost elements, such as support and utilities, could likewise change if specific percentages were used for each repository. The combined effect of all our proposed alternate cost allocations are incorporated into the summary illustration on page 10.

Allocation of Development and Evaluation Costs

Unlike the allocation plans discussed above, development and evaluation costs are indirect costs. In the proposed fee calculation method, however, development and evaluation costs were allocated by repository pairs using areal dispersion factors for the different geologic formations. The result was different allocations for each repository pair because areal dispersion factors vary by geologic formations. Under this method, which is not consistent with generally accepted criteria for allocating indirect costs, the allocation of development and evaluation costs to defense waste for different repository pairs ranged from \$560 million to over \$1 billion.

Criteria for allocating indirect costs is contained in the Federal Acquisition Regulations. Although intended for the use of Government contractors in allocating indirect costs to Government contracts, the principles are equally applicable to the equitable allocation of Waste Fund costs to defense and civilian waste. These principles state, in part, that:

...Indirect costs shall be accumulated by logical cost groupings with due consideration of the reasons for incurring such costs. Each grouping should be determined so as to permit distribution of the grouping on the basis of the benefits accruing to the several cost objectives ...[a function, organizational subdivision, contract, etc.] ... This necessitates the selection of a distribution base ... so as to permit allocation of the grouping on the basis of the benefits accruing to the several cost objectives...

We believe that Waste Fund development and evaluation costs should be allocated to defense waste using a basis consistent with these principles. For example, one such basis to use would be total metric tons of uranium.

Using metric tons of uranium and information contained in the Federal Register Notice, we re-computed the development and evaluation cost allocation. The latest Waste Management projection for total waste is equivalent to 114,951 metric tons of

uranium with the placement of 70,000 metric tons in the first repository. Defense waste is equivalent to 8,000 metric tons of uranium, which Waste Management originally proposed to split evenly between the two repositories. Civilian waste amounts to 106,951 metric tons of uranium. The Federal Register Notice showed that two of the five elements of development and evaluation costs are specifically identifiable to either the first or second repository, while the other three broader elements, such as transportation, are allocated to the total repository program. Using this information, Defense Programs would be allocated approximately 6 percent of development and evaluation costs related specifically to the first repository and 9 percent of costs related to the second. It would also be allocated approximately 7 percent of the remaining three cost elements.

The following illustration compares the costs computed using Waste Management's areal dispersion factor and those calculated using a common factor -- metric tons of uranium. Management's calculation is based on a basalt/salt repository pair while the auditor's alternate calculations would remain the same regardless of which repository pairs are used.

COMPARISON OF DEFENSE FEE CALCULATIONS
DEVELOPMENT AND EVALUATION
 (in millions)

Waste Management's Calculation:
 (Using average factors)

	<u>Cost</u>	<u>Factor</u>	<u>Total</u>
Basalt/Salt	\$9,370	x .08	<u>= \$750</u>

Proposed Alternate Calculation:
 (Using metric tons of uranium as a common factor)

	<u>Cost</u>	<u>Factor</u>	<u>Total</u>
First Repository	\$3,506	x .06	= \$211
Second Repository	2,602	x .09	= 234
Both Repositories	3,262	x .07	= 228
Total	<u>\$9,370</u>		<u>\$673</u>
Difference			<u>(\$ 77)</u>

In the illustration, the proposed defense fee for development and evaluation costs would be approximately \$77 million less for a basalt/salt repository pair, using the proposed alternate calculation. Differences in fee calculations using the other possible repository pairs were of similar magnitudes.

Metric tons of uranium, which we chose to use as an example, was only one of several acceptable allocation factors. In response to our finding, Waste Management stated it had considered using total metric tons of uranium, but did not. Management used total assignable cost as the factor to distribute development and evaluation costs in the final fee method. In our opinion the assignable cost factor provides results consistent with accepted cost allocation principles.

Combined Effect of Allocation Plans

The following schedule compares the total fee computed by Waste Management under the originally proposed fee calculation method for three possible repository pairs to the total fee computed by the auditors. Our method used repository-specific factors to allocate all construction and operation costs and allocated development and evaluation costs using metric tons of uranium.

COMPARISON OF CALCULATION OF DEFENSE FEE (in millions)

<u>Repository Pair</u>	<u>Waste Management's Calculation</u>	<u>Proposed Alternate Calculation</u>	<u>Difference</u>
Basalt/Salt	\$3,430	\$3,648	\$218
Tuff/Salt	\$2,603	\$2,916	\$313
Basalt/Tuff	\$3,632	\$3,424	(\$208)

The schedule shows that Waste Management's originally proposed fee calculation method produces results that are significantly different from the alternative method we consider to be equitable. Such differences were caused by an oversimplification of the proposed fee method at the time it was presented in the December 1986 Federal Register Notice. Since then, Waste Management has revised its calculations incorporating our recommendations, in principle, into the fee method issued in the Federal Register Notice of August 1987.

2. Defense Waste Payment Schedule

FINDING

Waste Management had not developed a payment schedule for the defense waste fee or established accrual dates for collecting interest on deferred or late payments. A payment schedule is called for in the legislative history of the Waste Act so that payments for defense waste are equivalent to those of civilian waste. The fee payment schedule had not been developed because until recently most of Waste Management's attention had been devoted to designing an equitable fee calculation method for defense waste. Since a fee payment schedule and interest accrual dates had not been established, they were not included in either the original or final Federal Register Notices or a subsequent draft Memorandum of Agreement with Defense Programs. The payment schedule with interest accruals estimated through Fiscal Year 1987 could result in about \$70 million in interest due, based on prevailing rates.

RECOMMENDATION

We recommend that the Director, Office of Civilian Radioactive Waste Management, establish and implement a fee payment schedule and interest accrual dates for defense waste, equivalent to the civilian waste fee schedule, and that it charge fees and interest accordingly.

MANAGEMENT REACTION

The Office of Civilian Radioactive Waste Management concurred with the finding and recommendation. Details of management's comments and our responses are provided in Part III.

Details of Finding

Although Waste Management had proposed a fee calculation method to allocate costs between civilian and defense waste, it had not yet established a payment schedule for defense waste fees or provided for interest to be collected on deferred or late payments. In our opinion, the provision in the Waste Act calling for equivalent fees applies not only to the amount of the fees but also the interest due. In addition, the legislative history of the Waste Act indicates that a

fee payment schedule should be established. This issue was commented on by civilian waste owners in response to the original Federal Register Notice. They felt it was unfair that Waste Management quickly established accrual dates and interest provisions for civilian waste, but had not done so for defense waste.

Waste Management officials did not include a fee payment schedule in either the draft or final Federal Register Notices or the October 1987 draft Memorandum of Agreement with Defense Programs because a schedule had not been developed. This can be attributed to Waste Management placing primary emphasis on designing the fee calculation method which was included in the August 1987 final Federal Register Notice. Our analysis disclosed that it would have been inequitable to develop a fee payment method for defense waste without appropriate consideration of the payment schedule and applicable interest provisions, which would amount to millions of dollars. Management agreed and subsequently began working with Defense Programs to develop an acceptable schedule.

In responding to a draft of this report, Waste Management officials informed us that they intend to assess interest back to the passage of the Waste Act (January 1983). They estimated that Defense Programs owed about \$70 million in interest through Fiscal Year 1987. Waste Management officials also pointed out that any payment schedule for defense waste will be used for preparing budget requests, even though they cannot require the Congress to appropriate funds.

PART III

MANAGEMENT AND AUDITOR COMMENTS

We submitted a draft of this report to the Associate Director, Office of Resource Management, Office of Civilian Radioactive Waste Management. Management's comments are summarized below along with our responses.

1. Cost Allocation Plans for Defense Fee Calculation

Management Comments. Waste Management officials concurred with both recommendations and have initiated action to correct the problems. With respect to the first recommendation, Waste Management has adopted the use of repository-specific factors to allocate construction and operation costs to defense waste. With respect to the second recommendation, Waste Management has used total assignable cost as the factor to distribute development and evaluation costs in the final method. This was presented in the final Federal Register Notice issued in August 1987.

Auditor Comments. These proposed actions are responsive to the recommendations.

2. Defense Waste Payment Schedule

Management Comments. Waste Management officials concurred with the recommendation and stated that negotiations were in process to work out a payment schedule with Defense Programs. They also stated that it was their intent to charge interest back to the passage of the Waste Act.

Auditor Comments. These proposed actions, when implemented, will be responsive to the recommendation.