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Fee Adequacy Assessment Report

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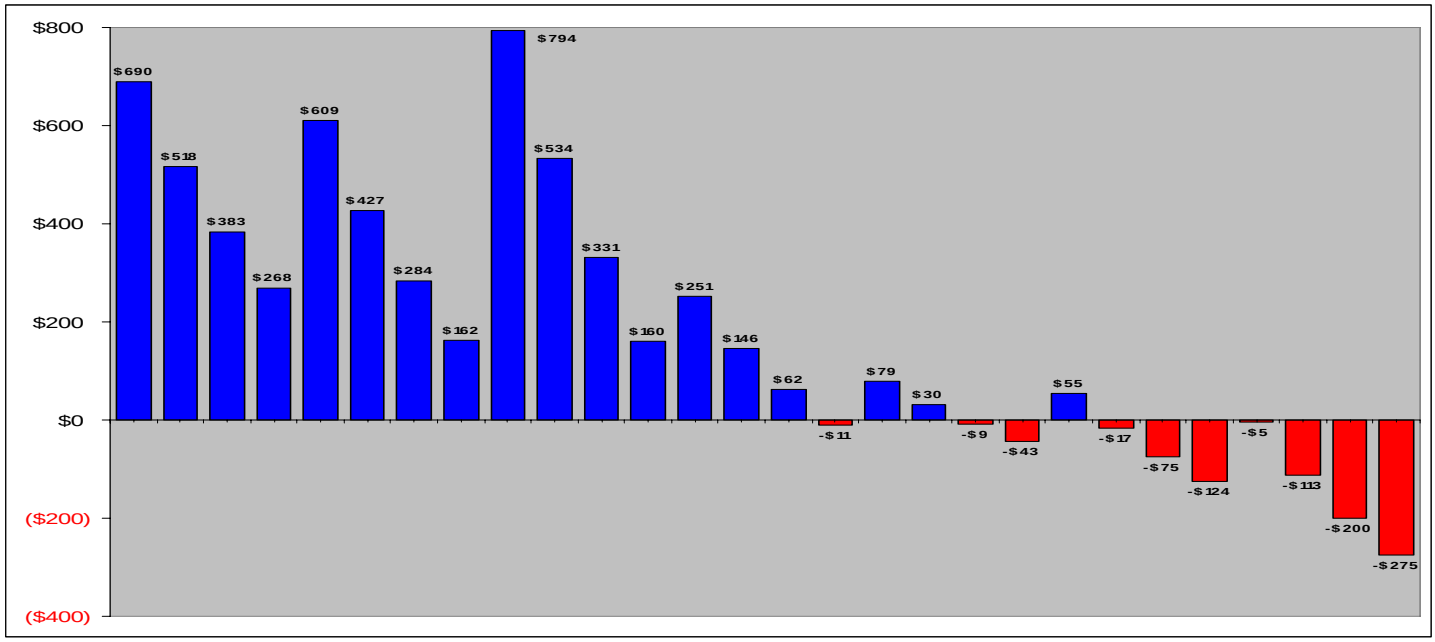
ACRONYMS

2000$	Constant year-2000 dollars (dollars with purchasing power equal to the dollar's purchasing power in 2000)
2007$	Constant year-2007 dollars (dollars with purchasing power equal to the dollar's purchasing power in 2007)
DOE	Department of Energy
EIA	Energy Information Administration
FY	Fiscal Year
HLW	High-Level Waste
kWh	Kilowatt-hour
MTHM	Metric Tons of Heavy Metal
NWF	Nuclear Waste Fund
NWPA	Nuclear Waste Policy Act, as amended (also called "the Act")
OCRWM	Office of Civilian Radioactive Waste Management (also called "the Program")
OMB	Office of Management and Budget
SNF	Spent Nuclear Fuel
TAD	Transportation, Aging, and Disposal
TSLCC	Total System Life Cycle Cost

EXECUTIVE SUMMARY

The purpose of this *U.S. Department of Energy Office of Civilian Radioactive Waste Management Fee Adequacy Assessment Report* is to present an analysis of the adequacy of the fee being paid by nuclear power utilities for the permanent disposal of their spent nuclear fuel by the Government. In accordance with the Nuclear Waste Policy Act of 1982 (the Act), the costs for disposal of commercial spent nuclear fuel are to be funded by a fee of one mill ($0.001) per kilowatt-hour levied on electricity generated and sold. Section 302(a)(4) of the Act states that the U.S. Secretary of Energy shall annually review the fee to evaluate whether the collection of the fee will provide sufficient revenues to offset the commercial utilities' share of the total life cycle costs of the Civilian Radioactive Waste Management Program (the Program). It states that in the event the Secretary determines that either insufficient or excess revenues are being collected, the Secretary shall immediately transmit to Congress a proposed fee adjustment that will ensure full cost recovery.

Based on this fee adequacy analysis, the Department determines that the fee is adequate and finds no reason to adjust the fee at this time. As shown Figure 1, 18 of the total of 28 scenarios developed for this analysis result in a positive Nuclear Waste Fund balance at the end of decommissioning in 2133, indicating that the current fee level will provide adequate revenue under the majority of cases considered.



Econ Scenario	GI Opt	GI Opt	GI Opt	GI Opt	GI Trnd	GI Trnd	GI Trnd	GI Trnd	EIA	EIA	EIA	EIA	OMB	OMB	OMB	OMB	Mkt Rate	Mkt Rate	Mkt Rate	Mkt Rate	GI Pess	GI Pess	GI Pess	GI Pess	Hist	Hist	Hist	Hist
Def %	30%	25%	20%	15%	30%	25%	20%	15%	30%	25%	20%	15%	30%	25%	20%	15%	30%	25%	20%	15%	30%	25%	20%	15%	30%	25%	20%	15%
NWF Balance	690	518	383	268	609	427	284	162	794	534	331	160	251	146	62	-11	79	30	-9	-43	55	-17	-75	-124	-5	-113	-200	-275

Figure 1: Fee Adequacy Assessment Results
Nuclear Waste Fund Balance in 2133 (billions of constant 2007 dollars)

The current mechanism for making revenues available to the Program, however, is not adequate to provide the funding needed to allow DOE to execute its mission under the Nuclear Waste Policy Act. A significant assumption in developing all total life cycle cost estimates and fee adequacy analyses is that funding reform will be enacted to provide sufficient annual funds when needed. This fee adequacy analysis did not assess the adequacy of the fee if the Congress continues the historical trend of not appropriating adequate funding to execute the Program's plans. The Administration has proposed funding reform legislation to allow the annual fees provided by utilities to be used to offset the annual appropriations for the Program. Developing and maintaining a credible schedule for the Program is highly dependent upon a steady and reliable funding stream.

The total system life cycle cost estimate used for this fee adequacy assessment assumes that legislation removing the statutory emplacement limit of 70,000 metric tons of heavy metal at Yucca Mountain will be enacted, so that additional costs for the siting, characterization, licensing, and construction of a second repository site will not be incurred. This assessment did not evaluate cost or fee revenue impacts on the system from the introduction of recycling, construction of new reactors, or granting of additional license renewals, all of which can affect the adequacy of the fee.

While this assessment does not warrant a change in the fee, without a change to the current budgetary process to allow consistent and sufficient annual funding, the assumption that adequate funding is provided cannot be maintained. At the time this fee assessment and the total system life cycle cost estimate was developed the initial start of the repository was assumed to be 2017. The Department is now reassessing, because of budget reductions, the repository schedule. The total life cycle cost estimate and fee adequacy assessment assumed consistent and sufficient funding. Future fee assessments may need to evaluate a cost scenario in which consistent and sufficient funding each year is not assumed.

1 INTRODUCTION

The purpose of this *U.S. Department of Energy Office of Civilian Radioactive Waste Management Fee Adequacy Assessment Report* is to present an analysis of the adequacy of the fee being paid by nuclear power utilities for the permanent disposal of their spent nuclear fuel (SNF) by the Government. This Fee Adequacy Assessment is based on analyses of estimated costs detailed in the *Analysis of the Total System Life Cycle Cost for the Civilian Radioactive Waste Management Program, Fiscal Year 2007*, DOE/RW-0591, which include development, construction, operation, monitoring, and decommissioning of the permanent repository for SNF and High-Level Waste (HLW) for the period beginning in 1983 and extending 150 years.

The 2007 Total System Life Cycle Cost (TSLCC) estimate used for this assessment is $96.2 billion in constant year-2007 dollars (2007$) and $79.3 billion in constant year-2000 dollars (2000$). This estimate is based on the permanent disposal of 122,100 metric tons of heavy metal (MTHM) in the Yucca Mountain repository, located approximately 90 miles northwest of Las Vegas, Nevada. The TSLCC estimate assumes a waste stream for the current and projected discharges of SNF from commercial utilities, including future discharges from 47 nuclear reactors that had received operating reactor license extensions as of January 2007. The Yucca Mountain Repository Environmental Impact Statement and some sensitivity studies have analyzed waste streams of 130,000 MTHM for bounding purposes; and if new license extensions are granted, future TSLCC cost estimates will include additional SNF. The TSLCC estimate also includes transportation of the waste from civilian and government sites throughout the country, primarily over the national rail network and over a new dedicated rail line to be built in Nevada.

Under the assumption of receiving 122,100 MTHM, the last annual fee payment from utilities will come in 2046. The interest generated in the Nuclear Waste Fund (NWF) is required to fund the years between 2046 and 2133. Therefore the impact of various future economic scenarios on the investments of the NWF is a key determining factor in the adequacy of the fee.

This fee adequacy assessment uses methodologies and historical assumptions that have been used in prior fee adequacy assessments and, like prior assessments, concludes that, although there are some scenarios in which the fee may be inadequate, it is not necessary to adjust the fee at this time.

1.1 Background

The Nuclear Waste Policy Act of 1982 (NWPA or the Act) established the Office of Civilian Radioactive Waste Management (OCRWM) within the Department of Energy (DOE) and made the Department responsible for permanent disposal of the Nation's SNF and HLW. This assessment of fee adequacy is based on the principle of full cost recovery contained in Section 302 of the Act, under which all costs related to the disposal services provided by the Department are to be paid by the owners and generators of SNF and HLW. The Act requires that the Secretary of Energy annually evaluate whether the one mill ($0.001) per kilowatt-hour (kWh) fee collected from civilian waste generators will offset their share of Program costs. This report supports that requirement.

In 1985, pursuant to Section 8 of the Act, President Reagan directed the DOE to use the capacity of the disposal system for government-managed SNF and HLW. The Government is required to pay its share of costs for disposal of nuclear waste owned and managed by the DOE and the U.S. Navy. These payments are currently made through annual Defense Nuclear Waste Disposal appropriations.

A methodology for allocating costs between government-managed nuclear materials and commercial wastes was developed by public rulemaking and published in the Federal Register on August 20, 1987 (52 FR 31508). This rule provides guidance for calculating the defense and civilian shares of total costs. Using the assumptions in the 2007 TSLCC, the defense share of total Program cost is 19.6 percent for 2007. The defense share, however, adjusts each year as assumptions change. In the 2001 TSLCC and fee adequacy reports, the defense share was approximately 27.3 percent. The current downward trend for the defense share is a result of increased commercial SNF to be accepted for disposal. Although a detailed analysis of the variation in defense share allocation would require an adjustment in the total cost of the program, a range of defense shares is provided in the report at the same Program cost level to provide a perspective of the potential impact of defense share variations on fee adequacy. The effect of a lower defense share is similar to that of a higher total Program cost for evaluating the adequacy of the fee, because civilian share, paid from the Nuclear Waste Fund, would be required to fund more of the total cost of the Program. To provide a conservative analysis of the adequacy of the fee, a range of hypothetical defense and civilian shares was used in fee adequacy scenarios, including a high of 30% and a low of 15%. Making an adjustment to the defense share, while maintaining constant total cost, is used only for fee adequacy purposes. If the defense waste quantity were to increase, there would be an incremental increase in the total cost; however, the incremental cost of defense share increases as a result of hypothetical defense waste increases was not estimated in developing the multiple hypothetical cost estimates for this fee adequacy analysis. In future assessments, it may be necessary to use a range of possible defense waste amounts for permanent disposal at Yucca Mountain with multiple cost estimates that represent the variation in the defense share.

This document consists of 5 sections: Section 1 provides a comparison to the previously published fee adequacy assessment; Section 2 provides a discussion of the impact of funding on the fee adequacy assessment; Section 3 describes the cost, income, and economic factors analyzed; Section 4 describes the methodologies used in this analysis; and Section 5 presents the results of the fee adequacy analyses.

1.2 Comparison with the Previously Published 2001 Fee Adequacy Assessment

In 2001, the Department issued the last published fee assessment, *Nuclear Waste Fee Adequacy: An Assessment, May 2001*, DOE/RW-0534. It was based on the 2001 *Analysis of the Total System Life Cycle Cost of the Civilian Radioactive Waste Management Program*, DOE/RW-0533, and concluded that there was no need to change the fee at that time. Although the design and assumptions for the repository system have matured and economic assumptions have changed since then, this assessment confirms that there is still no need to change the fee at this time. Table 1 highlights some of the key assumptions used for the two assessments. In summary, the major changes are that the anticipated total waste quantities have increased approximately 26 percent and civilian waste quantities have increased approximately 30 percent,

resulting in a total cost increase of 38 percent in constant value dollars. At the same time, system design has become better defined and forecasted inflation and interest rates are lower.

Table 1: Differences between the 2001 and 2007 Fee Adequacy Analyses

Element	2001	2007
Waste Quantity	97,000 MTHM	122,100 MTHM
Civilian	83,800 MTHM	109,300 MTHM
Government-Managed	~13,200 MTHM	12,800 MTHM
System Design	Separate canisters for shipment and disposal Limited aging capability	Transportation, Aging, and Disposal (TAD) Canister-based system Aging pad capacity of 27,000 MTHM
Surface Facilities in Geologic Repository Operations Area	One multi-purpose building	Six modular buildings
Transportation Mode / Nevada Rail Route	Mostly Rail / Average cost of possible Nevada rail routes	Mostly Rail / cost for the Caliente route
Estimated Total Life-Cycle Cost	$57.5 billion (Constant 2000$) ($69.7 billion in Constant 2007$)	$79.3 billion (Constant 2000$) ($96.2 billion in Constant 2007$)
Civilian Cost Share	72.8%	80.4%
Real Interest Rate (Global Insight Trend)	4.2%	3.5%
Inflation Rate (Global Insight Trend)	3.0%	2.0%

2 IMPACT OF INADEQUATE FUNDING ON THE DETERMINATION OF FEE ADEQUACY

The analysis in this report utilizes the historical methodology and assumptions that were used in prior fee adequacy assessments. When conducting total system life cycle cost estimates and fee adequacy assessments, the Department continues to assume that the future funds needed to meet the schedules and operations of the system are provided consistently and without reductions. Consistent funding is required so that acquisitions and operations can be planned and executed on schedule and within budget. Sustained annual funding well above current and historic levels will be required to construct and operate the repository. Funding at current levels in future years will not be adequate to support design and the necessary concurrent capital purchases for repository construction, transportation infrastructure, and transportation and disposal canisters.

The funding process outlined in the NWPA was intended to ensure that the generators of waste would pay the full costs of disposal and that the money paid into the Nuclear Waste Fund (NWF) would be available as needed to develop a repository expeditiously. Deficit control legislation enacted after the NWPA was passed, beginning with Gramm-Rudman-Hollings in 1985, changed the structure of the funding process envisioned in the NWPA. Instead of being available as

needed by the Program, fee receipts are now scored on the mandatory side of the federal budget, because fee payments are required by the NWPA. Program expenditures, however, are scored as discretionary, because they require appropriations. The Program must compete with other discretionary activities within the Department of Energy and across the Government to get access to the funds in the NWF. Since mandatory and discretionary accounts are treated separately, the utility fees, scored as mandatory receipts, cannot be used to directly offset discretionary expenditures as was intended by the Nuclear Waste Policy Act.

Now, under this arrangement, the fee receipts have no direct impact on the amount that can be appropriated to perform the disposal service for which the fee is being paid. As a result, the ability to use the NWF for its intended purpose has been limited by artificial constraints in the budget process. Through Fiscal Year (FY) 2007, less than 45 percent of fee income and less than 26 percent of total annual fee and investment income was appropriated.

The funding mechanism as it currently exists is not adequate to provide the funding needed to allow DOE to execute its mission under the NWPA. In legislation that the Administration submitted to the 109th Congress and has submitted again to this Congress, the Administration proposes changes to reclassify mandatory NWF receipts as discretionary in an amount equal to appropriations from the Fund for authorized waste disposal activities.

While this assessment does not warrant a change in the fee, without a change to the current budgetary process to allow consistent and sufficient annual funding, the assumption that adequate funding is provided can not be maintained. Without a consistent funding mechanism, the Program is limited in its ability to have confidence in a baseline and cost estimate, which threatens the Federal Government's ability to ensure a full cost recovery Program through fee adequacy assessments.

3 COST, INCOME, AND ECONOMIC ASSUMPTIONS USED FOR THE ASSESSMENT

Various economic conditions and defense shares were used to evaluate their effect on revenue and fee adequacy. Seven economic projections are combined with four defense shares and the current total system life cycle cost estimate, to provide 28 scenarios upon which to assess the fee adequacy. Making an adjustment to the defense share, while maintaining constant total cost, is used only for fee adequacy purposes; if there were actual variations in defense waste quantity, the total cost would not remain constant. By taking a range of defense shares and economic projections, the Department makes the best assessment, at this time, whether the fee would probably be adequate to sustain the Program for the life of the Program under the currently available assumptions. The Nuclear Waste Policy Act, of 1982 did not outline the methodology by which the Secretary is to assess the fee annually. Projecting the sustainability of the Nuclear Waste Fund to have appropriate assets for a 150 year period may improve over time. The Department has conducted these annual assessments since 1984, and it is expected that the analysis will improve as the Program matures.

3.1 Total System Life Cycle Cost Estimate for the Assessment

A Total System Life Cycle Cost (TSLCC) estimate was prepared in 2007 for fee adequacy analysis purposes. The life cycle cost estimate reflects current system designs presented in the Yucca Mountain license application submitted to the Nuclear Regulatory Commission (NRC) on June 3, 2008 seeking construction authorization and other major assumptions outlined below.

The TSLCC assumes a system capable of accepting and disposing of SNF and HLW equivalent to 122,100 MTHM. This estimate includes all defense wastes as well as past and projected discharges from commercial utilities, including the 47 nuclear power reactors that had received life extensions as of January 2007. The life cycle cost estimate for this system is $96.2 billion in 2007$ and $79.3 billion in 2000$.

The NWPA, as amended, limits the amount of SNF and HLW that can be emplaced in the first geologic repository to 70,000 MTHM until a second repository is in operation. There is no current cost estimate, design, or authorization for a second repository. Without authorization and a reliable estimate for a second repository, the 2007 TSLCC assumes that legislation removing the statutory emplacement limit of 70,000 MTHM at Yucca Mountain will be enacted, so that additional costs for the siting, characterization, licensing, and construction of a second repository will not be incurred.

The Program schedule assumes that the Department receives authorization from the NRC to commence construction in 2011. At the time of the estimate the TSLCC estimate assumed waste transportation and repository surface and subsurface operations will start in 2017 and emplacement will end in 2073. Subsequently, because of budget reductions, the Program is revising its baseline schedule, and future cost estimates will reflect the revised baseline. The 2007 estimate assumed that monitoring, including the installation of drip shields, will take place following the end of emplacement activities. Closure and decommissioning activities will follow monitoring. The Department expects annual costs during the monitoring period to be significantly lower than during the emplacement period, thereby allowing growth of the NWF's investments in order to fund the cost of drip shield emplacement and closure in the last 20 years of the Program's life.

An overview of the key variables used for the cost estimate is provided in Table 2.

Table 2: Key Variables

Total MTHM	122,100
Civilian	109,300
Defense	12,800
License Renewals	47
Start Date	2017
End of Transportation	2063
End of Emplacement	2073
Closure	2133

The 2007 TSLCC analysis assumes a primarily canister-based waste handling system,[1] also known as the transportation, aging, and disposal (TAD) canister approach. Under this system, commercial generators are assumed to provide SNF to DOE sealed in canisters that can be used for transport to the repository, temporary surface storage, if necessary, and placement in a waste package suitable for ultimate underground disposal at Yucca Mountain.

A summary of results of the cost analysis is provided in Table 3 and shown in Figure 2. The TSLCC estimate includes estimated historical costs through fiscal year 2006 of $13.5 billion (in 2007 dollars; $11.2 billion in 2000 dollars and $9.5 billion in year-of-expenditure dollars). Approximately 87 percent of future waste management system costs will be incurred by the end of emplacement operations, expected in 2073. The remaining 13 percent of costs will be dedicated to repository monitoring, the installation of drip shields, and the closure and decommissioning of repository facilities.

Table 3: Summary of Cost Results

Billions of constant	2007$	2000$
Repository	$64.7	$53.4
Transportation	$20.3	$16.7
Balance of Program	$11.2	$9.2
TOTAL	**$96.2**	**$79.3**

Individual elements may not sum due to rounding.
Includes historical costs (1983 – 2006) of $13.5 billion (in 2007$;
$11.2 billion in 2000$ and $9.5 billion in Year-of-expenditure dollars).

[1] "New Yucca Mountain Repository to be Simpler, Safer, and More Cost Effective", Press Release, October 25, 2005.

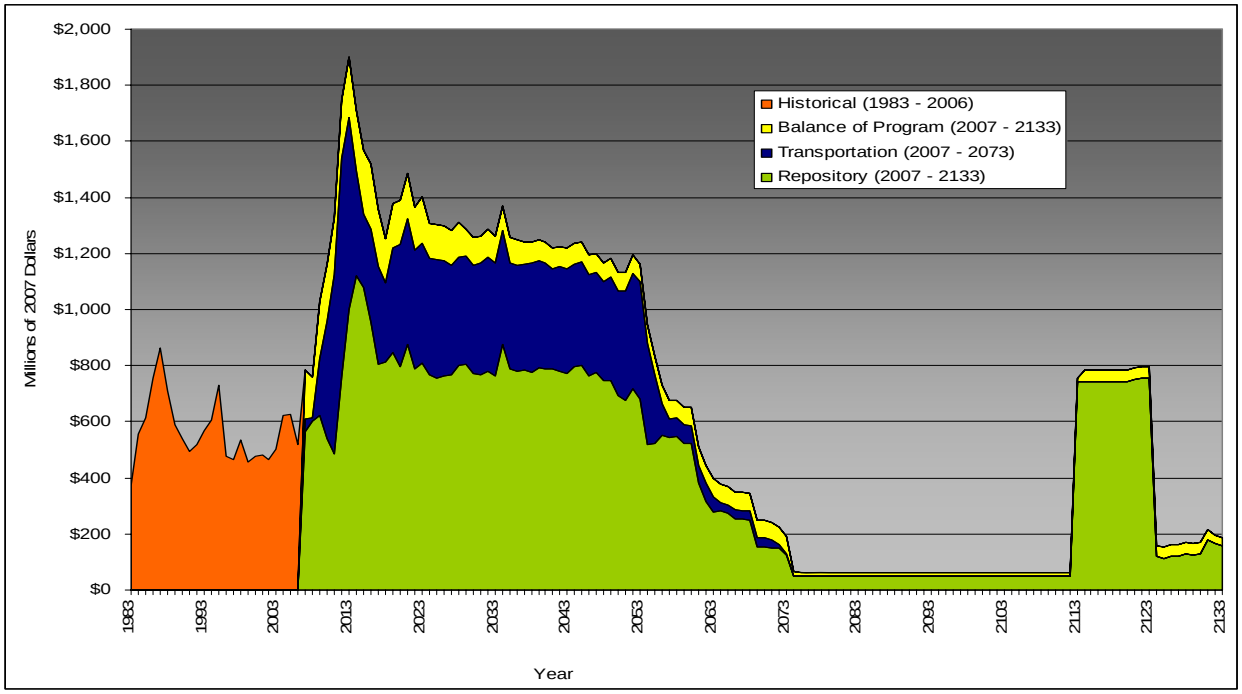


Figure 2: Annual Total System Life Cycle Cost Profile

3.2 Income Projections

The OCRWM has two sources of revenue: payments made by the U.S. Government for disposal of defense-related SNF and HLW and fees paid by commercial generators of SNF and HLW, including income from the portion of civilian fees invested to fund long-term Program costs. Defense and civilian waste owners are required to cover their respective costs for disposal by the waste management system. Defense costs are expected to be fully covered by annual Defense Nuclear Waste Disposal appropriations.

Utility fee payments are deposited in the NWF, a separate account in the U.S. Treasury. A portion is appropriated to meet current Program costs, and the remainder is invested to meet long-term needs. Revenues from the Fund's investments are necessary to cover the cost of Program activities from the expected end of nuclear power generation in 2046 through repository decommissioning in 2133.

Fees collected from utilities through September 2007 totaled approximately $21.9 billion (2007$). Future one mill per kWh and one-time fee income from utilities totals $19.0 billion (2007$) through 2046. Projections of kWh fee income are based on forecasts of electricity generation and sales made by the DOE's Energy Information Administration (EIA) and incorporate the 47 reactors that had received 20-year license extensions as of January 2007. Several utility purchasers also owe the Department one-time fees for disposal of waste from electricity generated and sold prior to 1983. Each of these utilities must pay its one-time fees, plus accumulated interest, prior to the acceptance of SNF at the utility site. For purposes of this analysis, payments of outstanding one-time fees were assumed to occur in the year the Department would begin waste acceptance from that utility.

NWF investments also provide civilian revenue through both interest payments and bond maturities. Investment income projections are derived from the current portfolio and the investment of surplus cash flows in future years. The current portfolio contains U.S. Treasury securities with maturities through 2037. For purposes of this analysis, starting in FY 2008, surplus cash flow (revenues from all sources minus Program costs) is assumed to be invested in 30-year Treasury bonds.

For this fee adequacy analysis, the defense share of payments is varied at 15, 20, 25, and 30 percent to test the adequacy of the civilian fee under various share scenarios. Making an adjustment to the defense share while maintaining constant the total cost is used only for fee adequacy purposes. If defense waste quantity actually varied, the total cost would not remain constant. The effect of a lower defense share is similar to that of a higher total Program cost for evaluating the adequacy of the fee, because civilian share, paid from the Nuclear Waste Fund, would be required to fund more of the total cost of the Program.

3.3 Economic Projections

Interest and inflation rates affect long-term income projections and are another component in assessing the adequacy of the fee. This analysis uses seven series of interest and inflation rates from five separate sources. There are five economic forecasts, three from Global Insight (GI), one from the EIA, and one based on data from the Office of Management and Budget (OMB). The other two scenarios are developed using current market data from Ryan Labs and long-term historical averages from Ibbotson Associates.

Interest rate projections were extended beyond the forecast period to cover the full 126 years remaining in the Program's life. The method used to extend each series is described below.

Global Insight

Global Insight, a leading global econometric forecasting firm, provides three series of projections of economic conditions over the next 30 years. The combination of their Optimistic, Trend, and Pessimistic forecasts is considered to encompass 90 percent of likely scenarios for future economic growth, exclusive of a major, unforeseen economic crisis (Global Insight 2007).

The Trend series represents Global Insight's base case forecast. The trend forecast assumes that the economy (i.e., Gross Domestic Product) will grow smoothly at its potential rate over the next 30 years, consistent with projected growth in underlying factors such as population, capital investment, and technology development. The Optimistic forecast generally predicts higher economic growth (e.g., higher population growth, higher consumer confidence) while maintaining a relatively low rate of inflation. The Pessimistic forecast generally predicts lower economic growth with higher inflation. The terms 'Optimistic' and 'Pessimistic' as used by Global Insight refer to the level of economic growth in general, not to those conditions most suitable for increase in the NWF balance. Inflation tends to reduce fee adequacy by reducing the value of the fee and investment revenues received. Because the Pessimistic forecast projects higher inflation, it tends to lead to a negative forecast in terms of fee adequacy. Likewise, the Optimistic forecast has lower inflation, which increases the adequacy of the fee.

The average of the forecasted rates in each Global Insight series is used to extend data through the end of the Program's life.

U.S. Department of Energy, Energy Information Administration

Data from EIA's *Annual Energy Outlook 2007* report provides an additional perspective on predicted inflation and interest rates through 2030. Their projections are intended to reflect the interaction between economic conditions and energy supply and demand. The average of the forecasted rates is used to extend data through the end of the Program's life.

Office of Management and Budget

Projections by OMB come from two sources. One is OMB's annually updated Circular A-94, *Guidelines and Discount Factors for Benefit-Cost Analysis of Federal Programs* (OMB 2007), with revised guidance for the real interest rate. It recommends a single real interest rate for use in calculating the present value of cash flows from long-term (30+ year) government projects. This rate is used for the life of the Program. The second is inflation and short term interest rate data contained in the FY 2008 Presidential Budget projection covering the next six years. For years after 2013, the average of the six years is used.

Market Yield Rates

Market yield data and associated implied inflation rates have been added to this year's report. They reflect the consensus interest rates currently demanded by investors. Ryan Labs, the NWF's investment consultant and a manager and advisor to many clients with long-term obligations, documents daily risk and reward across the relevant investment universe. Ryan Labs monitors interest rates on Treasury securities. Nominal interest rates on conventional Treasury securities include a premium for the inflation level that investors expect. Inflation-linked securities, called Treasury Inflation-Protected Securities (TIPS), do not include this premium and are adjusted semiannually by the Treasury to pay investors for actual inflation. The difference in yields between conventional and inflation linked securities reflects expected inflation and the yield on inflation-linked securities is the "real," or inflation-free, interest rate. Ryan Labs provides nominal, real, and expected inflation rates for maturities from 0 to 30 years. The 30^{th}-year (2037) rates were extended through the end of the life cycle.

Historical Rates

Historical rates are reported in *Stocks, Bills, Bonds, and Inflation* (Ibbotson, 2006) and represent the total annual holding period returns from various investments. For example, if Ibbotson reports one-year return of 5.87 percent, it indicates that one dollar invested at the beginning of the year was worth $1.0587 by the end of the year. The 40-year average of historical rates for 90-day Treasury bills, 10-year bonds, and inflation are used. Ten-year bonds are used because Treasury temporarily suspended issuance of 30-year bonds.

Table 4 shows the extended interest and inflation rates from the sources used.

Table 4: Summary of Inflation and Real Interest Rates

Series	Description	Forecast/ Historical Period	Inflation Rate	Real Interest Rate	90-Day Treasury Bill Rate
Global Insight 2007 Trend	Fiscal Year Averages (Base Case)	2007-2037	1.96%	3.50%	4.71%
Global Insight 2007 Optimistic	Fiscal Year Averages (High Economic Growth Case)	2007-2037	1.47%	3.47%	3.99%
Global Insight 2007 Pessimistic	Fiscal Year Averages (Low Economic Growth Case)	2007-2037	4.00%	2.62%	7.41%
Office of Management and Budget	Inflation and 90-Day T-Bill Interest Rate Forecast from President's Budget; Current 30 Year Bond Discount Rate	2007 to 2012 (inflation), 2036 (interest)	2.30%	3.00%	4.10%
DOE Energy Information Adminis-tration	Fiscal year averages for 2007-2030; Average of the data from 2007-2030 used for years beyond 2030	2007-2030	2.38%	3.84%	4.78%
Ibbotson Historical	Historical fiscal year average used for years 2007 and beyond	1966-2006	4.63%	3.03%	5.89%
Market Yield Rates	Market yield fiscal year averages for 2007-2037; 2037 values used for subsequent years	2007-2037	2.47%	2.24%	5.06%

4 METHODOLOGY

To evaluate the adequacy of the kWh fee, 28 scenarios were created and tested based on the possible combinations of four civilian/defense share allocation percentages and seven economic projections. For each scenario, the model begins with the current NWF balance, adds fee and investment income expected during the year and subtracts spending expected during the year to arrive at a year-end balance. This process is repeated for each year until the end of the Program's life to arrive at a final NWF balance.

The scenario methodology is intended to examine potential outcomes under a broad range of possible circumstances. Changing economic conditions have the greatest effect on financial outcomes and the Global Insight scenarios cover 90 percent of the paths the economy is likely to take, barring an economic crisis. The historical scenario (Ibbotson) reflects data from the oil shocks of the 1970s.

Changing cost shares have smaller effects on outcomes. The selected cost shares are considered to represent the likely range for the current total defense waste quantity.

The projected NWF balances should be seen as indications of the relative adequacy of the current fee level under a variety of scenarios, rather than as predictions of the actual NWF balance in 2133.

5 FEE ADEQUACY RESULTS

A summary of results is shown in Table 5 and graphed in Figure 3 at the end of this document. Results are organized from most favorable to least favorable economic conditions and highest to lowest defense share. Of the 28 scenarios analyzed, 18 result in a positive NWF balance in 2133.

Table 5: Fee Adequacy Results: Nuclear Waste Fund Balance in 2133

Economic Scenarios		Defense Share Scenarios	Potential Balance at End of Program (2133) (billions of constant 2007 dollars)
Scenario Group	**Scenario Name**		
Positive	Global Insight 2007 (Optimistic)	30%	$689.76
		25%	$517.59
		20%	$382.96
		15%	$268.39
Base Case (Trend)	Global Insight 2007 (Trend)	30%	$609.45
		25%	$426.57
		20%	$283.72
		15%	$162.25
	Energy Information Administration	30%	$793.54
		25%	$533.50
		20%	$331.27
		15%	$159.93
	Office of Management and Budget	30%	$251.49
		25%	$145.88
		20%	$61.53
		15%	($11.45)
	Market Rates	30%	$78.61
		25%	$30.42
		20%	($8.62)
		15%	($42.77)
Negative	Global Insight 2007 (Pessimistic)	30%	$54.57
		25%	($17.22)
		20%	($74.68)
		15%	($124.48)
	Ibbotson Historical	30%	($4.61)
		25%	($112.79)
		20%	($199.52)
		15%	($274.79)

This analysis is conducted each year to evaluate the adequacy of the fee using current income, programmatic, and economic assumptions. It is understood that any adjustment to the fee would require compelling evidence that such an adjustment is necessary to ensure future full cost recovery. Such evidence would likely come from more than a single year's analysis. In the event the Secretary determines that the fee is either too low or too high, the Secretary is required to transmit a proposed adjustment to Congress.

5.1 Impact of Cost Share Allocations

A methodology for allocating costs between government-managed nuclear materials and commercial wastes was developed by public rulemaking and published in the Federal Register on August 20, 1987 (52 FR 31508). This rule provides guidance for calculating the defense and civilian shares of total costs. Using the assumptions in the 2007 TSLCC, the defense share of total Program cost is 19.6 percent for 2007. The defense share, however, adjusts each year as assumptions change. To provide a conservative analysis of the adequacy of the fee, a range of defense and civilian shares are used in fee adequacy scenarios.

Making an adjustment to the commercial/defense cost share, while maintaining constant total cost, is used only for fee adequacy purposes. The defense share actually adjusts as assumptions change. In the 2001 TSLCC and fee adequacy reports, the defense share was approximately 27.3% of the total cost. The current downward trend for the defense share is a result of increased commercial SNF, not a change in the amount of defense waste accepted for disposal. If the defense waste quantity were to increase, there would be an increase in the total cost. However, a range of defense waste amounts was not used for this fee adequacy analysis. Any detailed analysis of the variation in defense share allocation would require an adjustment in the total cost of the Program, a range of defense shares is provided in the report at the same Program cost level to provide a perspective of the potential impact of the defense share variation on fee adequacy.

Four civilian/defense share scenarios, ranging from 15 percent defense and 85 percent civilian to 30 percent defense and 70 percent civilian, were analyzed. These define a likely range of possible defense and civilian cost share allocations. The civilian shares determine the funding required from civilian fees, interest income, and the principal balance of the NWF. The effect of a lower defense share is similar to that of a higher civilian Program cost. Higher defense shares, by lowering the civilian percentage of costs, make the fee more adequate. A higher defense share reduces civilian costs and allows greater growth in the NWF.

5.2 Economic Forecasts

Seven economic forecasts were examined for their effect on fee adequacy. Four of these scenarios are best estimate, trend, or base case forecasts, which attempt to project the most likely outcome given current trends. Two of the forecasts are Global Insight's efforts to present a range of forecasts that would encompass 90 percent of all economic scenarios. The remaining series provides historical data. The current market conditions case is considered a base case, because it represents the consensus view of all market participants.

The data in Table 6 show that higher real interest rates and lower inflation improve fee adequacy. Economic conditions with low real interest rates and high inflation are the least beneficial. With

a higher real interest rate and lower inflation, such as in the Global Insight Optimistic scenario, the balance at the end of the life of the Program would be ample, whereas in a scenario with low real interest rates and high inflation, such as the Global Insight Pessimistic scenario, adjustment to the fee may be required at some point to ensure there are sufficient funds for the life of the Program.

5.3 Fee Adequacy Conclusion

A variety of scenarios were analyzed to assess the adequacy of the one mill per kWh fee paid by utilities. The FY 2007 TSLCC, reflecting the latest estimate of total life cycle costs through the end of the Program in 2133, was used for Program costs. A total of 28 cases with varying economic conditions and cost shares were evaluated. Sixteen of the cases are base case or trend economic scenarios, representing the most likely outcomes based on market or forecasted estimates, with average rates from the forecast period (typically 25 or 30 years) applied throughout the Program life. Twelve scenarios are derived using less likely positive and negative economic scenarios. The defense payment ranged from 15 to 30 percent of total Program cost. The fee adequacy is assessed by estimating the NWF balance at Program's end in 2133. If the NWF is positive at the Program's end, then fees are considered to be adequate to cover the cost of the Program.

Table 6: Results of Economic Scenarios

Scenario Group	Economic Scenario	Average Inflation	Average Real Interest	Number of Cost Share Cases with	
				Positive Ending Balances	Negative Ending Balances
Positive	Global Insight Optimistic	1.47%	3.47%	4	0
Base Case (Trend)	Global Insight Trend	1.96%	3.50%	4	0
	DOE Energy Information Administration	2.38%	3.84%	4	0
	Office of Management and Budget	2.30%	3.00%	3	1
	Market Rates	2.47%	2.24%	2	2
Negative	Global Insight Pessimistic	4.00%	2.62%	1	3
	Ibbotson Historical	4.63%	3.03%	0	4
			TOTAL	18	10

Of the 28 scenarios evaluated, 18 had positive NWF balances at Program end, indicating that 64 percent of scenarios had adequate fees. The result was dependent on both the economic scenario

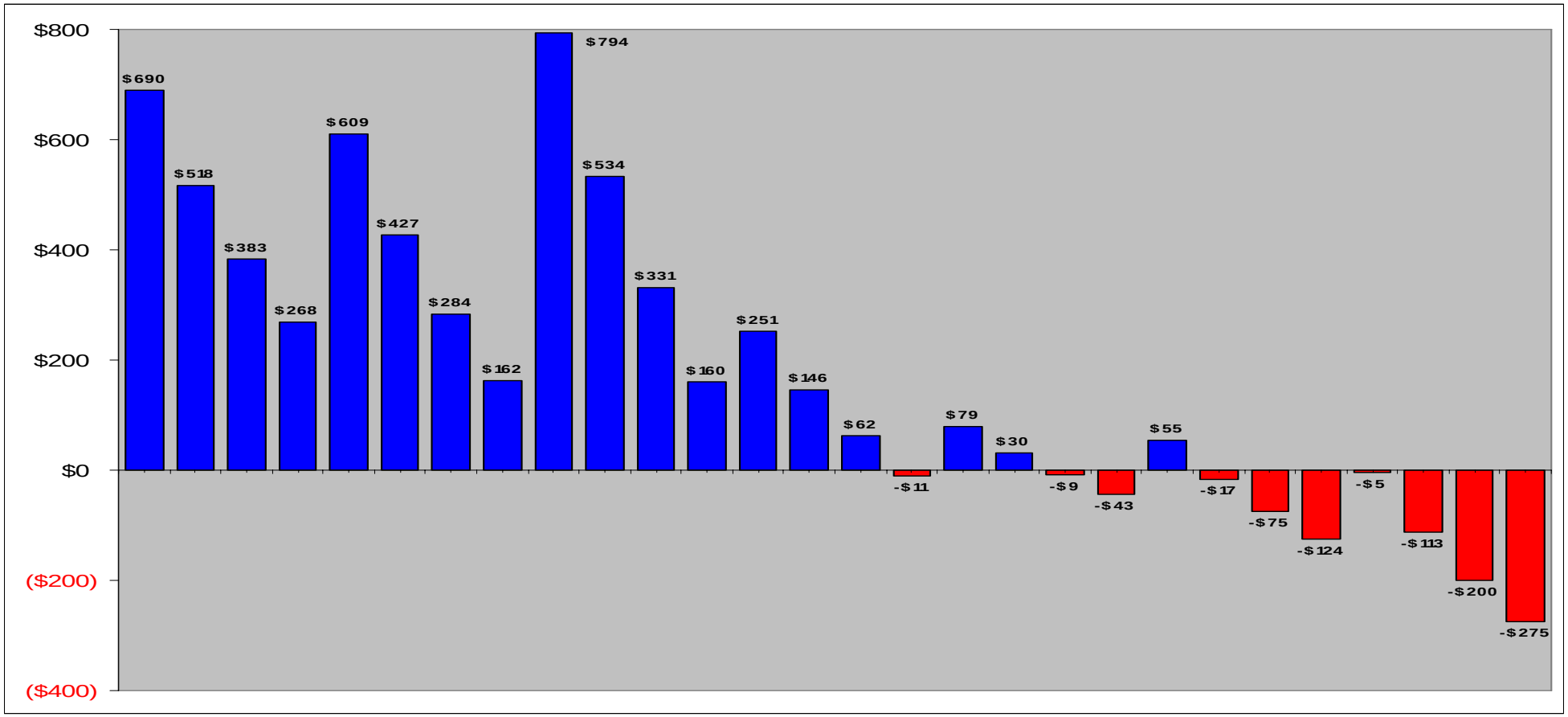
selected and the percentage of defense share. Six of the seven scenarios with 30 percent defense shares had adequate fees, whereas only three of the seven scenarios with 15 percent defense share had adequate fees. Likewise, all of the four most positive economic scenarios had adequate fees, as did 13 of the 16 base case scenarios. However, only one of the eight negative economic scenarios had adequate fees. These results differ from those found in the 2001 fee adequacy analysis in which the fee remained adequate in all the scenarios analyzed. In the 2007 fee adequacy analysis, some of the scenarios indicate that an increase in the fee may be needed in the future, if certain economic projections prevail.

Overall, this assessment concludes that the fee will be adequate to meet the FY 2007 life cycle estimate of the civilian share of Program costs under most estimates of economic conditions and expected defense shares, using the assumptions in the TSLCC estimate.

The Department would not make a decision to adjust the fee based solely on one year's fee assessment. If assumptions for the TSLCC estimate change significantly, however, or if economic projections trend in future years to have low real interest rates and high inflation, a fee adjustment may need to be considered. In particular, one significant analytical assumption is that sufficient and consistent funding will be provided to meet the Program's needs so that the milestones in the TSLCC estimate can be maintained. This analysis did not evaluate possible results if the Program were to continue to receive funding at the historical annual levels of only $300 million to $600 million, nor did it evaluate the impact of an unreliable funding process on the construction schedule. If funding reform to provide reliable, consistent, and sufficient funding each year is not authorized, future fee assessments may need to include a cost scenario in which consistent and sufficient funding each year is not assumed.

Figure 3: Fee Adequacy Assessment Results

Nuclear Waste Fund Balance in 2133 (billions of constant 2007 dollars)



Econ Scenario	GI Opt	GI Opt	GI Opt	GI Opt	GI Trnd	GI Trnd	GI Trnd	GI Trnd	EIA	EIA	EIA	EIA	OMB	OMB	OMB	OMB	Mkt Rate	Mkt Rate	Mkt Rate	Mkt Rate	GI Pess	GI Pess	GI Pess	GI Pess	Hist	Hist	Hist	Hist
Def %	30%	25%	20%	15%	30%	25%	20%	15%	30%	25%	20%	15%	30%	25%	20%	15%	30%	25%	20%	15%	30%	25%	20%	15%	30%	25%	20%	15%
NWF Balance	690	518	383	268	609	427	284	162	794	534	331	160	251	146	62	-11	79	30	-9	-43	55	-17	-75	-124	-5	-113	-200	-275

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