NUREG-1307 Revision 8

Report on Waste Burial Charges

Changes in Decommissioning Waste Disposal Costs at Low-Level Waste Burial Facilities

U.S. Nuclear Regulatory Commission

Office of Nuclear Regulatory Research



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Division of Regulatory Applications Office of Nuclear Regulatory Research U.S. Nuclear Regulatory Commission Washington, DC 20555-0001



Abstract

A requirement placed upon nuclear power reactor licensees by the U.S. Nuclear Regulatory Commission (NRC) is that licensees must annually adjust the estimate of the cost of decommissioning their plants, in dollars of the current year, as part of the process to provide reasonable assurance that adequate funds for decommissioning will be available when needed. This report, which is revised periodically, explains the formula that is acceptable to the NRC for determining the minimum decommissioning fund requirements for nuclear power plants. The sources of information used in the formula are identified, and the values developed for the estimation of radioactive waste burial/disposition costs, by site and by year, are given. Licensees may use the formula, coefficients, and burial/disposition adjustment factors from this report in their cost analyses, or they may use adjustment factors at least equal to the approach presented herein.

New to this report is the inclusion of an alternative low-level waste (LLW) disposition option other than direct disposal at the two remaining operating LLW burial sites. This new option, which is accepted as a valid approach for consideration by licensees, is to contract with waste vendors to provide for the disposition of LLW generated during decommissioning.

This eighth revision of NUREG-1307 contains updated disposal costs for the reference pressurized water reactor (PWR) and the reference boiling water reactor (BWR) and the ratios of disposal costs at the two remaining burial sites in Washington and South Carolina for the year 1998. In addition, disposal costs for the reference reactors and ratios of disposal costs at the Washington, Nevada, and South Carolina sites for the years 1986, 1988, 1991, 1993, 1994, 1995, 1996, and 1997 are provided for historical purposes. This report also provides costs for dispositioning a portion of the total LLW volume using waste vendors, including the ratios of these costs relative to the original 1986 disposal cost estimates. Future updates of NUREG-1307 will provide revised estimates for this alternative LLW disposition option in addition to the direct disposal option. Several sample calculations for estimating the burial/disposition cost for both the old and new options are presented, demonstrating the use of the data contained in this report.

Estimated disposal costs at the Washington site increased by 2% for the reference PWR and 130% for the reference BWR over corresponding estimates for 1997. The large increase for disposal of BWR LLW was primarily due to tripling of the exposure dose rate charges for BWR and to doubling of disposal charges per container and shipment for both PWRs and BWRs. Estimated disposal costs at the South Carolina site remained essentially unchanged (<1% increase) with only the addition of a revised site access fee. The cost of LLW disposition using waste vendors is about 50% less than direct disposal at the South Carolina burial site. At the Washington burial site, however, the waste vendor option is about 5% (BWR) and 40% (PWR) greater than direct disposal.

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Foreword

Nuclear power reactor licensees are required, per 10 CFR 50.75, to adjust annually the estimated decommissioning costs of their nuclear facilities in order to ensure adequate funds are available for decommissioning. The regulation references NUREG-1307 as the appropriate source for obtaining the adjustment factor for waste burial/disposition costs; this Revision 8 of NUREG-1307 provides the current waste burial costs at the Washington and South Carolina disposal sites. In addition, this revision, for the first time, provides costs for low-level radioactive waste disposition using waste vendors. Licensees can factor these numbers into the adjustment formula, as specified in 10 CFR 50.75(c)(2), to determine the minimum decommissioning fund requirement for their nuclear facilities.

Although this report is specifically prepared for the use of power reactor licensees, it can also be a valuable source of information for material licensees on current waste burial/disposition costs. After July 1, 1994, access to the Barnwell, South Carolina, facility was limited to Southeast Compact waste generators. Effective July 1, 1995, the scheduled closure date, December 31, 1995, was canceled and access to the Barnwell facility was extended to waste generators from all States except North Carolina. At the Richland, Washington, facility, disposal rates are determined annually based on waste generator volume projections and a maximum operator revenue set by the Washington Utilities and Transportation Commission. If the total operator revenue is exceeded in a given year, a rebate may be sent to the waste generator.

It is important to note that there is an additional waste disposal facility that may be used in certain specific circumstances by licensees. That facility is operated by Envirocare in Utah and is designed to accept high volume (bulk), low-activity, low-level radioactive waste. However, that facility does not offer the range of disposal capability needed by power reactor licensees that the other established disposal sites provide. That facility also does not issue a rate schedule of waste disposal charges. For these reasons, the Envirocare facility is not included as a reference burial site in this report.

Another option now available to licensees for the disposition of their LLW is to contract with waste vendors to provide these services. Licensees are increasingly recognizing that, generally, waste vendors are more effective at identifying the lowest cost solutions to LLW disposition. This revision of the report provides, for the first time, waste burial/disposition adjustment factors for the waste vendor option, in addition to the standard option of direct disposal at the two available disposal facilities.

Low-level radioactive waste disposal costs are an important element in the cost of decommissioning a nuclear facility. This report provides the latest information that was available at time of publication for licensees to use for annually adjusting the estimated cost of decommissioning their nuclear facilities.

tohn W. Craig, Director V Division of Regulatory Applications Office of Nuclear Regulatory Research

1 Introduction

In 10 CFR 50.75(b), the U.S. Nuclear Regulatory Commission (NRC) requires nuclear power plant licensees to annually adjust the estimate of the cost (in dollars of the current year) of decommissioning their plants. This is just one step of a multi-step process of providing reasonable assurance to the NRC that adequate funds for decommissioning will be available when needed. This report provides adjustment factors for the waste burial/disposition component of the decommissioning fund requirement, as required by 10 CFR 50.75(c)(2). This report also provides the regional adjustment factors for the labor and energy components of the decommissioning fund requirement. The term "adjustment factor," as used in this report and in 10 CFR 50.75(c)(2), refers to increases and/or decreases in decommissioning costs since the NRC regulations were issued. The decommissioning fund requirements in these regulations are in 1986 dollars. This report is periodically updated to reflect changes in waste burial/disposition costs.

Provided within this report is the development of a formula for estimating decommissioning cost that is acceptable to the NRC. The sources of information used in the formula are identified, and the values developed for the adjustment of radioactive waste burial/disposition costs, by site and by year, are given in this report. Licensees may use the formula, the coefficients, and the burial/disposition adjustment factors from this report in their analyses, or they may use an adjustment rate at least equal to the approach presented herein.

The formula and its coefficients, together with guidance to the appropriate sources of data needed, are summarized in Chapter 2. The development of the formula and its coefficients, with sample calculations, are presented in Chapter 3. Price schedules for burial/disposition for 1998 are given in Appendix A for currently operating burial sites and waste vendors. The calculations to determine the burial/disposition cost factors, B_x , for each site and each year of evaluation are summarized in Appendix B.

This eighth revision of NUREG-1307 contains updated low-level waste (LLW) burial/disposition costs for the reference pressurized water reactor (PWR) and the reference boiling water reactor (BWR) and the ratios of LLW burial/disposition costs at the two remaining burial sites in Washington and South Carolina for the year 1998. In addition, disposal costs for the reference reactors and ratios of disposal costs at the Washington, Nevada, and South Carolina sites for the years 1986, 1988, 1991, 1993, 1994, 1995, 1996, and 1997 are provided for historical purposes. In addition to direct disposal at the two remaining burial sites, this report also, for the first time, includes the option of LLW disposition by waste vendors.

Burial cost surcharges mandated by the Low-Level Radioactive Waste Policy Amendments Act of 1985 (LLRWPAA) have been incorporated into the revised ratio tables for the years 1986, 1988, and 1991, and are provided in Appendix D. The provisions in the Act that mandated these surcharges expired at the end of 1992. Thus, the values of the ratios of disposal costs calculated for the years 1993 and later do not include the LLRWPAA surcharges.

Year

1998

The elements of decommissioning cost, per 10 CFR 50.75(c)(2), are assigned to three categories: those that are proportional to labor costs, L_x ; those that are proportional to energy costs, E_x ; and those that are proportional to burial costs, B_x . The adjustment of the total decommissioning cost estimate can be expressed by

Estimated Cost (Year X) =
$$[1986 \text{ Cost}] [A L_x + B E_x + C B_x]$$

where A, B, and C are the fractions of the total 1986 dollar costs that are attributable to labor (0.65), energy (0.13), and burial (0.22), respectively, and sum to 1.0. The factors L_x , E_x , and B_x are defined by

- $L_x =$ labor cost adjustment, January of 1986 to January of Year X,
- E_x = energy cost adjustment, January of 1986 to January of Year X, and
- B_x = LLW burial/disposition cost adjustment, January of 1986 to January of Year X (i.e., burial/disposition cost in January of Year X / burial cost in January of 1986).

Licensees are to evaluate L_x and E_x for the y-ars subsequent to 1986 based on the national producer price indices, national consumer price indices, and on local conditions for a given site (see Chapter 3).

 B_x is evaluated by recalculating the costs of burial/disposition of the radioactive wastes from the reference PWR (Ref. 1) and the reference BWR (Ref. 2) based on the price schedules provided by the available burial sites/waste vendors for the year of interest. The results of these recalculations are presented in Table 2.1, by site and by year. Previous issues of this report had considered direct burial of LLW at an available LLW disposal site as the only LLW disposition option. This update includes the additional LLW disposition option of turning the majority of the LLW generated during decommissioning over to waste vendors for disposition. The B_x values for this option are provided in Table 2.1 for 1998 (see footnote (e) at the bottom of the table). It is left to the licensees to determine

whether direct disposal or disposition using waste vendors best represents their particular situation.

Table 2.1 Values of B, as a Function of LLW Burial Site, Waste Vendor, and Year

Values of B _x (PWR/BWR) ^(a) (No Surcharges, No Penalties)				
Washington	Nevada	South Carolina		
3.165/14.403 ^(b) 4.538/15.203 ^(b, c)	j' ^(c)	15.886/13.948 7.173/6.968 ⁶		

	4.538/15.203	^(c) / (c)	7.173/6.968(0, 0)	
1997	3.112/6.264 ^(b)	/ ^(c)	15.852/13.837 ^(d)	
1996	2.845/3.294 ^(b)	/ ^(C)	12.771/10.3'79 ^(d)	
1995	2.015/1.878 ^(b)	/ ^(c)	12.824/10.420 ^(d)	
1994	2.521/2.373 ^(b)	/(c)	11.873/9.794 ^(f)	
	/	/	6.619/5.714 ^(g)	
1993	2.002/1.943 ^(b)	/ (C)	11.408/9.434(1)	
	/	/	6.155/5.354 ^(g)	
1991	1.326/1.184	1.334/1.296	2.494/2.361	
1988	1.223/1.093	1.193/1.175	2.007/1.831	
1986	1.000/1.000	0.857/0.898	1.678/1.561	

- (a) The values presented in this table are developed in Appendix B, with all values normalized to the 1986 Washington (PWR/BWR) values with no LLRWPAA surcharges or penalties by dividing the calculated burial costs for each site and year by the Washington site burial costs calculated for the year 1986.
- (b) Effective 1/1/93, the Washington site is not accepting waste from outside the Northwest and Rocky Mountain Compacts.
- (c) Nevada site closed 12/31/92.
- (d) Effective 7/1/95, access is allowed for all states except North Carolina.
- (c) Effective with the 1998 update of NUREG-1307, turning over the majority of LLW to waste vendors for disposition is considered a possibility.
- (f) Includes \$220/ft3 out-of-region access fee.
- (g) Includes \$74/ft³ in-region access fee.

Consideration of LLRWPAA surcharges and penalties (which ceased being imposed on January 1, 1993) is given in Appendix D for historical purposes. As noted in the footnotes to Table 2.1, the LLW disposal site in Nevada ceased operation as of December 31, 1992, and is therefore

3 Development of Cost Adjustment Formula

The evaluations presented in this chapter are based on information presented in NUREG/CR-0130 (Addendum 4) and NUREG/CR-0672 (Addendum 3) (Refs. 1, 2), in which the estimated costs for immediate dismantlement of the reference PWR and the reference BWR are adjusted to January 1986 dollars. Decommissioning costs are divided into three general areas per 10 CFR 50.75(c)(2) that tend to escalate similarly: (1) iabor, materials, and services, (2) energy and waste transportation, and (3) radioactive waste burial/disposition. A relatively simple equation can be used to determine the minimum decommissioning fund requirement in 1998 or previous year dollars. That equation is

Estimated Cost (Year x) = $[1986 \text{ $Cost}]^*(A L_x + B E_y + C B_y)$

where

Estimated Cost (Year x)

 estimated decommissioning costs in Year x dollars,

[1986 \$ Cost]

- = estimated decommissioning costs in 1986 dollars,
- A = fraction of the [1986 \$ Cost] attributable to labor, materials, and services (0.65)
- B = fraction of the [1986 \$ Cost] attributable to energy and transportation (0.13)
- C = fraction of the [1986 \$ Cost] attributable to waste burial (0.22)
- $L_x =$ labor, materials, and services cost adjustment, January of 1986 to January of Year x
- E_x = energy and wast ansportation cost adjustment, January of 1986 to January of Year x
- B_x = radioactive waste burial/disposition and surcharge cost adjustment, January of 1986 to nominally January of Year x (i.e.,

burial/disposition cost in nominally January of Year x / burial cost in January of 1986)

$$(R_x + \sum S_x) / (R_{1986} + \sum S_{1986})$$

where:

R_x = radioactive waste buriel/disposition (...) (excluding surcharges) in Year x do (...)

 $\sum S_x$ = summation of surcharges in Year : dc lars

R₁₉₆₆ = radioactive waste burial costs (excluding surcharges) in 1986 dollars

 $\sum S_{1986}$ = summation of surcharges in 1986 dollars.

Values for L_x and E_x for years subsequent to 1986 are to be based on the national producer price indices, national consumer price indices, and local conditions for a given site, as outlined in Sections 3.1 and 3.2. Thus, the licensee can evaluate these parameters appropriately for a particular site. The values to be used in determining B_x are taken from actual cost schedulc d from price quotes by waste vendors.

Prior to 1993, calculation of B, included basic disposal costs plus surcharges resulting from the Low-Level Radioactive Waste Policy Amendments Act of 1985 (LLRWPAA). Surcharges mandated by the LLRWPAA were applied to wastes generated outside the regional waste compact in which the LLW burial facility is located. As of January 1992, surcharges were \$40/ft3 for wastes generated within a compact which has met the milestones given in the LLRWPAA toward implementing an LLW disposal facility in their compact and \$120/ft3 (\$40/ft3 surcharge plus \$80/ft3 penalty) for wastes generated within a compact which has not met the milestones given in the LLRWPAA toward implementing an LLW disposal facility in their compact. After December 31, 1992, no LLRWPAA surcharges are assessed and are therefore no longer applicable to the calculation of B, Values of B, for 1998, and earlier years, are provided to the licensees via this report for information purposes only, as described in Section 3.3.

The major elements of the three components of the decommissioning cost estimates for both the reference PWR and BWR are provided in Table 3.1. Considering the uncertainties and contingencies contained within these numbers, and considering that the values of the coefficients for the PWR and the BWR are so similar, the best estimates of their values are their averages:

 $\overline{A} = 0.65$ $\overline{B} = 0.13$ $\overline{C} = 0.22$

for both the PWR and BWR estimates.

3.1 Labor Adjustment Factors

The adjustment factor for labor, L_x , can be obtained from "Monthly Labor Review," published by the U.S. Department of Labor, Bureau of Labor Statistics (BLS) (Ref. 4). Specifically, the appropriate regional data from the table (currently Table 24) entitled "Employment Cost Index, Private Nonfarm Workers, by Bargaining Status, Region, and Area Size," subtitled "Compensation," should be used. These labor adjustment factors can also be obtained from BLS databases made available on the World Wide Wey (see Appendix C for instructions). L_x should be adjusted from a base value in Table 24 corresponding to the amounts in the decommissioning rule amendments that are in January 1986 dollars.

Table 3.1 Evaluation of the Coefficients A, B, and C in January 1986 Dollars

	Reference PWR Values		s Reference BWR Values	
Cost Category	(millions)	Coefficient	(millions)	Coefficient
Labor	17.98 ^(a)		35.12 ^(b)	
Equipment	1.64(a)		4.03 ^(b)	
Supplies	3.12 ^(a)		3.71 ^(b)	
Contractor	12.9 ^(a)		21.1 ^(b)	
Insurance	1.9 ^(a)		1.9 ^(b)	
Containers	10.9 ^(d)		8.14 ^(c)	
Added Staff	7.5 ^(a)		4.4 ^(b)	
Added Supplies	1.2 ^(a)		0.2 ^(b)	
Spec. Contractor	0.78 ^(a)		0.71 ^(h)	
Pre-engineering	7.4 ^(a)		7.4 ^(b)	
Post-TMI-beckfits	0.9 ^(a)		0.1 ^(b)	
Surveillance	0.31 ^(a)			
Fees	0.14 ^(a)		0.14 ^(b)	
Subtotal	66.67	A = 0.64	86.95	A = 0.66
Energy	8.31 ^(a)		8.84 ^(b)	
Transportation	6.08 ^(d)		7.54(0)	
Subtotal	i4.39	B = 0.14	16.38	B = 0.12
Burial		C = 0.22	29.98 ^(c)	C = 0.22
Total	103.54		133.31	

Note: All costs include a 25% contingency factor.

(a) Based on Table 3.1, NUREG/CR-0130, Addendum 4.

(b) Based on Table 3.1, NUREG/CR-0672, Addendum 3.

(c) Based on Table 5.2, NUREG/CR-0672, Addendum 3.

(d) Based on Table 6.2, NUREG/CR-0130, Addendum 4.

To calculate a labor adjustment factor for a particular region, two indices and a scaling factor are needed. These values are shown in Table 3.2 for each region. The base index of L_x from the BLS data for January 1986 is listed in Course 2 of Table 3.2. These values are based on an index value of 100 in June 1981 (Base June 1981 = 100). However, current BLS index values (1997) are based on an index value of 100 in June 1989 (Base June 1989 = 100). These values are shown in column 3. To convert between these two indices, regional scaling factors are needed. These scaling factors are listed in the last column in Table 3.2.

Table 3.2	Regional	Factors fo	r Labor	Cost A	Adjustment
-----------	----------	------------	---------	--------	------------

Region	1986 Reference (Base June 1981 = 100)	Current Year (1997) (Base June 1989 = 100)	Scaling factor
Northeast	130.5	135.0	1.555
South	127.7	134.6	1.441
Midwest	125.0	136.9	1.409
West	130.1	133.4	1.449

In general, L_x is calculated for each region by multiplying the 1997 value (column 3) by the scaling factor (column 4) and then dividing by the reference value (column 2). For example, for the Northeast region:

$$\begin{split} L_x &= (135.0)_{\text{Base 1989}} (\text{column 3}) \\ & x (1.555)_{\text{Base 1981/Base 1989}} (\text{column 4}) \\ &+ (130.5)_{\text{Base 1981}} (\text{column 2}) \\ &= 1.609. \end{split}$$

This value of $L_x = 1.609$ should then be used in the equation to adjust the labor cost (to January 1998 dollars) for decommissioning a nuclear power plant located in the Northeast region of the U.S.

3.2 Energy Adjustment Factors

The adjustment factor for energy, E_{xy} can be obtained from the "Producer Price Indexes," published by the U.S. Department of Labor, Bureau of Labor Statistics (BLS) (Ref. 5). Specifically, data from the table (currently Table 6) entitled "Producer Price Indexes and Percent Changes for Commodity Groupings and Individual Items" (PPI) should be used.

E_x is made up of two components, namely, industrial electric power, P_x, and light fuel oil, F_x. Hence, E_x should be obtained using the BLS data in the following equations: for the reference PWR, $[0.58P_x + 0.42F_x]$ and for the reference BW: $[0.54P_x + 0.46F_x]$. These equations are derived from Vr/Ve_x .) of Reference 1 and Table 5.3 of Reference 2. P_x (acculd be taken from data for industrial electric pow x (Commodity code 0543 in Table 6), and F_x should be taken from data for light fuel oils (Commodity code 0573 in Table 6). These energy adjustment factors can also be obtained from BLS databases made available on the World Wide Web (see Appendix C for instructions).

As discussed for L_x in Section 3.1 above, P_x and F_x should be adjusted from a base value in the BLS table corresponding to the amounts in the decommissioning rule amendments that are in January 1986 dollars. The base values of P_x and F_x from the BLS data for January 1986 are 114.2 and 82.0, respectively. No regional BLS data for these PPI commodity codes are currently available. All PPI values are based on a value of 100 for the year 1982 (Base 1982 = 100). Thus, the values of P_x and F_x for December 1997 (latest data available) are

- $P_x = 128.3$ (the December 1997 value) + 114.2 (the January 1986 value) = 1.123
- $F_x = 59.4$ (the December 1997 value) \div 82.0 (the January 1986 value) = 0.724.

The value of E, for the reference PWR is therefore

 $E_x = [(0.58 \times 1.123) + (0.42 \times 0.724)] = 0.955.$

This value of $E_x = 0.955$ should then be used in the equation to adjust the energy cost (to January 1998 dollars) for decommissioning a PWR. Correspondingly, for a BWR, $E_x = 0.939$.

3.3 Waste Burial Adjustment Factors

The adjustment factor for waste burial/disposition, B_x , can be taken directly from data on the appropriate LLW burial location as given in Table 2.1 of this report. For example, $B_x = 15.886$ (in 1998 dollars) for a PWR directly disposing all decommissioning LLW at the South Carolina burial site.

3.4 Sample Calculations of Estimated Reactor Decommissioning Costs

Several sample calculations are provided in this section to demonstrate the use of the decommissioning cost equation developed above using the appropriate adjustment terms of L_x for labor, material, and services, E_x for energy and waste transportation, and B_x for radioactive waste burial/disposition.

Example 1 (LLW Direct Disposal)

Scenario Description Reactor Type: PWR Thermal Power Rating: 3400 MW _b Location of Plant: Western Region of the U.S. LLW Disposition Preference: Direct Disposal LLW Burial Location: Washington
Base Cost (1986 Dollars) ≈ \$105 million [from 10 CFR 50.75(c)(1)]
$L_x = (133.4)^{\circ}(1.449)/(130.1) = 1.486$ [from Table 3.2]
$E_x = 0.955$ [from Section 3.2]
B _x = 3.165 [from Table 2.1]
DecommissioningCost (1998 Dollars) = (\$105 million)*[(0.65)*(1.486)+(0.13)*(0.955)+(0.22)*(3.165)] = \$188 million

Example 2 (LLW Direct Disposal)

Scenario Description Reactor Type: PWR Thermal Power Rating: 3400 MW _a Location of Plant: Northeast Region of the U.S. LLW Disposition Preference: Direct Disposal LLW Burial Location: South Carolina
Base Cost (1986 Dollars) = \$105 million [from 10 CFR 50.75(c)(1)]
$L_x = (135.0)^*(1.555)/(130.5) = 1.609$ [from Table 3.2]
E _x = 0.955 [from Section 3.2]
B _x = 15.886 [from Table 2.1]
DecommissioningCost (1998 Dollars) = (\$105 million)*[(0.65)*(1.609)+(0.13)*(0.955)+(0.22)*(15.886)] = \$490 million

Example 3 (LLW Disposition by Waste Vendors)

Scenario Description Reactor Type: PWR Thermal Power Rating: 3400 MW _a Location of Plant: Northeast Region of the U.S. LLW Disposition Preference: Contract with Waste Vendors LLW Burial Location: South Carolina
Base Cost (1986 Dollars) = \$105 million [from 10 CFR 50.75(c)(1)]
$L_x \approx (135.0)^{\circ}(1.555)/(130.5) = 1.609$ [from Table 3.2]
E _x = 0.955 [from Section 3.2]
B _x = 7.173 [from Table 2.1]
DecommissioningCost (1998 Dollars) = (\$105 million)*[(0.65)*(1.609)+(0.13)*(0.955)+(0.22)*(7.173)] = \$289 million

Example 4 (LLW Disposition by Waste Vendors)

Scenario Description Reactor Type: BWR Thermal Power Rating: 3400 MW _m Location of Plant: Midwest Region of the U.S. LLW Disposition Preference: Contract with Waste Vendors LLW Burial Location: South Carolina
Base Cost (1986 Dollars) = \$135 million [from 10 CFR 50.75(c)(1)]
$L_x = (136.9)^*(1.409)/(125.0) = 1.543$ [from Table 3.2]
E _x = 0.939 [from Section 3.2]
B _x = 6.968 [from Table 2.1]
DecommissioningCost (1998 Dollars) = (\$135 million)°[(0.65)*(1.543)+(0.13)*(0.939)+(0.22)*(6.968)]

= \$359 million

4 References

- Konzek, G. J., and R. I. Smith, "Technology, Safety and Costs of Decommissioning a Reference Pressurized Water Reactor Power Station - Technical Support for Decommissioning Matters Related to Preparation of the Final Decommissioning Rule," (Report prepared by Pacific Northwest Laboratory, Richland, Washington), NUREG/CR-0130, Addendum 4, U.S. Nuclear Regulatory Commission, July 1988.
- Konzek, G. J., and R. I. Smith, "Technology, Safety and Costs of Decommissioning a Reference Boiling Water Reactor Power Station - Technical Support for Decommissioning Matters Related to Preparation of the Final Decommissioning Rule," (Report prepared by Pacific Northwest Laboratory, Richland, Washington), NUREG/CR-0672, Addendum 3, U.S. Nuclear Regulatory Commission, July 1988.
- U.S. Nuclear Regulatory Commission, Office of Nuclear Regulatory Research, "Report on Waste Burial Charges - Escalation of Decommissioning Waste Disposal Costs at Low-Level Waste Burial Facilities," NUREG-1307, Revision 7, November 1997.
- U.S. Department of Labor, Bureau of Labor Statistics, Monubly Labor Review, Table 24, Updated Periodically.
- U.S. Department of Labor, Bureau of Labor Statistics, *Producer Price Indexes*, Table 6, Updated Periodically.

Appendix A

LLW Burial/Disposition Prices for the Current Year

Appendix A

LLW Burial/Disposition Prices for the Current Year

This appendix contains the price schedules for burial/disposition of low-level wastes at the Washington and South Carolina sites for the year 1998. Also provided are vendor price quotes for disposition of LLW generated by the decommissioning of nuclear power plants. These schedules are used to calculate the results shown in Appendix B used to develop the waste burial adjustment factor, B_x , for the year 1998.

A.1 Washington LLW disposal Site

Beginning in 1993, the Northwest Compact imposed on eligible (Northwest or Rocky Mountain Compact) waste generators an annual permit fee based on the volume of waste to be shipped to the Washington site for disposal. In 1998, the annual permit fee ranges from \$400 to \$40,006. Hospitals, universities, research centers, and industries pay the lower fees, and nuclear power plants pay the highest fee of \$40,000 per year. The permit fees for nuclear power plants are included in this analysis for the years 1993 and later.

Beginning in 1994, the rate schedule for handling and disposing of heavy objects (greater than 5,000 pounds) at the Washington site was revised to recover additional crane rental costs from the waste generator. In 1996, the heavy object limit was raised to 17,500 pounds. A series of shipments of heavy objects for disposal was assumed that would minimize the crane surcharge and result in only a one-time heavy object charge.

Effective January 1, 1996, the operator of the Washington site implemented a restructured rate schedule based on waste volume, number of shipments, number of containers, and dose rate at the container surface. Each waste generator is also assessed an annual site availability charge based on cumulative volume and dose rate at the surface of all containers disposed. The site availability charge appears near the bottom of Tables B.1 through B.3. In 1997, and again in 1998, the operator of the Washington site more than tripled rate charges on containers having surface dose rates in excess of 100 R/hr. The overall increase arising from these two increases is about a factor of 11. These large increases affect the overall burial costs for a BWR reactor more than for a PWR reactor since the BWR usually has more highly irradiated components than a PWR.

Exhibit A.1 provides the current rate schedule for the Washington LLW disposal site, effective May 1, 1998.

A.2 South Carolina LLW Burial Site

At the South Carolina site, during the period of January 1, 1993 through June 30, 1994, the Southeast Compact imposed the collection of access fees of \$220/ft³ from all eligible out-of-region waste generators. Eligible generators were those in compact regions or unaffiliated states that were in compliance with the Low-Level Radioactive Waste Policy Amendments Act of 1985 (LLRWPAA). Large waste generators (greater than 1,500 cubic feet for that period) were assessed an access fee based on their waste volume projection for that period. One-sixth of the access fee was paid in advance on a quarterly basis. Large waste generators from the Southeast Compact states paid an access fee of \$74/ft³.

Access to the South Carolina site by waste generators outside the Southeast Compact ended June 30, 1994, with site closure scheduled for December 31, 1995. However, effective July 1, 1995, the scheduled closure was canceled and access to the Barnwell facility was extended to all states except North Caroling.

Effective November 1, 1996, the operator of the South Carolina disposal site implemented a restructured waste disposal rate schedule. The restructured pricing is based on weight, dose rate, and curies with a cost incentive toward higher density packaging. All business after November 1, 1996, while through customer-specific contracts. Effective July 1, 1998, the operator of the South Carolina disposal site imposed a site access fee on users which varies according to their level of use. Access fees for large users (e.g., utilities with nuclear plants) average about \$205,000 per year. The site access for appears near the bottom of Table B.10 for the South & volina disposal site.

Exhibit A.2 provides the current rate schedule for the South Carolina LLW disposal site, effective January 1998.

A.3 LLW Disposition by Waste Vendors

Rapidly increasing fees for disposal of low-level radioactive waste has spawned the creation of a niche market for firms specializing in the management of LLW. Increasingly, licensees of nuclear power plants are outsourcing LLW management functions to these waste vendors for a negotiated fee (usually \$/pound of LLW processed). The degree to which LLW management functions are outsourced is negotiated on a case-by-case basis. Waste vendors can manage all LLW management functions from time of generation to disposal (including packaging, transportation, and volume reduction) or any subset of these functions as desired by the licensee.

The vendor determines the most efficient disposition process for each waste stream, which may include sorting into clean/contaminated streams, recycling where possible, volume reduction via the many techniques currently commercially available, and disposal of the residual LLW at the most cost effective disposal site. The vendor's profit is the difference between the price negotiated with the licensee and the total cost for waste minimization, recycling, volume reduction, packaging, transportation, and disposal. The more effective the vendor is at minimization, recycling, volume reduction, and obtaining volume discounts for packaging, transportation, and disposal, the greater will be the profit.

Currently, there are approximately 10 waste vendors operating in the United States. Clearly, waste management costs at nuclear power plants are being reduced through the use of waste vendors. Also, closer attention to LLW management by power plant licensees has resulted in dramatic reductions of LLW being disposed of at the commercial LLW burial sites. Since publication of NUREG/CR-0130 and NUREG/CR-0672, the average annual LLW volume disposed of by nuclear power plants has decreased by an order of magnitude. This volume reduction has been achieved through a combination of increased efforts to minimize the volume of LLW generated to begin with and increased use of waste vendors to reduce the volume of disposed LLW.

The trend of utilizing waste vendors by licensees of operating nuclear power plants is also now being observed at nuclear power plants being decommissioned. Table A.1 shows the disposition destination for LLW generated between 1993 and 1997 during the decommissioning of the Yankee Rowe Nuclear Power Plant (NPP). Over 60% of the waste generated during the decommissioning of this plant was contracted to waste vendors for disposition.

The decommissioning analyses reported in NUREG/CR-0130 and NUREG/CR-0672 did not consider the possible use of waste vendors given that this market niche essentially did not exist at the time. Since the use of waste vendors has clearly become an accepted practice by the nuclear power industry for operations and decommissioning since that time, this update of NUREG-1307 includes an alternative that provides for contracting with waste vendors to manage the disposition of certain portions of LLW generated during decommissioning. This new alternative does **not** modify or alter in any way the bases for the decommissioning fund requirement specified in 10 CFR 50.75. It merely provides another burial cost adjustment factor (B_x) that reflects LLW disposition by waste vendors.

In support of this analysis, several waste vendors were surveyed to develop a representative cost for waste vendor services. Each of the vendors was asked to provide a generic price quote for processing two waste streams: activated/contaminated concrete and contaminated metal. They were asked to provide these quotes as a price per pound of waste, or as a range of price per pound, based on the waste concrete and metal inventories in NUREG/CR-0130 and NUREG/CR-0672. The price quotes were to encompass complete disposition of these waste streams (from generation to disposal) and were to be developed assuming the vendor had a contract with a license maged in a large decommissioning project.

Five vendors provided price quotes in response to the survey. The price quotes are provided in Table A.2. For confidentiality reasons, the vendors providing the data are not identified. The vendor prices used to calculate the waste burial/ disposition cost factors, B_{...} for both PWR and BWR were \$1.50/lb for activated/contaminated concrete and \$2.00/lb for contaminated metal. These were developed by taking the average of the three mid-range values in Table A.2 and rounding the result up to the next half dollar. In order to minimize the effect of differences in assumptions in what the vendors did or did not include in their price quotes, both the low and high price quotes were eliminated from the average price calculation.

This analysis assumed that disposition of dry active waste (DAW) was contracted by waste vendors at the same price as activated/contaminated concrete. All liquid radioactive waste and activated metal are dispositioned as assumed in NUREG/CR-0130 and NUREG/CR-0672 or, in other words, they go directly to disposal without further

Table A.1 Disposition Destination of Yankee Rowe NPP LLW⁽ⁿ⁾

LLW Destination	LLW Volume (ft ³)	LLW Volume (% of Total)
South Carolina Disposal Site	30,867	21.1
Utah Disposal Site	22,390	15.3
Waste Vendors	92,428	63.3
Liquid LLW Vendors	585	0.3
Total	146,070	100.0

(a) Reference: NRC Public Document Room (PDR) under NUREG-1307, Revision 8

processing. The resulting B_x will be conservative for the following reasons:

- the waste vendor prices used are at the upper range of the price quotes provided and
- the waste vendor quotes included packaging and transportation of LLW, which are already included in the labor and energy cost elements, respectively, of the 10 CFR 50.75 algorithm.

Also, when utilization of waste vendors is more cost effective than direct disposal, the resulting B_x will further be conservative because at least some of the activated metal could be dispositioned more economically through the services of a waste vendor.

Vendor	Activated/Contaminated Concrete (\$/lb)	Contaminated Metal (\$/lb)
Vendor #1	0.55 - 0.89	0.87 - 1.50
Vendor #2	1.50 - 2.00	2.50 - 3.00
Vendor #3	1.00 - 1.50	1.50 - 1.75
Vendor #4	0.24 - 0.31	1.57 - 1.70
Vendor#5	1.72	1.85

Table A.2 Price Quotes for Waste Vendor Services(a)

(a) Reference: NRC Public Document Room (PDR) under NUREG-1307, Revision 8

Exhibit A.1

US ECOLOGY, INC. RICHLAND, WASHINGTON FACILITY RADIOACTIVE WASTE DISPOSAL

DISPL SAL CHARGES EFFECTI E MAY 1, 1998 SCHEDULE A, VIGHTH REVISION

Note: Rates in this schedule A are subject to adjustment in scordance with the rate adjustment mechanism adopted in the Commission's sixth supplemental order in Docket No. UR-950619. These rates reflect the third year of a three-year phase-in of a revised rated design, in accordance with the stipulation accepted by the Commission in its fifth supplemental order in Docket No. UR-950619.

A. SITE AVAILABILITY CHARGE

	 - 6 -	-
	 2012	- 10
	 -	-

Block	K Block Criteria Annual Charge per Generator
0	No site use at all
1	Greater than zero but less than or equal to 10 ft ³ and 50 mR/h
2	Greater than 10 ft ³ or 50 mR/h° but less than or equal to 20 ft ³ and 100 mR/h°
3	Greater than 20 ft ³ or 100 mR/h° but less than or equal to 40 ft ³ and 200 mR/h°
4	Greater than 40 ft ³ or 200 mR/h° but less than or equal to 80 ft ³ and 400 mR/h°
5	Greater than 80 ft ³ or 400 mR/h° but less than or equal to 160 ft ³ and 800 mR/h°
6	Greater than 160 ft ³ or 800 mR/h* but less than or equal to 320 ft ³ and 1,600 mR/h*
7	Greater than 320 ft ³ or 1,600 mR/h° but less than or equal to 640 ft ³ and 3,200 mR/h*
8	Greater than 640 ft ³ or 3,200 mR/h* but less than or equal to 1,280 ft ³ and 6,400 mR/h*
9	Greater than 1,280 ft ³ or 6,400 mR/h° but less than or equal to 2,560 ft ³ and 12,800 mR/h°
10	Greater than 2,560 ft ³ or 12,600 mR/h* but less than or equal to 5,120 ft ³ and 25,600 mR/h*
11	Greater than 5,120 ft ³ or 25,600 mR/h*
En	r summers of determining the site multiplifty change on D Anur is calculated by summing the -D to

For purposes of determining the site availability charge, mR/hour is calculated by summing the mR per hour at container surface of all containers received during the year.

2. Exemptions

As to waste which is generated for research, medical or educational purposes, educational research institutions shall be placed in a rate block for the site availability charge which is one (1) lower than what would otherwise apply through application of the block criteria shown above. <u>"Educational research institution" means a state or independent, not-for-profit, post-secondary educational institution.</u>

b. As to waste which arises as residual or secondary waste from brokers' provision of compaction or processing services for others, if application of the block criteria shown above would place a broker in a rate block for the site availability charge which is greater than Block No. 7, such broker shall be placed in the rate block which is the greater of (I) Block No. 7, or (ii) the block which is two (2) lower than what would otherwise apply through application of the block criteria shown above. "Brokers" are those customers holding the "broker" classification of site use permits issued by the Department of Ecology.

3. Payment Arrangements

a. Initial Determination

Initial determination as to the applicable rate block for each customer shall be based on projections provided by customers prior to the beginning of each calendar year. For those customers who do not intend to ship waste to the facility during the calendar year (those assigned to block No. 0) and for those customers who are initially determined to fall into block Nos. 1-2, the entire site availability charge for the year will be due and payable as of January 1. For those customers who are initially determined to fall into block Nos. 3-6, the entire site availability charge special arrangements with the Company to pay the charge in equal installments at the beginning of each calendar quarter. For those generators who are initially determined to fall in block Nos. 9-11, 1/12 of the site availability charge will be due and payable as of January 1. Bow the beginning of each calendar quarter.

b. Reconciliation

The site availability charge is assessed on the basis of actual volume and dose rate of waste delivered during the calendar year. Assessment of additional amounts, or refunds of overpaid amounts, will be made as appropriate to reconcile the initial determination regarding applicable rate block with the actual volume and dose rates during the calendar year.

Appendix A

Exhibit A.1 (Continued)

SCHEDULE A (Continued)		A (Continued)	US ECOLOGY, INC. RICHLARD, WASHINGTON FACILITY	EFFECTIVE MAY 1, 1998		
В.	DISPOSAL RATES		DISPOSAL RATES			
	1.	Volume:	\$30.60 per cubic foot			
	2.	Shipment	\$6,280 per manifested shipment			
	3.	Container:	\$1,158 per container on each manifest.			
	4.	Exposure:				
		Block No.	Dose Rate at Container Surface	Charge per Container		
		1	Less than or equal to 200 mR/h	\$ 133		
		2	Greater than 200 mR/h but less than or equal to 1,000 mR/h			
		3	Greater than 1,000 mR/h but less than or equal to 10,000 mR/h			
		4	Greater than 10,000 mR/h but less than or equal to 100,000 mR/	h		
		5	Greater than 100,000 mR/h			

EXTRAORDINARY VOLUMES

Waste shipments qualifying as an "extraordinary volume" under RCW 81.108.020(3) are charged a rate equal to 51.5% of the volume disposal rate.

NUCLEAR DECOMMISSIONING WASTE

The volume disposal rate applicable to waste from the decommissioning of nuclear generating units shall be 80% of those set forth above; provided, however, that such waste must satisfy the quantity requirements for "extraordinary volume" under RCW 81.108.020(3).

SCHEDULE B Surcharges and Other Special Charges Third Revision

ENGINEERED CONCRETE BARRIERS

72" x 8' barrier 84" x 8' barrier \$7,006.00 each \$8,828.00 each

SURCHARGE FOR HEAVY OBJECTS

The Company shall collect its actual labor and equipment costs incurred, plus a margin thereon of 25%, in handling and disposing of objects or packages weighing more than seventeen thousand five hundred (17,500) pounds.

> SCHEDULE C Tax and Fee Rider Tenth Revision

The rotes and charges set forth in Schedules A and B shall be increased by the amount of any fee, surcharge or tax assessed on a volume or gross revenue basis against or collected by US Ecology, as listed below:

Perpetual Care and Maintenance Fees	\$1.75 per cubic foot
Business & Occupation Tax	3.3% of rates and charges
Site Surveillance Fee	\$6.00 per cubic foot
Surcharge (RCW 43.200.233)	\$6.50 per cubic foot
Commission Regulatory Fee	1.0% of rates and charges

-end-

A.5

Appendix A

Exhibit A.2

Chem-Nuclear Systems, L.L.C.

Barnwell Low-Level Radioactive Waste Management Disposal Facility Pricing Schedule Example

All radwaste material shall be packaged in accordance with Department of Transportation and Nuclear Regulatory Commission Regulations in Title 49 and Title 10 of the Code of Federal Regulations, Chem-Nuclear Systems, L.L.C.'s Nuclear Regulatory Commission and South Carolina Radioactive Material Licenses, Chem-Nuclear Systems, L.L.C.'s Barnwell Site Disposal Criteria, and amendments thereto:

1. BASE DISPOSAL CHARGES (not including surcharges):

A. Standard and Special Nuclear Material (SN) was	A.	Standard and Special Nuclea	r Material	(SN) waste	32
---	----	-----------------------------	------------	------------	----

٦.		Weight		Rate
	a.)	Greater than 120 lbs./ft ³	1	Upon Request
	b.)	Greater than 75 lbs./ft ³ and less than 120 lbs./ft ³ density	1	\$ 4.40 per pound
	c.)	Greater than 60 lbs./ /ft ³ and less than75 lbs./ft ³ den	sity s	5.40 per pound
	d.)	Greater than 45 lbs./ft ³ and less than 60 lbs./ft ³ dens	ity s	7.00 per pound
	e.)	Less than 45 lbs/ft ³	5	5 7.00 per pound times the ratio of 45 lbs/ft ³ divided by package density
2.	Milli	curie Charge	5	.30 per millicurie
B.	Bio	ological Waste	\$ 1 additio	.00 per pound, in in to above rates
C.	Uti (ba	ility Specific Base Disposal Charges ased on submission of LLRW Profile Sheets)	To be Evalua Utility N Type	determined Upon ition of Specific Waste Quantity/

- 1 -

Battelle, Pacific Northwest National Laboratory

EXAMPLE FOR ESTIMATING USE ONLY PRICING IS SUBJECT TO CHANGE

Exhibit A.2 (Continued)

Chem-Nuclear Systems, L.L.C.

NOTES:

2

3

4

5.

	Note 1:	Maximum Millicurie Charge is \$120,000.00	per shipment.
	Note 2:	The minimum charge per shipmont, excluding surcharges and specific other charges, is \$1,0	00.00.
	Note 3:	Base disposal charge includes:	
•	EXTENDED	CARE FUND	Included in Rates
	SOUTH CAR WASTE DIS	ROLINA LOW-LEVEL RADIOACTIVE POSAL TAX:	Included in Rates
	SITE STABIL	IZATION AND CLOSURE FUND:	
	All waste dis	posed	Included in Rates
	TECHNOLO	GY CHARGE:	

6. SURCHARGES:

A. Dose Rate Surcharge

For all waste in "A" vaults.

Do	se Le	vei	Multiplier of Base Weight Rate
0	-	200 mR/hr	1.00
200 mR/hr	-	1 R/hr	1.08
1R/hr	-	2R/nr	1.12
>2R/hr	-	3R/hr	1.17
>3R/hr	-	4R/hr	1.22
>4R/hr	-	5R/hr	1.27
>5R/hr		10R/hr	1.32
>10R/hr		25R/hr	1.37
>25R/hr	-	50R/hr	1 42
>50R/hr			1.48

B. items which do not conform to one of the above Upon Request categories

Included in Rates

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Battelle, Pacific Northwest National Laboratory

EXAMPLE FOR ESTIMATING USE ONLY PRICING IS SUBJECT TO CHANGE

Exhibit A.2 (Continued)



Chem-Nuclear Systems, L.L.C.

C. Irradiated Hardware Charges

Per Shipment

\$ 30,000.00 Included in Item 6.c.

D. Irradiated Cask-Handling Fee

E. Special Nuclear Material Surcharge

Upon Request

7. MISCELLANEOUS:

- A. Transport vehicles with additional shielding features may be subject to an additional handling fee which will be provided upon request.
- B. Decontamination services, if required: \$150.00 per man hour, plus supplies at current Chem-Nuclear rate.
- C. Customers may be charged for all special services as described in the Barnwell Site Disposal Criteria.
- D. Terms of payment are NET 30 DAYS upon presentation of invoices. A per-month service charge of one and half percentage (1&1/2%) shall be levied on accounts not paid within 30 days.
- E. Company purchase orders or a written letter of authorization in form and substance acceptable to Chem-Nuclear shall be received before receipt of radioactive waste material at the Barnwell Disposal Site and shall refer to Chem-Nuclear's Radioactive Naterial Licenses, the Barnwell Site Disposal Criteria, and subsequent changes thereto.
- F. All shipments shall receive a Chem-Nuclear shipment identification number and conform to the Prior Notification Plan.
- G. Class B/C waste received with cheinting agents, which require separation in the trench, may be subject to a surcharge if Stable Class A waste is not available for use in achieving the required separation from other wastes.
- H. Material delivered for disposal by Company, from processing of the material at a third party site, may be credited towards the quantity of either Company or the processor, but not both. As the original generator is ultimately responsible for waste disposition, CNSI will abide by the original waste-generator's direction. Material delivered directly from a generator's site will be credit to that generator's account.

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Battelle, Pacific Northwest National Laboratory

EXAMPLE FOR ESTIMATING USE ONLY PRICING IS SUBJECT TO CHANGE

Calculation of LLW Burial/Disposition Cost Estimation Factors

Calculation of LLW Burial/Disposition Cost Estimation Factors

The calculations necessary to determine the costs for burial/disposition of the radioactive wastes postulated to result from decommissioning the reference PWR and the reference BWR are performed using detailed spreadsheets. The spreadsheets evaluate the burial/disposition costs for each of the items originally costed in the PWR and BWR decommissioning studies and in the updated costs presented in Addendums 4 and 3 (Refs. 1,2), respectively, to those reports. Those costs are based on the burial price schedule for U S. Ecology's Washington Nuclear Center, located on the Hanford Site near Richland, Washington.

The B_x values reported in this document reflect the results for cost changes and waste burial/disposition at different sites normalized to the 1986 burial costs for the Washington low-level waste (LLW) disposal site. All the calculations are based on the same inventory of radioactive wastes as was postulated in the 1986 and 1978-80 analyses. Starting in 1988, the inventories also included post-TMI-2 contributions from the reference PWR and the reference BWR (Refs. 1,2).

B.1 Washington LLW Disposal Site

The LLW disposal site located in Washington was used to develop the original decommissioning cost estimates for the reference PWR and the reference BWR. These estimates are the basis for the minimum decommissioning fund requirement specified in 10 CFR 50.75(c), which is in 1986 dollars. Thus, as shown in Table 2.1, $B_x = 1.0/1.0$ (for PWR/BWR) for 1986. For 1998, $B_x = 3.165/14.403$. These B_x values reflect the adjustment in waste burial costs at the Washington LLW disposal site since 1986.

The 1998 waste burial costs were developed using the rate schedule provided in Exhibit A.1. The spreadsheet calculations, which are too voluminous to present here, are summarized in Table B.1. Tables B.2 through B.9 provide summaries of the waste burial costs at the Washington LLW disposal site for 1997, 1996, 1995, 1994, 1993, 1991, 1988, and 1986, respectively. These estimates were originally reported in previous issues of NUREG-1307.

B.2 South Carolina LLW Disposal Site

The 1998 waste burial costs for the South Carolina LLW disposal site were developed using the rate schedule provided in Exhibit A.2. The spreadsheet calculations, which are too voluminous to present here, are summarized in Table B.10. For 1998, $B_x = 15.886/13.948$. These B_x values reflect the 1998 burial cost estimates for the South Carolina LLW disposal site normalized to the 1986 Washington LLW disposal site burial costs.

Tables B.11 through B.18 provide summaries of the waste burial costs at the South Carolina LLW disposal site for 1997, 1996, 1995, 1994, 1993, 1991, 1988, and 1986, respectively. These estimates were originally reported in previous issues of NUREG-1307.

B.3 LLW Disposition by Waste Vendors

The 1998 waste disposition costs for activated/contaminated concrete, contaminated metal, and dry active waste (DAW) by waste vendors were developed using the unit prices discussed in Section A.3. The 1998 waste burial costs for activated metal and liquid radioactive waste at the Washington and South Carolina LLW disposal sites were developed using the rate schedules provided in Exhibits A.1 and A.2, respectively. The spreadsheet calculations, which are too voluminous to present here, are summarized in Tables B.19 and E.20. For 1998, $B_x = 4.538/15.203$ for the Washington LLW disposal site and $B_x = 7.173/6.968$ for the South Carolina disposal site. These B_x values reflect the 1998 waste vendors disposition cost estimates for both the Washington and South Carolina LLW disposal

sites normalized to the 1986 Washington LLW disposal site burial costs.

No estimates are provided for LLW disposition by waste vendors prior to 1998 since this was the first year that this disposition alternative was included in NUREG-1307.

B.4 Nevada LLW Disposal Site

No 1998 waste burial costs are provided for the Nevada LLW disposal site since this site closed on December 31, 1992.

Tables B.21 through B.23 provide summaries of the waste burial costs at the Nevada LLW disposal site for 1991, 1988, and 1986, respectively. These estimates were originally reported in previous issues of NUREG-1307.

B.5 Other

Appendix D, Table D.1, includes historical values of B_x for waste generators required to pay surcharges (with/without

penalties) mandated by the Low-Level Radioactive Waste Policy Amendments Act of 1985 (LLRWPAA). Effective January 1, 1993, no LLRWPAA surcharges or penalties are assessed.

As other low-level radioactive waste burial sites come into service in the various interstate compacts, values for B, will be calculated using the price schedules for each of those sites and will be incorporated into subsequent issues of this report. Those materials whose activity concentrations exceed the limits for Class C LLW are identified by footnote as greater-than-Class C (GTCC) material. Because the analyses in this report postulate placing this material in a LLW disposal facility, the disposal costs for this material may be overestimated by factors ranging from about 1.6 to more than 80, depending upon the disposal site, compared with high-density packaging and geologic repository disposal. Evidence of this can be seen in the dramatic cost increase (compared to 1996) in the "Liner Dose Rate Charge" column for the reference BWR (See Tables B.1, B.2, and B.3).

Table B.1 Burial Costs at the Washington Site Reference PWR (1998 dollars)

	VOLUME	SHIPMENT	CONTAINER	LINER DOSE	BENTON COUNTY	DISPOSAL
COMPONENT	CHARGE	CHARGE	CHARGE	RATE CHARGE	TAX SURCHARGE	
VESSEL WALL	116,280	238,640	44,004	2,147,000	0	2,545,924
VESSEL HEAD & BOTTOM	122,400	251,200	46,320	0	0	419,920
UPPER CORE SUPPORT ASSM	12,240	25,120	4,632	151,200	0	193, 192
UPPER SUPPORT COLUMN	12,240	25,120	4,632	151,200	0	193, 192
UPPER CORE BARREL	6,120	12,560	` 316	113,000	0	133,996
LIDDER CORF GRID PLATE	15,300	31,400	. 4	282,500	0	334,990
GUIDE TURES	18,360	37,680	0,948	226,800	C	289,788
LOWER CORE BARREL (a)	97,920	200,960	37,056	1,808,000	0	2,143,936
THERMAL SHIFLDS(a)	18,360	37,680	6,948	339,000	0	401,988
COPE SHROUD (a)	12,240	25,120	4,632	226,000	0	267,992
AFATE IS TO PLATE (3)	15,300	31,400	5,790	282,500	0	334,990
LOUSE SUPPORT COLUMN	3.060	6,280	1,158	56,500	0	66,998
LOUER CORF FORGING	33,660	69,080	12,738	621,500	0	736,978
SIGC INTERNALS	24,480	50,240	9,264	452,000	0	535,984
RIG SHIFLD CONCRETE	763.776	307,720	225,810	0	0	1,297,306
REACTOR CAVITY LINER	15.667	6,280	4,632	0	0	26,579
REACTOR COCHANT PLINPS	128,520	75,360	13,896	0	0	217,776
DDECOID1715	110,160	50,240	9,264	0	C	169,664
D UN EUN CIMD DIMD CAVITY DIMD	12,240	6,280	3,474	0	0	21,994
DESSIDIZED BEITEF TANK	36.720	12,560	2,316	C	0	51,596
CALETY IN IECTION ACCUM TANKS	122,400	50,240	9,264	0	0	181,904
STEAM CENERATORS	653,677	200,960	37,056	0	0	891,693
PEACTOR CODIANT PIPING	100,980	43,960	8,106	0	0	153,046
PENAINING CONTAM MATIS	1,609,805	634,280	475,938	0	0	2,720,023
CONTANINATED MATEL OTHE RLD	14,599,321	4,998,880	4,295,022	0	0	23,893,223
CONTRACTOR CARTPINGES	9,639	37,680	6,948	1,587,600	0	1,641,867
CDENT DESING	61,200	125,600	23,160	1,130,000	0	1,339,960
COMBLISTIBLE UASTES	309,825	376,800	69,480	0	0	756,105
EVADORATOR ROTTOMS	287,640	590.320	108,852	1,676,341	0	2,663,153
POST-THI-2 ADDITIONS	476,228	C	0	0	Э	476,228
NEAVY OBJECT CHAPCE						121,713
CITE AVAILABILITY CHADGES /3 YDS						413,442
SUBTOTAL PWR COSTS	19,805,758	8,559,640	5,485,446	11,251,141	0	45,637,140
TAYES & FEES (% OF CHARGES)						1,962,397
TAYES & FEES (\$/CIL FT.)						9,223,270
ANNUAL PERMIT FEES (3 YRS)						120,000
TOTAL PWR COSTS						56,942,806

Table B.1 Burial Costs at the Washington Site Reference BWR (1998 dollars)

COMPONENT	VOLUME CHARGE	CHARGE	CONTAINER CHARGE	LINER DOSE RATE CHARGE	BENTON COUNTY TAX SURCHARGE	DISPOSAL
STEAM SEPARATOR	10,802	87,920	32,424	26,600,000	0	26.731.146
FUEL SUPPORT & PIECES	5,416	43,960	16,212	791,000	0	856.588
CONTROL RODS/INCORES	16,218	50,240	9,264	7,600,000	0	7 675 722
CONTROL RODS GUIDES	4,315	37,680	13,896	678,000	0	733 801
JET PLMPS	15,147	125,600	46.320	38,000,000	0	38 187 067
TOP FLEL GUIDES	25,949	452,160	83, 376	68,400,000	0	68 061 685
CORE SUPPORT PLATE	11,903	100.480	35,898	1.751.500	ñ	1 800 781
CORE SHROLD	50,796	879,200	162,120	133,000,000	0	136 002 116
REACTOR VESSEL WALL	8,660	125,600	25 676	1 243 000	0	1 602 736
SAC SHIELD	97.247	87 920	16 212	1,243,000	0	201 370
REACT. WATER REC	95 105	31,400	6 948	0	0	177 /57
SAC SHIELD	335 009	238 640	44 004	0	0	133,433
OTHER PRIMARY CONTAINMENT	3 821 022	1 067 600	1 073 444	0	0	5 042 000
CONTAINM, ATMOSPHERIC	51 867	6 280	2 216	0	0	5,902,000
HIGH PRESSURE CORE SPRAY	19 360	13 560	3 316	0	0	00,403
I OU DRESSURE CORE SDRAV	10 803	6 380	6,310	0	0	33,230
REACTOR BIDG CLOSED COOL INC	24 579	12 540	1,150	0	0	18,240
PEACTOR CODE ISO COOLING	34,213	12,500	0,948	0	0	54,086
REALIOR LORE ISU COULING	14,045	6,280	5,474	0	0	23,799
RESIDUAL HEAT REMUVAL	67,014	31,400	8,106	0	0	106,520
FUL LINER & RACKS	411,723	113,040	42,846	0	0	567,609
CUNTAMINATED CONCRETE	469,006	175,840	125,064	0	0	769,910
OTHER REACTOR BUILDING	1,533,366	288,880	451,620	0	0	2,273,866
URBINE	1,519,351	514,960	321,924	0	0	2,356,235
NUCLEAR STEAM CONDENSATE	392,261	81,640	50,952	0	0	524,853
LOW PRESSURE FEEDWATER HEATER'S	796,396	263,760	50,952	0	0	1,111,108
MAIN STEAM	76,745	12,560	3,474	0	0	92,779
MOISTURE SEPARATOR REHEATERS	772,650	163,280	30,108	0	0	966.038
REACIDE FERNUATER PUMPS	209,641	37,680	23,160	0	0	270.481
HIC: PRESSURE FEEDWATER HEATERS	130,754	50,240	9,264	0	0	190,258
OTHER TO BLDG	5,248,512	1,494,640	1,486,872	0	0	8,230,024
RAD WASTE BLOG	2,598,889	452,160	743,436	0	0	3 794 485
REACTOR BLDG	327,726	238,640	1,653,624	0	0	2,210,000
TG BLDG	221,238	157,000	1,116,312	0	0	1,494,550
RAD WASTE & CONTROL	190,944	144,440	963,456	0	0	1,298,840
CONCENTRATOR BOTTOMS	688,500	1,413,000	260,550	3,978,045	0	6.340.095
OTHER	186,660	383,080	70,638	187,036	0	827.414
POST-TMI-2 ADDITIONS	38,923	6	0	0	0	38 023
HEAVY OBJECT CHARGE						193 388
SITE AVAILABILITY CHARGES, (3.5 Y	RS)					551 256
SUBTOTAL BWR COSTS	20,507,539	9,38 3,600	8,994,186	282,228,581	0	321,863,549
TAXES & FEES (% OF CHARGES)						13,840,133
TAXES & FEES (\$/CU.FT.)						9,550,079
ANNUAL PERMIT FEES (3.5 YRS)						140,000
TOTAL BWR COSTS						345, 393, 761

Table 6.2 Burial Costs at the Washington Site Reference PWR (1997 dollars)

	VOLUME	SHIPMENT	CONTAINER	LINER DOSE	BENTON COUNTY	DISPOSAL
COMPONENT	CHARGE	CHARGE	CHARGE	RATE CHARGE	TAX SURCHARGE	COST
VESSEL WALL	145,920	106,324	22,610	703,000	21,585	999,439
VESSEL HEAD & BOTTOM	153,600	111,920	23,800	0	6,161	295,481
LIPPER CORF SLIPPORT ASSN	15.360	11, 192	2,380	48,760	1,720	79,412
UPPER SUPPORT COLUMN	15,360	11,192	2,380	48,760	1,720	79,412
UPPER CORF BARREL	7,680	5,596	1,190	37,000	1,136	52,602
UPPER CORF GRID PLATE	19.21	13,990	2,975	92,500	2,840	131,505
GUIDE TURES	23.040	16,788	3,570	73,140	2,580	119,118
LOWER CORE BARREL (a)	122,880	89,536	19,060	592,000	18,177	841,633
THERMAL SHIELDS(a)	23,040	16,788	3,570	111,000	3,408	157,806
CORE SHROUD (a)	15,360	11, 192	2,380	74,000	2,272	105,204
LOWER GRID PLATE (a)	19,200	13,990	2,975	92,500	2,840	131,505
LOWER SUPPORT COLUMN	3,840	2,798	595	18,500	568	26,301
LOWER CORE FORGING	42.240	30,778	6,545	203,500	6,248	289,311
MISC INTERNALS	30,720	22,384	4,760	148,000	4,544	210,408
BIO SHIELD CONCRETE	958,464	545,610	116,025	0	26,335	1,646,434
REACTOR CAVITY LINER	19,661	11,192	2,380	0	540	33,773
REACTOR COOLANT PUMPS	161,280	33,576	7,140	0	4,398	206,394
PRESSURIZER	138,240	22,384	4,760	0	3,612	168,996
R. HX. EHX. SUMP PUMP, CAVITY PUMP	15,360	8,394	1,785	0	490	26,029
PRESSURIZER RELIEF TANK	46,080	5,596	1,190	0	1,158	54,024
SAFETY INJECTION ACCUM TANKS	153,600	22,384	4,760	0	3,952	184,696
STEAM GENERATORS	820,301	89,536	19,040	0	20,366	949,243
REACTOR COOLANT PIPING	126,720	19,586	4,165	0	3,288	153,759
REMAINING CONTAM. MATLS	2,020,147	1,149,978	244,545	0	55,377	3,470,047
CONTAMINATED MATRL OTHR BLD	18,320,717	10,377,782	2,206,855	0	495,141	31,400,495
FILTER CARTRIDGES	12,096	16,788	3,570	511,980	12,274	556,708
SPENT RESINS	76,800	55,960	11,900	370,000	11,360	526,020
COMBUSTIBLE WASTES	388,800	167,880	35,700	0	12,747	695,127
EVAPORATOR BOTTOMS	360,960	263,012	55,930	547,031	23,586	1,250,519
POST-TM1-2 ADDITIONS	597,619	0	0	0	13,229	610,848
HEAVY OBJECT CHARGE						120,875
SITE AVAILABILITY CHARGES, (3)	(KS)					265.092
SUBTOTAL PWR COSTS	24,854,285	13,254,126	2,818,515	3,671,671	763,654	45,748,218
TAXES & FEES (% OF CHARGES)						2,001,813
TAXES & FEES (\$/CU.FT.)						8,122,950
ANNUAL PERMIT FEES (3 YRS)						112,500
TOTAL PWR COSTS						55,985,481

Table B.2 Burial Costs at the Washington Site Reference BWR (1997 dollars)

COMPONENT	VOLUME	SHIPMENT	CONTAINER	LINER DOSE RATE CHARGE	BENTON COUNTY TAX SURCHARGE	DISPOSAL
CTEAN SEDADATON	13 555	30 172	16 660	8 713 600	105 060	R 078 034
ELEL CUDDODT & DIECES	6 707	10 586	8 330	250 000	6 513	300 226
CONTROL BODS/INCODES	20 352	22 384	6 760	2 489 400	56 570	2 503 675
CONTROL FIDS CHIDES	5 414	16 788	7 140	222 000	5 573	256 916
IET DIMOS	10 008	55 960	23 800	12 448 000	270 010	12 826 687
TOP FUEL CUIDES	542 55	201 456	62 860	22 406 400	505 874	23 180 133
CORE SUDDORT DI ATE	14 038	44 768	18 445	573 500	16 667	666 008
CORE SKEMIN (3)	63 744	301 720	83 300	43 548 000	083 654	45 090 418
PEACTOR VESSEL UALL	10 867	55 960	13 090	407 000	10.753	497 670
SAC SHIFLD	122 035	30,172	8 330	0	3 668	173,205
PEACT WATER DEC	110 347	13 990	2 975	n	2 987	130 200
SAC SHIELD	620 603	106 326	22 610	Ő	11 020	561 266
OTHER DRIMARY CONTAINMENT	4 705 008	2 716 858	577 745	0	173 158	8 262 760
CONTAINM ATMOSPHERIC	65 DRR	5 596	1 190	ñ	1.579	73.453
HIGH DEESLIDE CODE SPRAY	23 040	5 506	1 100	ñ	668	30 474
I OLI DECCIDE CORE CDRAY	13 555	2 798	505	0	945	17 317
PEACTOR BLOC CLOSED COOLING	43 302	\$ 304	1 785	0	1 168	56 730
REACTOR CORE ISO COOLING	17 626	2 708	505	0	450	21 678
DESCRIPTION CORE 130 COOLING	84 006	13 000	6 165	0	2 230	104 481
DC-1 I INED 2 DACKS	516 672	50 344	10 710	0	12 679	500 425
CONTANINATED CONCRETE	588 557	78 344	16 660	0	14 961	608 521
OTVER DEACTOR BUILDING	1 024 224	1 424 182	302 855	0	77 725	3 728 ORA
TIDD THE	1 006 637	162 284	34 510	0	46 207	2 140 638
NUCLEAD CTEAM CONDENCATE	402 250	102,204	7 140	0	11 774	2, 147, 000
HULLEAR STEAM LURDERSATE	492,200	117 516	24 200	0	25 021	1 144 025
LUW PRESSURE FEEDWATER MEATERS	999,390	8 304	1 795	0	2 330	108 825
MOISTINE CEDADATOD DEVEATEDE	90, 307	72 748	15 470	0	23 257	1 081 075
BEACTOD CEEDUATED DIMOS	262 078	27 080	5 050	0	6 516	303 522
NEALIOR FEEDWATER FURTS	144 087	27,900	4 760	0	4 184	105 611
ATTER TO BLOC	4 596 348	6 331 304	921 060	0	252 635	12 001 367
DAD WETE BLOC	7 361 350	201 454	381 000	0	83 044	3 029 740
RAD WASTE BLOG	3,201,330	80 534	38 080	0	11 603	550 573
TC PLOC	277 632	58 759	24,990	0	7 845	360 225
DAD WASTE & CONTROL	230 616	53 162	22 610	0	6 841	322 220
CONCENTRATOR BOTTOMS	864 000	620 550	133 875	1 208 083	63 763	2 080 251
OTHER OTHER	234 240	170 678	36 205	60 660	10 725	512 378
DOST-THI-2 ADDITIONS	48 845	110,010	0	00,440	1 081	40 026
HEAVY OR JECT CHARGE	40,045	0	•	•	1,001	190,500
CITE AVAILADILITY CHADCEC 175	VPC					353 456
SUBTOTAL BWR COSTS	25,734,950	11,295,526	2,823,275	92,445,623	2,920,573	135,763,903
TAXES & FEES (% OF CHARGES)						5,911,528
TAXES & FEES (\$/CU.FT.)						8,410,772
ANNUAL PERMIT FEES (3.5 YRS)						131.250
TOTAL BWR COSTS						150,217,453

(a) GTCC Material: Assumes a low density, distributed packaging scheme and final disposal as LLW. High density packaging and geologic repository disposal could reduce disposal costs.

B.7

Table B.3 Burial Costs at the Washington Site Reference PWR (1996 dollars)

COMPONENT	VOLUME	SHIPMENT CHARGE	CONTAINER	LINER DOSE RATE CHARGE	BENTON COUNTY TAX SURCHARGE	DISPOSAL
VERCEI UNI	207 860	32 034	5 080	106 270	11 705	453 04R
VESSEL WALL	218 800	32,034	6 304	190,270	5 576	264 600
HODER CORE CHOD DET ACCH	210,000	3 372	0,50	13 828	1 016	60 724
UPPER CORE SUPPORT CALINAN	21,880	3,372	630	13 828	1 016	60 726
UPPER SUPPORT CALORA	10 040	1 686	315	10 330	621	23 802
UPPER LURE BARKIL	37 350	4, 215	788	25 825	1 552	50 730
OPPER CORE GRID PLATE	27,330	4,213 5 059	067	20,743	1 520	61 086
GUIDE TUBES	175 040	3,030	5 0/3	165 280	0 033	382 272
LOWER CORE BARKE	175,040	20,970	0,043	30 000	1 862	71 676
THERMAL SHIELDS	32,020	3,030	630	20,440	1 242	47 784
CORE SHROOD	21,000	3,372	700	20,000	1,552	50 730
LOWER GRID PLATE	27,330	4,213	100	5 165	310	11 046
LOWER SUPPORT COLUMN	5,470	043	1 77/	54 815	510 T 414	131 405
LOWER CORE FORGING	60,170	9,213	1,734	20,013	2 4 14	05 568
MISC INTERNALS	43,700	0,144	1,201	41,320	2,403	1 501 / 27
BIO SHIELD CONCRETE	1,365,312	164,385	30,732	0	30,990	1,391,421
REACTOR CAVITY LINER	28,006	3,372	630	0	630	32,043
REACTOR COOLANT PUMPS	229,740	10,116	1,891	0	5,213	240,900
PRESSURIZER	196,920	6,744	1,261	0	4,419	209,344
R.Hx, EHx, SUMP PUMP, CAVITY PUMP	21,880	2,529	4/3	0	518	25,400
PRESSURIZER RELIEF TANK	65,640	1,686	315	0	1,459	69,100
SAFETY INJECTION ACCUM TANKS	218,800	5,744	1,261	0	4,891	231,090
STEAM GENERATORS	1,168,501	26,976	5,043	0	25,892	1,226,413
REACTOR COOLANT PIPING	180,510	5,901	1,103	0	4,044	191,558
REMAINING CONTAM. MATLS	2,877,658	346,473	64,774	0	65,293	3,354,197
CONTAMINATED MATRL OTHR BLD	26,097,479	3,126,687	584,538	0	589,919	30, 398, 624
FILTER CARTRIDGES	17,231	5,058	946	145,194	5,288	173,716
SPENT RESINS	109,400	16,860	3,152	103,300	6,208	238,920
COMBUSTIBLE WASTES	553,838	50,580	9,456	0	13,232	627,105
EVAPORATOR BOTTOMS	514,180	79,242	14,814	152,744	16,866	777,846
POST-TMI-2 ADDITIONS	851,296	0	0	0	0	851,296
HEAVY OBJECT CHARGE						120,875
SITE AVAILABILITY CHARGES, (3)	(RS)					125.214
SUBTOTAL PWR COSTS	35,404,411	3,993,291	746,551	1,028,116	818,763	42,237,221
TAXES & FEES (% OF CHARGES)						1,843,121
TAXES & FEES (\$/CU.FT.)						6,990,268
ANNUAL PERMIT FEES (3 YRS)						112,500
TOTAL PWR COSTS						51,183,110

Table B.3 Burial Costs at the Washington Site Reference BWR (1996 dollars)

COMPONENT	VOLUME	SHIPMENT CHARGE	CONTAINER	LINER DOSE RATE CHARGE	BENTON COUNTY TAX SURCHARGE	DISPOSAL
CYCAN CEDADATOD	10 300	11 802	4 417	2 (35 752	81 048	3 5/3 7//
SICAR SEPARATUR	0 682	5 001	2 206	72 310	2 776	2, 342, 344
CONTROL BODS / INCORES	28 001	5,901	1 261	603 073	2,110	751 909
CONTROL RODS/INCORES	7 713	5 058	1,201	61 090	23,74:	70,000
LET DIMOS GUIDES	27 077	5,056	1,091	7 / 45 740	2,307	7 471 401
JEI POMES	21,011	10,000	0,304	3,403,300	200 077	3,031,401
TOP FUEL GUIDES	40,300	17 (22	11,34/	0,237,040	209,037	0,000,114
CORE SUPPORT PLATE	21,270	13,400	4,000	12 129 740	0,133	12 744 121
DEACTOR VECCEL MALL	90,002	118,020	22,004	117 630	400,473	12,700,121
REALIUR VESSEL WALL	17,400	10,000	3,40/	113,630	4,331	103,900
SAC SHIELD	173,837	11,802	2,200	0	4,050	191,895
REACT. WATER REL	170,008	4,215	788	0	3,114	178,785
SAL SHIELD	398,830	32,034	5,989	0	13,732	050,010
CONTAINE ATMORPHENI	0,030,309	010,555	155,050	0	108,120	1,910,098
LUNIAINM. AIMUSPHERIC	72,717	1,000	315	0	2,043	90,101
HIGH PRESSURE CORE SPRAT	32,820	1,000	313	0	/51	37,572
LOW PRESSURE LURE SPRAT	19,309	843	158	0	438	20,748
REACTOR BLDG CLOSED COOLING	01,811	2,529	4/3	0	1,398	66,210
REACTOR CORE ISO COOLING	25,107	843	158	0	203	20,011
RESIDUAL NEAT REMOVAL	119,793	4,215	1,103	0	2,698	127,809
POOL LINER & RACKS	135,989	15,174	2,837	0	10,202	770,201
CONTAMINATED CONCRETE	838,387	23,604	4,415	0	18,685	885,089
OTHER REACTOR BUILDING	2,741,017	429,087	80,218	0	70,022	3,320,345
TURBINE	2,715,964	48,894	9,141	0	59,831	2,855,850
NUCLEAR STEAM CONDENSATE	/01,199	10,116	1,891	0	15,383	728,590
LOW PRESSURE FEEDWATER MEATERS	1,423,022	35,406	0,619	0	31,609	1,491,251
MAIN SIEAM	157,188	2,529	4/3	0	3,024	143,213
MOISTURE SEPARATOR RENEATERS	1,381,175	21,918	4,098	0	30,351	1,437,542
REACTOR FEEDWATER PUMPS	3/4,/50	8,430	1,576	0	8,298	393,054
HIGH PRESSURE FEEDWATER MEATERS	233,733	0,144	1,201	0	5,213	240,901
DINER IG BLDG	9,382,144	1,304,964	243,903	0	235,521	11,100,394
RAD WASTE BLDG	4,043,720	00,090	101,179	0	103,697	4,911,298
REALTOR BLOG	202,037	20,970	10,000	0	13,431	030,331
DAD WASTE & CONTROL	393,401	16 017	5,019	0	7 032	420,000
CONCENTRATOR DOTTONS	1 220 250	10,017	75 / 60	742 /54	1,034	1 861 770
OTHER	1,230,730	109,073	33,400	302,430	43,309	1,001,730
DOCT THI 2 ADDITIONS	555,070	51,423	9,014	10,002	40 578	420,043
HEAVY OBJECT CHADCE	09,370	0	0	0	04,578	100 500
CITE AVAILABILITY CHADCE /7 5 VE	100					166 052
SUBTOTAL BWR COSTS	36,658,901	3,403,191	747,812	25,737,965	1,730,180	68,635,500
TAXES & FEES (% OF CHARGES)						2,977,287
TAXES & FEES (\$/CU.FT.)						7,237,955
ANNUAL PERMIT FEES (3.5 YRS)						131,250
TOTAL BWR COSTS						78,981,992

Table B.4 Burial Costs at the Washington Site Reference PWR (1995 dollars)

CONDONENT	CRANE	CASK HANDLING	CURIE	LINER DOSE	BURIAL	DISPOSAL
CORPORENT	<u>SARFUGUAE</u>				WINTERSON	
VESSEL WALL	0	49,780	108,285	139,570	141,702	439,337
VESSEL HEAD & BOTTOM	0	40,000	0	0	149,160	189,150
UPPER CORE SUPPORT ASSH	0	4,000	0	6,611	14,916	25,527
LIPPER SLIPPORT COLUMN	0	4,000	0	6,611	14,916	25,527
UPPER CORE BARREL	0	2,620	5,699	8,299	7,458	24,077
UPPER CORE GRID PLATE	0	6,550	19,947	20,749	18,645	65,891
GUIDE TUBES	0	6,000	0	6,224	22,374	34,598
LOWER CORE BARREL (a)	0	41,920	344,594	132,790	119,328	638,632
THERMAL SHIELDS(a)	0	7,360	73,525	24,898	22,374	128,658
CORE SHROLD (*)	0	5,240	1,519,808	16,599	14,916	1,556,562
LOWER GRID PLATE (a)	0	6,550	245,312	20,749	18,645	291,256
LOWER SUPPORT COLUMN	0	1,310	5,813	4,150	3,729	15,002
LOWER CORE FORGING	0	14,410	25,076	45,647	41,019	126,151
MISC INTERNALS	0	10,480	18,237	33, 198	29,832	91,746
BIO SHIELD CONCRETE	0	0	0	0	930,758	930,758
REACTOR CAVITY LINER	0	0	0	0	19,092	19,092
REACTOR COOLANT PUMPS	0	0	0	0	156,618	156,618
PRESSURIZER	0	0	0	0	134,244	134,244
R.HX.EHX.SUMP PUMP.CAVITY PUMP	0	0	0	0	14,916	14,916
PRESSURIZER RELIEF TANK	0	0	0	0	44,748	44,748
SAFETY INJECTION ACCUM TANKS	0	0	0	0	149,160	149,160
STEAM GENERATORS	0	0	72,947	0	796,589	869,536
REACTOR COOLANT PIPING	0	0	0	0	123,057	123,057
REMAINING CONTAM. MATLS	0	0	0	0	1,961,752	1,961,752
CONTAMINATED MATRL OTHR BLD	0	0	0	0	17,791,134	17,791,134
FILTER CARTRIDGES	0	6,000	20,517	25,851	11,746	64,114
SPENT RESINS	0	26,200	79,788	63,922	74,580	244,490
COMBUSTIBLE WASTES	0	60,000	0	0	377,561	437,561
EVAPORATOR BOTTOMS	0	94,000	87,767	77,377	350,526	609,670
POST-TMI-2 ADDITIONS	0	0	0	0	580,344	580,344
HEAVY OBJECT CHARGE	102,800	0	0	0	0	102.800
SUBTOTAL PUR COSTS	102,800	386,920	2,627,315	633,244	24,135,841	27,886,119
TAXES & FEES (% OF CHARGES)						1,259,058
TAXES & FEES (\$/CU.FT.)						6,990,268
ANNUAL PERMIT FEES (3 YRS)						112,500
TOTAL PWR COSTS						36,247,945
Table B.4 Burial Costs at the Washington Site Reference BWR (1995 dollars)

COMPONENT	CRANE SURCHARGE	CASK HANDLING	CURIE SURCHARGE	LINER DOSE RATE	BUR I AL CHARGE	DISPOSAL
STEAM SEPARATOR	0	36,680	47.873	356,499	13, 163	454,215
FUEL SUPPORT & PIECES	0	18,340	0	51,421	6,600	76,361
CONTROL RODS/INCORES	0	10,480	104,974	967,726	19,764	1,102,944
CONTROL RODS GUIDES	0	12,000	0	25,987	5,258	43,245
JET PUMPS	0	52,400	68,390	871,652	18,459	1,010,901
TOP FUEL GUIDES	0	94,320	205,171	1,568,974	31,622	1,900,087
CORE SUPPORT PLATE	0	31,000	0	67,134	14,506	112,639
CORE SHROLD	0	183,400	3, 162, 726	2,283,134	61,901	5.691.161
REACTOR VESSEL WALL	0	22,000	25.076	47.643	10,553	105,272
SAC SHIFLD	0	0	0	0	118,508	118,508
REACT. WATER REC	0	0	0	0	115,897	115,897
SAC SHIFLD	0	0	0	0	408,251	408,251
OTHER PRIMARY CONTAINMENT	0	0	0	0	4.656.402	4,656,402
CONTAINM ATMOSPHERIC	0	0	0	0	63,207	63,207
HICK PRESSURE CORE SPRAY	0	0	0	0	22 376	22.374
LOW PRESSURE CORE SPRAY	0	0	n	0	13, 163	13, 163
REACTOR BLOC CLOSED COOLING	0	0	n	0	42 138	42 138
REACTOR DEDG CEOSED COOLING	0	0	0	0	17 116	17, 116
DESTINIAL HEAT DEMOVAL	0	0	0	0	81 665	81 665
DOUL I THER & DACKS	0	0	0	0	501 737	501 737
CONTAMINATED CONCRETE	0	0	0	G	571 544	571 544
OTHER DEACTOR BUILDING	0	0	0	0	1 868 602	1 868 602
TIDDINE	0	0	0	0	1 851 523	1 851 523
NICLEAR CTEAN CONDENCATE	0	0	0	0	478 021	478 021
LOU DECCINE FEEDUATED WEATED	0	0	0	0	970 510	970 510
HAIN CTEAM	0	0	0	0	03 523	03 523
MOTOTUDE CEDADATOD BENEATEDC	0	0	0	0	061 573	061 573
PEACTOR EFERNATER DIMOS	0	0	0	0	255 676	255 676
NEAGIOR FEEDWATER PORTS	0	0	0	0	150 340	150 340
OTHER TO BLOC	0	0	0	0	6 105 081	6 305 081
DAD WARTE BIDC	0	0	0	0	3 167 077	3 167 077
RAD WASTE DEDG	0	000 34	0	0	281 503	345 503
TC BLDC	0	42 000	0	0	190 110	232 110
DAD WASTE & CONTROL	0	38 000	0	0	164 096	202 094
CONCENTRATOR BOTTONS	0	225 000	207 440	183 338	839 025	1 454 812
OTHER	0	61 000	201,449	5 107	227 660	203 666
COST THE 3 ADDITIONS	0	81,000	0	0	47 433	67 633
HEAVY OD LECT CHADGE	177 200	0	0	0	41,435	177 200
SUBTOTAL BWR COSTS	177,200	890,620	3,821,659	6,428,704	24,725,174	36,043,357
TAXES & FEES (% OF CHARGES)						1,627,358
TAXES & FEES (\$/CU.FT.)						7,237,955
ANNUAL PERMIT FEES (3.5 YRS)						131,250
TOTAL BWR COSTS						45,039,919

Table B.5 Burial Costs at the Washington Site Reference PWR (1994 dollars)

COMPONENT	CRANE	CASK	CURIE	LINER DOSE RATE CHARGE	BURIAL	DISPOSAL COST
SWID STRUT	STREET, STREET	ALL	A REAL BALLEN PLAN			
VESSEL WALL	0	49,780	146,585	188,932	191,824	577,121
VESSEL HEAD & BOTTOM	0	40,000	0	0	201,920	241,920
UPPER CORE SUPPORT ASSM	0	4,000	0	8,950	20,192	33,142
UPPER SUPPORT COLUMN	0	4,000	0	8,950	20,192	33,142
UPPER CORE BARREL	0	2,620	7,715	11,235	10,096	31,666
UPPER CORE GRID PLATE	0	6,550	27,003	28,087	25,240	86,879
GUIDE TUBES	0	6,000	0	8,425	30,288	44,713
LOWER CORE BARREL (a)	0	41,920	466,406	179,754	161,536	849,616
THERMAL SHIELDS(a)	0	7,860	99,504	33,704	30,288	171,356
CORE SHROUD (a)	0	5,240	2,055,886	22,469	20,192	2,103,787
LOWER GRID PLATE (a)	0	6,550	331,843	28,087	25,240	391,720
LOWER SUPPORT COLUMN	0	1,310	7,869	5,617	5,048	19,845
LOWER CORE FORGING	0	14,410	33,945	61,790	55,528	165,673
MISC INTERNALS	0	10,480	24,687	44,938	40,384	120,490
BIO SHIELD CONCRETE	0	0	0	0	1,259,981	1,259,981
REACTOR CAVITY LINER	D	0	0	0	25,846	25,846
REACTOR COOLANT PUMPS	0	0	0	0	212,016	212,016
PRESSURIZER	0	0	0	0	181,728	181,728
R.Hx.EHx.SUMP PUMP.CAVITY PUMP	0	0	0	0	20,192	20,192
PRESSURIZER RELIEF TANK	0	0	0	0	60,576	60,576
SAFETY INJECTION ACCUM TANKS	0	0	0	0	201,920	201,920
STEAM GENERATORS	0	0	98,749	0	1,078,354	1,177,103
REACTOR COOLANT PIPING	0	0	0	0	166,584	166,584
REMAINING CONTAM. MATLS	0	0	0	0	2,655,652	2,655,652
CONTAMINATED MATRL OTHR BLD	0	0	0	0	24,084,109	24,084,109
FILTER CARTRIDGES	0	6,000	27,774	34,994	15,901	84,570
SPENT RESINS	0	26,200	108,010	86,530	100,960	321,700
COMBUSTIBLE WASTES	0	60,000	0	0	511,110	571,110
EVAPORATOR BOTTOMS	0	94,000	118,811	104,747	474,512	792,070
POST-TM1-2 ADDITIONS	0	0	0	0	785,620	785,620
HEAVY OBJECT CHARGE	102.800	0	0	0	0	102.800
SUBTOTAL PWR COSTS	102,800	386,920	3,554,787	857,208	32,673,029	37,574,744
ANNUAL PERMIT FEES (3 YRS)						105,000
TAXES & FEES (% OF CHARGES)						1,690,863
TAXES & FEES (\$/CU.FT.)				,		5,987,035
TOTAL PWR COSTS						45,357,642

Table B.5 Burial Costs at the Washington Site Reference BWR (1994 dollars)

COMPONENT	CRANE SURCHARGE	CASK HANDLING	CURIE SURCHARGE	LINER DOSE RATE CHARGE	BURIAL	DISPOSAL
STEAM SEPARATOR	0	74 400				
FUEL SUPPORT & PIECES	0	30,000	64,806	482,566	17,819	601.871
CONTROL RODS/INCORES	0	10,340	0	69,607	8,935	96 882
CONTROL RODS GUIDES	0	10,480	142,057	1,309,922	26.754	1 480 213
JET PLIMPS	0	12,000	0	35,179	7,118	56 207
TOP FUEL CHIDES	0	52,400	92,580	1,179,884	24 988	1 3/0 053
CORF SUPPORT DI ATE	0	94,320	277,740	2,123,791	42 807	2 589 450
CODE SUDOUD(2)	0	31,000	0	90,880	10 637	2,330,030
DEACTOD VECCEL MALL	0	183,400	4,278,498	3,090,500	83 707	7 474 305
CAC CHIELD	0	22,000	33,944	64.495	16 386	(,030,195
DEACT WATER BEG	0	0	0	0	4,200	134,725
REAL WATER REE	0	0	0	0	154 802	160,425
SAL SHIELD	0	0	0	0	130,092	156,892
CONTAINMENT CONTAINMENT	0	0	0	0	532,033	552,655
CUNTAINM. ATMOSPHERIC	0	0	0	0	0,303,438	6,303,438
HIGH PRESSURE CORE SPRAY	0	0	Ő	0	83,364	85,554
LOW PRESSURE CORE SPRAY	0	0	0	0	30,288	30,288
REACTOR BLDG CLOSED COOLING	0	0	0	0	17,819	17,819
REACTOR CORE ISO COOLING	0	0	0	U	57,042	57,042
RESIDUAL HEAT REMOVAL	0	0	0	0	23,170	23,170
POOL LINER & RACKS	0	0	0	0	110,551	110,551
CONTAMINATED CONCRETE	0	0	0	0	679,208	679,208
OTHER REACTOR BUILDING	0	0	0	0	773,707	773,707
TURBINE	0	0	0	0	2,529,553	2,529,553
NUCLEAR STEAM CONDENSATE	0	0	0	0	2,506,433	2,506,433
LOW PRESSURE FEEDWATER HEATERS	0	0	0	0	647,103	647,103
MAIN STEAM	0	0	0	0	1,313,792	1.313.792
MOISTURE SEPARATOR REHEATERS	0	0	0	0	126,604	125 604
REACTOR FEEDWATER PUMPS	0	0	0	0	1,274,620	1 274 620
HIGH PRESSURE FEEDWATER HEATERS	0	0	0	0	345,838	345 838
OTHER TO BLDG	0	0	0	0	215,701	215 701
RAD WASTE BIDG	0	0	0	0	8,658,330	8 658 330
REACTOR BLDG	0	0	0	0	4,287,317	6 287 317
TG BLDG	0	64,000	0	0	381,227	4,207,317
RAD WASTE & CONTROL	0	42,000	0	0	257.375	200 37
CONCENTRATOR BOTTOME	0	38,000	0	G	222, 154	260 154
OTHER	0	225,000	280,826	248,190	1 135 800	1 890 914
DOST-THI- 2 ADDITIONS	0	61,000	0	7.036	307 928	775 04/
HEAVY OF LECT CHARGE	0	0	0	0	66 211	313,904
SUBTOTAL BUD COSTS	177.200	0	0	0	04,211	177 200
SUBIUTAL BWR CUSTS	177,200	890,620	5,170,450	9,702,050	33,470,887	48,411,207
ANNUAL PERMIT FEES (3.5 YRS)						
TAXES & FEES (% OF CHARGES)						122,500
TAXES & FEES (\$/CU.FT.)						2,178,504
TOTAL BWR COSTS						5,199,174
						56,911,386

(a) STCC Material: Assumes a low density, distributed packaging scheme and final disposal as LLW. High density packaging and geologic repository disposal could reduce disposal costs.

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Appendix B

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COMPONENT	CRANE SURCHARGE	CASK HANDLING	CURIE SURCHARGE	LINER DOSE RATE CHARGE	BURIAL	DISPOSAL
VESSEL MALL	95.000	49.780	104,306	134,436	136,496	520,019
VESSEL HEAD & BOTTOM	0	40,000	0	0	143,680	183,680
LIDDED CODE SUDDOT ASSM	0	4,000	0	6.368	14,368	24,736
LIDDED SUDDODT COLUMN	0	4,000	0	6,368	14,368	24,736
HODED CORE BADDEL	0	2,620	5,490	7,994	7,184	23,288
HODER CORE COID DIATE	n	6.550	19,214	19,985	17,960	63,709
CHIDE THREE	0	6,000	0	5,995	21,552	33,547
LOLED CODE DADDEL (8)	0	41 920	331.857	127,904	114,944	616,625
THEOMAL CHIELDC(8)	0	7 860	70,795	23,982	21,552	124,189
CODE CHECHID (2)	0	5 240	1 462 414	15,988	14.368	1,498,010
LOKE SHROOD	0	6 550	236 051	10 085	17,960	280,546
LOWER GRID PLATE	0	1 310	5,600	3 007	3, 592	14,499
LOWER SUPPORT COLUMN	0	14 410	26 156	43 967	30 512	122 043
LOWER CORE FORGING	0	10 480	17 566	31 076	28 736	88,758
MISC INTERNALS	0	10,400	17,500	51,110	547 308	896 563
BIO SHIELD CONCRETE	0	0	0	0	18 301	18 301
REACTOR CAVITY LINER	\$30.000	0	0	0	150 866	270 864
REACTOR CODEANT PUMPS	120,000	0	0	0	120 312	160 312
PRESSURIZER	40,000	0	0	0	845 51	16 368
R.HX, EHX, SUMP PUMP, CAVITY PUMP	2 000	0	0	0	43 104	45 104
PRESSURIZER RELIEF TANK	2,000	0	0	0	143 680	223 680
SAFETY INJECTION ACCUM TANKS	80,000	0	70 366	0	767 323	1 157 580
STEAM GENERATORS	320,000	0	10,200	0	118 536	188 534
REACTOR COOLANT PIPING	70,000	0	0	0	1 880 670	1 880 670
REMAINING CONTAM. MATLS	0	0	0	0	17 137 504	17 137 504
CONTAMINATED MATRL OTHR BLD	0	4 000	10 747	24 002	15 315	61 080
FILTER CARTRIDGES	0	6,000	19,103	24,702	71 840	236 468
SPENT RESINS	0	26,200	10,000	01,572	004 545	623 600
COMBUSTIBLE WASTES	0	60,000	P1 512	71 576	777 649	500 725
EVAPORATOR BOTTOMS	0	94,000	84,742	74,330	550 023	550 023
POSY-TMI-2 ADDITIONS		0			27.063	27 501 840
SUBTOTAL PWR COSTS	727,000	386,920	2,528,875	609,955	22,249,112	27,501,000
ANNUAL PERMIT FEES (3 YRS)						105,000
TAXES & FEES (% OF CHARGES)						1,787,621
TAXES & FEES (\$/CU.FT.)						6.627.809
TOTAL PWR COSTS						36,022,291

Table B.6 Burial Costs at the Washington Site Reference BWR (1993 dollars)

COMPONENT	CRANE SURCHARGE	CASK HANDLING	CURIF SURCHARGE	LINER DOSE RATE CHARGE	BURIAL	DISPOSAL
STEAM SEPARATOR	0	36,680	46,115	343,353	12,680	438.827
FUEL SUPPORT & PIECES	0	18,340	0	49,529	6.358	74,227
CONTROL RODS/INCORES	4,000	10,480	101.068	932,008	19.038	1.066.593
CONTROL RODS GUIDES	0	12,000	0	25,032	5 065	42 097
JET PUMPS	0	52,400	65 878	830 496	17 780	075 554
TOP FUEL GUIDES	0	94.320	197,633	1.511.093	30,460	1.833.506
CORE SUPPORT PLATE	0	31,000	0	64 666	13 073	100 630
CORE SHROUD (a)	0	183,400	3 043 488	2 108 024	59 627	5 485 430
REACTOR VESSEL WALL	55,000	22 000	26 156	45 802	10 165	157 211
SAC SHIFID	140,000	0	0	45,672	116 156	254 154
REACT. WATER REL	50,000	0	0	0	111 630	053 131
SAC SHIFLD	380,000	0	0	0	303 252	773 252
OTHER PRIMARY CONTAINMENT	0	0	0	0	4 485 330	4 485 330
CONTAINM ATMOSPHERIC	2 000	0	0	0	4,403,330	4,403,330
HICH DESSURE CODE SDDAY	20,000	0	0	0	21 552	02,004
I OU DECCUE CORE SPRAT	5,000	0	0	0	12 680	41,332
DEACTOR BLDC CLOSED COOL THE	7 500	0	0	0	12,000	17,000
REACTOR BLUG CLOSED COULING	1,000	0	0	0	40,390	40,090
REALTOR LORE ISU COULING	70,000	0	0	0	10,40/	11,401
RESIDUAL HEAT REMUVAL	10,000	0	0	0	18,000	148,000
POUL LINER & RALKS	150,000	0	0	0	483,304	633,304
CUNTAMINATED CONCRETE	10,000	0	0	0	330,340	200,240
UTHER REALTOR BUILDING	500 000	0	0	0	1, (99, 951	1,799,951
IURBIN:	580,000	0	0	0	1,783,500	2,363,500
NULLEAK STEAM CUNDENSATE	60,000	0	0	0	460,458	520,458
LOW PRESSURE FEEDWATER HEATERS	420,000	0	0	0	934,854	1,554,854
MAIN SIEAM	15,000	0	0	0	90,087	105,087
MOISTURE SEPARATOR REHEATERS	260,000	0	0	0	906,980	1,166,980
REACTOR FEEDWATER PUMPS	25,000	0	0	0	246,088	271,088
HIGH PRESSURE FEEDWATER HEATERS	80,000	0	0	0	153,486	233,486
OTHER TO BLDG	0	0	0	0	6,160,998	6,160,998
RAD WASTE BLDG	0	0	0	0	3,050,722	3,050,722
REACTOR BLDG	0	64,000	0	0	390,617	454,617
TG BLDG	0	42,000	0	0	263,693	305,693
RA? WASTE & CONTROL	0	38,000	0	0	227,585	265,585
CONCEN RATOR BOTTOMS	0	225,000	199,826	176,606	808,200	1,409,632
OTHER	0	61,000	0	5,007	219,112	285,119
POST- MI-2 ADDITIONS	0	0	0	0	45,690	45.690
SUBTOTAL BWR COSTS	2,340,500	890,620	3,678,160	6,191,605	24,086,252	37, 187, 137
ANNUAL PERMIT FEES (3.5 YRS)						122,500
TAXES & FEES (% OF CHARGES)						2,417,164
TAXES & FEES (\$/CU.FT.)						6,862.653
TOTAL BWR COSTS						46,589,455

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Table B.7 Burial Costs at the Washington Site Reference PWR (1991 dollars)

COMPONEN?	CRANE SURCHARGE	CASK HANDLING	CURIE SURCHARGE	LINER DOSE RATE	BURIAL CHARGE	DISPOSAL
VESSEL MALL	30,411	49,780	67,982	129,200	122,018	399, 392
VESSEL HEAD & BOTTOM	0	24,000	0	0	128,440	152,440
UPPER CORE SUPPORT ASSM	0	2,400	0	5,176	12,844	20,420
UPPER SUPPORT COLUMN	0	2,400	0	5,176	12,844	20,420
UPPER CORE BARREL	0	2,620	3.584	8,200	6,422	20,326
UPPER CORE GRID PLATE	0	6,550	13,374	20,500	16,055	56,479
GUIDE TUBES	0	3,600	0	4,856	19,266	27,732
OWER CORE BARREL (a)	0	41,920	188,448	131,200	102,752	464,320
THERMAL SHIELDS(a)	0	7,860	37,662	24,600	19,266	89,388
CORF SHROLD (a)	0	5,240	807.248	16,400	12,844	841,732
OWER GRID PLATE (3)	0	6.550	130.344	20,500	16,055	173,449
LOWER SUPPORT COLUMN	0	1,310	3,724	4,100	3,211	12,345
OWER CORE FORGING	0	14,410	18,958	45,100	35,321	113,789
MISC INTERNALS	0	10,480	13.82%	32,800	25,688	82,794
BIO SHIFLD CONCRETE	0	0	0	0	801,466	801,466
REACTOR CAVITY LINER	0	0	0	0	16,440	16,440
REACTOR COOLANT PLMPS	168,000	0	0	0	134,862	302,862
PRESSURIZER	13.380	0	0	0	115,596	128,976
A HA FHA SLIMP PLINP CAVITY PLIMP	0	0	0	0	12,844	12,844
PRESSIRIZER RELIEF TANK	1,190	0	0	0	38,532	39,722
SAFFTY INJECTION ACCUM TANKS	24,480	0	0	0	128,440	152,920
STEAM GENERATORS	582,400	0	0	0	685,934	1,268,334
REACTOR COOLANT PIPING	16.845	0	0	0	105,963	122,808
PENATNING CONTAM MATLS	0	0	0	0	1,689,243	1,689,243
CONTAMINATED MATRI OTHE BLD	0	0	0	0	15,319,745	15,319,745
FILTER CARTRIDGES	0	3,600	11,212	20,076	10,115	45,002
SPENT RESINS	0	26,200	43,200	54,000	64,220	187,620
COMBLISTIBLE WASTES	0	36,000	0	0	325,114	361,114
EVAPORATOR BOTTOMS	0	56,400	0	68,850	301,834	427,084
POST-THI-2 ADDITIONS	0	0	0	0	499.728	499.728
SUBTOTAL PWR COSTS	836,706	301,320	1,339,562	590,744	20,783,101	23,851,433
TOTAL DUD COSTS						23,851,433

TOTAL PWR COSTS

(a) GTCC Material: Assumes a low density, distributed packaging scheme and final disposal as LLW. High density packaging and geologic repository disposal could reduce disposal costs.

B.16

Table B.7 Burial Costs at the Washington Site Reference BWR (1991 dollars)

COMPONENT	CRANE	CASK	CURIE	LINER DOSE	BURIAL	DISPOSAL
COMPONENT	SUKCHARGE	HANULING	SUKLHAKGE	KAIL	GNARGE	COST
STEAM SEPARATOR	0	36,680	25,687	196,000	11.335	269,702
FUEL SUPPORT & PIECES	0	18,340	0	47,600	5,683	71,623
CONTROL RODS/INCORES	0	10,480	56,886	144,000	17,018	228, 384
CONTROL RODS GUIDES	0	7,200	0	20,400	4,528	32,128
JET PUMPS	0	52,400	38,140	440,000	15.894	546.434
TOP FUEL GUIDES	0	94,320	127,666	792,000	27,229	1.041.215
CORE SUPPORT PLATE	0	18,600	0	52,700	12,491	83,791
CORE SHROUD (a)	0	183,400	1,683,780	1,540,000	53,303	3,460,483
REACTOR VESSEL WALL	17,864	13,200	0	37,400	9.087	77,551
SAC SHIELD	49,130	0	0	0	102.046	151,176
REACT. WATER REC	84 800	0	0	0	99,798	184,598
SAC SHIELD	139,528	0	0	0	351,540	491,069
OTHER PRIMARY CONTAINMENT	0	0	0	0	4.009.576	4,009,576
CONTAINM. ATMOSPHERIC	970	0	0	0	54,426	55.396
HIGH PRESSURE CORE SPRAY	4,570	0	0	0	19,266	23,836
LOW PRESSURE CORE SPRAY	1,435	0	0	0	11.335	12 770
REACTOR BLDG CLOSED COOLING	2,805	0	0	0	36,284	30 080
REACTOR CORE ISO COOLING	735	0	0	0	14 738	15 473
RESIDUAL HEAT REMOVAL	13,045	0	0	0	70 321	83 366
POOL LINES & RACKS	52,125	0	0	0	432,040	484 165
CONTAMINATED CONCRETE	10,160	0	0	0	492,150	502 310
OTHER REACTOR BUILDING	0	0	0	0	1,609,032	1 600 072
TURBINE	129,433	0	0	0	1.594 326	1 723 750
NUCLEAR STEAM CONDENSATE	18,920	0	0	0	411,618	430 538
LOW PRESSURE FEEDWATER HEATERS	141,569	0	0	0	835 695	977 264
MAIN STEAM	4,805	0	0	0	80.532	85 337
MOISTURE SEPARATOR REHEATERS	86,710	0	0	0	810,778	897 488
REACTOR FEEDWATER PUMPS	9,350	0	0	0	219 986	220 336
HIGH PRESSURE FEEDWATER HEATERS	27,880	0	0	0	137,206	165,086
OTHER TG BLDG	0	ŋ	0	0	5,507,507	5,507,507
RAD WASTE BLDG	0	0	0	0	2,727,134	2,727,134
REACTOR BLDG	0	36,400	0	0	349.314	387.714
TG BLDG	0	25,200	0	0	235,811	261,011
RAD WASTE & CONTROL	0	22,800	0	0	203,520	226, 320
CONCENTRATOR BOTTOMS	0	135,000	0	163.080	722.475	1.020.555
OTHER	0	36.600	0	3,990	195,871	236.461
POST-TMI-2 ADDITIONS	00	0	00	0_	40,844	40.844
SUBTOTAL BWR COSTS	795,836	692,620	1,932,159	3,437,170	21,531,737	28,389,521
TOTAL BWR COSTS						28,389,521

Table B.8 Burial Costs at the Washington Site **Reference PWR (1988 dollars)**

I INFR DOSE

COMPONENT
VERCEL UALL
VESSEL HEAD & BOTTOM
UPPER CORE SUPPORT AS
UPPER SUPPORT COLUMN
UPPER CORE BARREL

COMPONENT	CRANE SURCHARGE	CASK HANDLING	CURIE	LINER DOSE	BURIAL CHARGE	DISPOSAL COST
VERCEL MALL	29.671	45.600	62.710	119,320	112,480	369,781
VESSEL HEAD & ROTTOM	0	22,000	0	0	118,400	140,400
HODER CORE SUPPORT ASSM	0	2,200	0	4.770	11.840	18,810
LIPPER SUPPORT COLUMN	0	2,200	0	4,770	11,840	18,810
UPPER CORF BARREL	0	2,400	3,306	7,560	5,920	19,186
UPPER CORE GRID PLATE	0	6,000	12,295	18,900	14,800	51,995
GUIDE TURES	0	3,300	0	4,482	17,760	25,542
LOWER CORE BARREL (a)	0	38,400	172,599	120,960	94,720	426,679
THERMAL SHIELDS(8)	0	7,200	34,488	22,680	17,760	82,128
CORE SHROUD (a)	0	800	738,079	15,120	11,840	769,839
LOWER GRID PLATE (a)	0	6.000	119,178	18,900	14,800	158,878
LOWER SUPPORT COLUMN	0	1,200	3,417	3,780	2,960	11,357
LOWER CORE FORGING	0	13,200	17,495	41,580	32,560	104,835
MISC INTERNALS	0	9,600	12,759	30,240	23,680	76,279
BIO SHIELD CONCRETE	0	0	0	0	738,816	738,816
REACTOR CAVITY LINER	0	0	0	0	15,155	15,155
REACTOR COOLANT PUMPS	154,800	0	0	0	124,320	279,120
PRESSURIZER	13,224	0	0	0	106,560	119,784
R.HX, EHX, SUMP PUMP, CAVITY PUMP	0	0	0	0	11,840	11,840
PRESSURIZER RELIEF TANK	1,151	0	0	0	35,520	36,671
SAFETY INJECTION ACCUM TANKS	24,324	0	0	0	118,400	142,724
STEAM GENERATORS	547,200	0	0	0	632,315	1,179,515
REACTOR COOLANT PIPING	16,708	0	0	0	97,680	114,388
REMAINING CONTAM. MATLS	0	0	0	0	1,557,197	1,557,197
CONTAMINATED MATRL OTHR BLD	0	0	0	0	14, 122, 219	14,122,219
FILTER CARTRIDGES	0	3,300	10,338	18,522	9,324	41,484
SPENT RESINS	0	24,000	39,780	49,800	59,200	172,780
COMBUSTIBLE WASTES	0	33,000	0	0	299,700	332,700
EVAPORATOR BOTTOMS	0	51,700	0	63,488	278,240	393,428
POST-TMI-2 ADDITIONS	0	0	0	0	460.665	460,665
SUBTOTAL PWR COSTS	787,079	276,100	1,226,444	544,872	19,158,511	21,993,005
TOTAL PUR COSTS						21,993,005

(a) GTCC Material: Assumes a low density, distributed packaging scheme and final disposal as LLW. High density packaging and geologic repository disposal could reduce disposal costs.

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Table B.8 Burial Costs at the Washington Site Reference BWR (1988 dollars)

COMPONENT	CRANE SURCHARGE	CASK HANDLING	CURIE SURCHARGE	LINER DUSE	BURIAL	DISPOSAL
CTEAN CEDADATOD	0	003 55	23 680	180 880	10 440	248 618
ELEL CUDDODT & DIECES	0	16 800	23,007	100,000	5 230	45,000
CONTROL BODS / INCODES	0	0,600	52 076	132 720	15 688	210 082
CONTROL RODS/INCORES	0	6,600	52,014	18 702	6 176	20,546
LET PLANES	0	48,000	75 140	10,792	16 653	503 (12
JEI FURFS	0	40,000	117 776	730 080	25 101	050 757
TOP FUEL GUIDES	0	17 050	117,776	130,000	25,101	77 110
CORE SUPPORT PLATE	0	17,050	1 570 700	40,340	11,514	7 176 /56
CURE SHROOD	17 175	168,000	1,539,720	1,419,600	49,130	3,110,430
REACTOR VESSEL WALL	17,435	12,100	0	34,452	8,3//	12,304
SAC SHIELD	48,857	0	0	0	94,089	142,926
REACT. WATER REC	79,300	0	0	0	91,997	171,297
SAC SHIELD	138,788	0	0	0	324,061	462,849
OTHER PRIMARY CONTAINMENT	0	0	0	0	3,696,152	3,696,152
CONTAINM. ATMOSPHERIC	931	0	0	0	50,172	51,103
HIGH PRESSURE CORE SPRAY	4,531	0	0	0	17,760	22,291
LOW PRESSURE CORE SPRAY	1,416	0	0	0	10,449	11,864
REACTOR BLDG CLOSED COOLING	2,747	0	0	0	33,448	36, 195
REACTOR CORE ISO COOLING	716	0	0	0	13,586	14,302
RESIDUAL HEAT REMOVAL	12,909	0	0	0	64,824	77,733
POOL LINES & RACKS	51,833	0	0	0	398,268	450,101
CONTAMINATED CONCRETE	9.848	0	0	0	453.679	463,528
OTHER REACTOR BUILDING	0	0	0	0	1.483.256	1,483,256
TURBINE	128.303	0	0	0	1,469,699	1,598,002
NUCLEAR STEAM CONDENSATE	18,687	0	0	0	379.442	398, 129
LOW PRESSURE FEEDWATER HEATERS	140.751	0	0	0	770.370	911, 121
MAIN STEAM	4.747	0	0	0	74,237	78,983
MOISTURE SEPARATOR RENEATERS	86,204	0	0	0	747.400	833
REACTOR FEEDWATER PLIMPS	9,155	0	0	0	202,790	211,945
HIGH PRESSURE FEEDWATER NEATERS	27.724	0	0	0	126, 481	154,205
OTHER TO BLDG	0	0	0	0	5.076.992	5.076.992
RAD WASTE BLDG	0	0	0	0	2 513 958	2,513,958
REACTOR BLDG	0	35,200	0	0	322,000	357,200
TG BLDG	0	23, 100	0	Ő	217 372	260 672
RAD WASTE & CONTROL	Ő	20, 900	0	0	187 607	208 507
CONCENTRATOR BOTTOMS	0	123 750	0	150 378	000 344	940 128
OTHER	0	33,550	0	3.677	180,560	217, 787
POST-THI-2 ADDITIONS	0	0	0	0	37.651	37 651
SUBTOTAL BUR COSTS	784,881	634,650	1,768,419	3,168,685	19,848,608	26,205,242
TATAL NO ADATA						

TOTAL BWR COSTS

26,205,242

Table B.9 Burial Costs at the Washington Sitc Reference PWR (1986 dollars)

	CRANE	CASK	CURIE	LINER DOSE	BURIAL	DISPOSAL
COMPONENT	SURCHARGE	HANDLING	JUKLMAKUE		<u></u>	
VE FL WALL	28.864	27,284	56,544	106,224	94,620	313,536
VESSEL NEAD & BOTTOM	0	28,720	0	0	99,600	128,320
UPPER CORE SUPPORT ASSM	0	2,872	0	5,154	9,960	17,986
UPPER SUPPORT COLUMN	0	2,872	0	5,154	9,960	17,986
UPPER CORE BARREL	0	1,436	2,981	6,351	4,980	15,748
LIPPER CORE GRID PLATE	0	3,590	11,098	15,878	12,450	43,016
GUIDE TUBES	0	4,308	0	5,345	14,940	24,593
LOWER CORE BARREL (a)	0	22,976	155,998	101,617	79,680	360,270
THERMAL SHIELDS(a)	0	4,308	31,173	19,053	14,940	69,474
CORE SHROLD ^(a)	0	2,872	667,474	12,702	9,960	693,008
LOWER GRID PLATE (a)	0	3,590	107,777	15,878	12,450	139,694
LOWER SUPPORT COLUMN	0	718	3,086	3,176	2,490	9,470
LOWER CORE FORGING	0	7,898	15,772	34,931	27,390	85,991
MISC INTERNALS	0	5,744	11,503	25,404	19,920	62,571
BIO SHIELD CONCRETE	0	0	0	0	621,504	621,504
REACTOR CAVITY LINER	0	0	0	0	12,749	12,749
REACTOR COOLANT PUMPS	65,532	0	0	0	104,580	170,112
PRESSURIZER	13,054	0	0	0	89,640	102,694
R.HX.EHX.SUMP PUMP.CAVITY PUMP	0	0	0	0	9,960	9,960
PRESSURIZER RELIEF TANK	1,109	0	0	0	29,880	30,989
SAFETY INJECTION ACCUM TANKS	24,154	0	0	0	99,600	123,754
STEAM GENERATORS	249,417	0	0	0	531,914	781,331
REACTOR COOLANT PIPING	16,560	0	0	0	82,170	98,730
REMAINING CONTAM. MATLS	0	0	0	0	1,309,939	1,309,939
CONTAMINATED MATRL OTHR BLD	0	0	0	0	11,879,840	11,879,840
FILTER CARTRIDGES	0	4,308	9,322	26,663	7,844	48,137
SPENT RESINS	0	14,360	35,889	55,907	49,800	155,956
COMBUSTIBLE WASTES	0	43,080	0	0	252,113	295, 193
EVAPORATOR BOTTOMS	0	67,492	0	64,931	234,060	366,483
SUBTCTAL PWR COSTS	398,691	248,428	1,108,617	504,366	15,728,932	17,989,034
TOTAL PWR COSTS						17,989,034

Table B.9 Burial Costs at the Washington Site Reference BWR (1986 dollars)

COMPONENT	CRANE	CASK	CURIE	LINER DOSE RATE	BURIAL	DISPOSAL
CTEAN CEBADATOR	0	20.10/	21.7/1			
ELEL CUDDODT & DICCEO	0	20,104	21,361	119,000	8,790	169,255
FUEL SUPPORT & FIELES	0	10,052	0	39,135	4,407	53,594
CONTROL RODS/INCORES	0	5,744	47,074	320,000	13,197	386,015
LOWIROL RODS GUIDES	0	8,616	0	19,738	3,511	31,865
JET PUMPS	0	28,720	31,709	670,000	12,326	742,755
TOP FUEL GUIDES	0	51,696	106,191	1,206,000	21,115	1,385,003
CORE SUPPORT PLATE	0	22,258	0	50,990	9,686	82,934
CORE SHROUD	0	100,520	1,392,364	1,785,000	41,334	3,319,218
REACTOR VESSEL WALL	16,968	15,796	0	36,186	7,047	75,998
SAC SHIELD	48,560	0	0	0	79,132	127,692
REACT. WATER REC	35,871	0	0	0	77,389	113,261
SAC SHIELD	137,981	0	0	0	272,605	410,587
OTHER PRIMARY CONTAINMENT	0	0	0	0	3,109,263	3,109,263
CONTAINM. ATMOSPHERIC	889	0	0	0	42,206	43,094
HIGH PRESSURE CORE SPRAY	4,489	0	0	0	14,940	19,429
LOW PRESSURE CORE SPRAY	1,394	C	0	0	8,790	10,184
REACTOR BLDG CLOSED COOLING	2,683	0	0	0	28,137	30,820
REACTOR CORE ISO COOLING	694	0	0	0	11,429	12,123
RESIDUAL HEAT REMOVAL	12,760	0	0	0	54,531	67,291
POOL LINES & RACKS	51,514	0	0	0	335,030	386,544
CONTAMINATED CONCRETE	9,509	0	0	0	381,642	391,151
OTHER REACTOR BUILDING	0	0	0	0	1.247.739	1,247,739
TURBINE	127,072	0	0	0	1,236,335	1.363.406
NUCLEAR STEAM CONDENSATE	18,432	0	0	0	319,193	337.625
LOW PRESSURE FEEDWATER HEATERS	139,860	0	0	0	648.047	787,907
MAIN STEAM	4,683	0	0	0	62.449	67,132
MOISTURE SEPARATOR REHEATERS	85,652	0	0	0	628,725	714 377
REACTOR FEEDWATER PUMPS	8,943	0	0	0	170,590	179 533
HIGH PRESSURE FEEDWATER HEATERS	27,554	0	0	0	106.398	133 952
OTHER TO BLDG	0	C	0	0	4 270 848	4 270 848
RAD WASTE BLDG	0	0	0	0	2,114,782	2 114 782
REACTOR BLDG	0	45.952	0	0	272 859	318 811
TG BLDG	0	30,156	0	0	184, 198	214 354
RAD WASTE & CONTROL	0	27,284	0	0	158,975	186 259
CONCENTRATOR BOTTOMS	0	161,550	G	153,896	560,250	875 696
OTHER	0	43.798	0	4,911	151,890	200,599
SUBTOTAL BWR COSTS	735,508	572,246	1,598,700	4,404,856	16,669,784	73,981,094
TOTAL BWR COSTS						23 981 094

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Table	

COMPONENT	BASE DISPOSAL CHARGE	CASK HANDLING	CURIE	LINER DOSE RATE	DOSE RATE SURCHARGE	DISPOSAL
VESSEL MALL	2.379.200	1.140.000	4.560,000	0	1,142,016	9,221,216
VESSEL HEAD & BOTTOM	1.515.780	1.200.000	6,000	0	0	2,721,780
UPPER CORE SUPPORT ASSM	143,100	120,000	3,000	0	45, 792	311,892
UPPER SUPPORT COLUMN	132.300	120,000	30,000	0	42,336	324,636
UPPER CORE BARREL	63,000	60,000	240,000	0	30,240	393,240
UPPER CORE GRID PLATE	157,500	150,000	600,000	0	75,600	983,100
GUIDE TUBES	233,100	180,000	30,000	0	62,937	506,037
LOWER CORE BARREL (a)	1,008,000	960,000	3,840,000	0	483,840	6,291,840
THERMAL SHIELLS(3)	189.000	180,000	720,000	0	90,720	1,179,720
CORE SHROUD (a)	108.400	120,000	7,320,000	0	52,032	7,600,432
LOWER GRID PLATE ^(a)	38,280	150,000	1,200,000	0	18,374	1,406,654
LOWER SUPPORT COLUMN	39,960	30,000	120,000	0	19,181	209,141
LONER CORE FORGING	434.160	330,000	750,000	0	208,397	1,722,557
MISC INTERNALS	352,000	240,000	600,000	0	168,960	1,360,960
BIO SHIELD CONCRETE	8,560,000	0	360,000	0	0	8,940,000
REACTOR CAVITY LINER	172,800	0	3,000	0	0	175,800
REACTOR COOLANT PUMPS	3 08,000	0	23, 298	0	0	3,031,298
PRESSURIZER	1,565,000	0	1,521	0	0	1,366,521
R. HX. EHX. SUMP PUMP, CAVITY PUMP	126,009	0	3,537	0	0	129,537
PRESSURIZER RELIEF TANK	378,000	0	1,212	0	0	379,212
SAFETY INJECTION ACCUM TANKS	1,346,400	0	24,432	0	0	1,370,832
STEAM GENERATORS	11,008,000	0	1,320,000	0	0	\$2,328,000
REACTOR COOLANT PIPING	1,198,789	0	89,400	0	0	1,288,189
REMAINING CONTAM. MATLS	21,192,300	0	67,137	0	0	21,259,437
CONTAMINATED MATRL OTHR BLD	163,033,074	0	55,275	0	0	163,088,349
FILTER CARTRIDGES	216,000	180,000	1,500,000	0	25,920	1,921,920
SPENT RESINS	792,000	600,000	2,400,000	0	380,160	4,172,160
COMBUSTIBLE WASTES	3.780.000	1,800,000	000'06	0	0	5,670,000
EVAPORATOR BOTTOMS	3.722.400	2,820,000	11,280,000	0	508,464	18, 330, 564
POST-TMI-2 ADDITIONS	7,470,863	0	0	0	0	7,470,863
SITE ACCESS FEES. (3 YRS)						615.000
SUBTOTAL PHR COSTS	234, 183, 406	10,380,000	37,237,812	0	3,354,969	285, 771, 187
TAUTO AND CURCUANCES						0

TAXES AND SURCHARGES

TOTAL PUR COSTS

285,771,187

GTCC Material: Assumes a low density, distributed packaging scheme and final disposal as LLW. High density packaging and geologic repository disposal could reduce disposal costs. (8)

Appendix B

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Table B.10 Burial Costs at the South Carolina Site Reference BWR (1998 dollars)

COMPONENT	BASE DISPOSAL CHARGE	CASK HANDLING	CURIE SURCHARGE	LINER DOSE RATE	DOSE RATE SURCHARGE	DI SPOSAL COST
STEAN SEPARATOR	146 216	840 000	1 680 000	0	70 184	2 736 40
FUES SUPPORT & DIFCES	66 611	420,000	210,000	0	30 017	725 32
CONTROL BODS / INCODES	101 770	240,000	960,000	0	02 040	1 /02 01
CONTROL -ODS CUIDES	53 000	360 000	30,000	0	10 0/3	1,403,01
IET DIMOS	155 025	1 200,000	2 400 000	0	71 944	2 820 74
TOD FUEL CHIDES	267 120	2 160 000	8 660 000	0	129 219	11 105 77
CODE CUDDODT DIATE	170 000	2,100,000	105 000	0	120,210	11,193,33
CORE SUPPORT PLATE	522,000	4 300,000	14 800 000	0	00,200	1,370,34
DEACTOR VECCEL HALL	112 767	4,200,000	10,000,000	0	63 001	61,113,090
REALTUR VESSEL WALL	113,101	000,000	648,000	0	42,094	1,403,80
SAC SHIELD	2,393,638	0	50,400	0	U	2,444,00
REALT. WATER REC	1,035,098	0	13,184	0	0	1,048,88
SAC SHIELD	6,198,720	0	40,441	0	0	6,245,161
OTHER PRIMARY CONTAINMENT	45,414,209	0	529,699	0	0	44,003,895
CONTAINM. ATMOSPHERIC	533,925	0	7,190	0	0	541,115
HIGH PRESSURE CORE SPRAY	268,400	3	2,545	0	0	270,945
LOW PRESSURE CORE SPRAY	118,800	0	1,497	0	0	120,297
REACTOR BLDG CLOSED COOLING	418,880	0	4,793	0	0	423,673
REACTOR CORE ISO COOLING	144,585	0	1,947	0	0	146,532
RESIDUAL HEAT REMOVAL	809,609	0	9,290	0	0	818,899
POOL LINER & RACKS	5,339,180	0	57,076	0	0	5,396,256
CONTAMINATED CONCRETE	5,888,916	0	65,017	0	0	5,953,933
OTHER REACTOR BUILDING	15,784,650	0	212,567	0	0	15,997,217
TURBINE	19,753 826	0	210,624	0	0	19,964,450
NUCLEAR STEAM CONDENSATE	4,037,985	0	54,378	0	0	4,092,363
LOW PRESSURE FEEDWATER HEATERS	8,767,440	0	110,402	0	0	8,877,842
MAIN STEAM	790,020	0	10,639	0	0	800,659
MOISTURE SEPARATOR REHEATERS	7,953,750	0	107,111	0	0	8,060,861
REACTOR FEEDWATER PUMPS	2,158,065	0	29,062	0	0	2,187,127
HIGH PRESSURE FEEDWATER HEATERS	1,422,573	0	18,126	0	0	1,440,699
OTHER TG BLDG	54,028,800	0	727,588	0	0	54,756,388
RAD WASTE BLDG	26,753,265	0	360,277	0	0	27, 113, 542
REACTOR BLDG	6,839,437	1,920,000	57,000	0	0	8,816,437
TG BLDG	4,499,629	1,260,000	37,500	0	0	5,797,129
RAD WASTE & CONTROL	4,139,659	1,140,000	34,500	0	0	5,314,159
CONCENTRATOR BOTTOMS	15,297,858	6,750,000	27,000,000	0	2,072,350	51,120,208
OTHER	4, 147, 419	1,830,000	287,700	G	103,346	6,368,465
POST-THI-2 ADDITIONS	610,611	0	. 0	0	0	610,611
SITE ACCESS FEES, (3.5 YRS)						717.500
SUBTOTAL BWR COSTS	245,304,598	23,910,000	61,609,554	0	2,951,196	334,492,848
TAXES AND SURCHARGES						0
TOTAL BUR COSTS						334,492,848

Table B.11 Burial Costs at the South Carolina Site Reference PWR (1997 dollars)

	BASE DISPOSAL	CASK	CURIE	LINER DOSE	DOSE RATE	DISPOSA
COMPONENT	CHARGE	HANDLING	SURCHARGE	RATE	SURCHARGE	COST
VESSEL WALL	2,379,200	1,140,000	4,560,000	0	1,142,016	9,221,21
VESSEL HEAD & BOTTOM	1,515,780	1,200,000	6,000	0	0	2,721,78
UPPER CORE SUPPORT ASSM	143,100	120,000	3,000	0	45,792	311,89
UPPER SUPPORT COLUMN	132,300	120,000	30,000	0	42,336	324,63
UPPER CORE BARREL	63,000	60,000	240,000	0	30,240	393,24
UPPER CORE GRID PLATE	157,500	150,000	600,000	0	75,600	983,10
GUIDE TUBES	233,100	180,000	30,000	0	62,937	506,03
LOWER CORE BARREL (a)	1,008,000	960,000	3,840,000	0	483,840	6,291,840
THERMAL SHIELDS(a)	189,000	180,000	720,000	0	90,720	1,179,720
CORE SHROUD(a)	108,400	120,000	7,320,000	0	52,032	7,600,432
LOWER GRID PLATE (a)	38,280	150,000	1,200,000	0	18,374	1,406,654
LOWER SUPPORT COLUMN	39,960	30,000	120,000	0	19,181	209,14
LOWER CORE FORGING	434,160	330,000	750,000	0	208,397	1,722,55
MISC INTERNALS	352,000	240,000	600,000	0	168,960	1,360,96
BIO SHIFLD CONCRETE	8,580,000	0	360,000	0	0	8,940,00
REACTOR CAVITY LINER	172.800	0	3,000	0	0	175,80
REACTOR COOLANT PUMPS	3,008,000	0	23,298	0	0	3,031,29
PRESSUR 17ER	1,365,000	Ŭ	1,521	0	0	1,366,52
R. HX FHX SIMP PUMP CAVITY PUMP	126.000	0	3,537	0	0	129,53
PRESSURIZER RELIEF TANK	378,000	0	1,212	0	0	379,21
SAFETY INJECTION ACCUM TANKS	1,346,400	0	24,432	0	0	1,370,83
STEAM GENERATORS	11,008,000	0	1,320,000	0	0	12,328,00
REACTOR COOLANT PIPING	1,198,789	0	89,400	0	0	1,288,18
REMAINING CONTAM, MATLS	21, 192, 300	0	67,137	0	0	21,259,43
CONTAMINATED MATRI OTHE BLD	163.033.074	0	55,275	0	0	163,088,34
FULTER CARTRIDGES	216,000	180,000	1,500,000	0	25,920	1,921,92
SDENT RESINS	792.000	600,000	2,400,000	0	380,160	4, 172, 16
COMPLICITIE F WASTES	3,780,000	1.800.000	90,000	0	0	5,670,00
EVADORATOR ROTTOMS	3,722,400	2,820,000	11,280,000	0	508,464	18,330,86
POST-THI-2 ADDITIONS	7,470,863	0	0	0	0	7,470,86
SUBTOTAL PWR COSTS	234, 183, 406	10,380,000	37,237,812	0	3,354,969	285, 156, 18

TAXES AND SURCHARGES

TOTAL PWR COSTS

285, 156, 187

Table B.11 Burial Costs at the South Carolina Site Reference BWR (1997 dollars)

COMPONENT	BASE DISPOSAL CHARGE	CASK	CURIE	LINER DOSE RATE	DOSE RATE	DISPOSAL
STEAM SEPARATOR	111 211				SALAUNICE	
FUEL SUPPORT & DIECES	140,210	840,000	1,680,000	0	70,184	2 736 400
CONTROL PODS / INCODES	04,411	420,000	210,000	0	30,917	725 320
CONTROL RODS OL DEC	191,770	240,000	960,000	0	92 049	1 483 810
JET DIMOS GOIDES	53,900	360,000	30,000	0	10 043	1,403,017
TOD FUEL CUIDER	155,925	1,200,000	2,400,000	0	76 844	3 830 740
CORE SUBDORT DUATE	267,120	2,160,000	8,640,000	0	128 218	11 105 770
CORE SUPPORT PLATE	179,080	930,000	195,000	0	66 260	1 770 7/0
CORE SHRUOD	522,900	4,200,000	16,800,000	0	250,002	1,370,340
REALTOR VESSEL WALL	113,767	660,000	648,000	0	42 004	21,113,892
SAC SHIELD	2,393,608	0	50,400	0	42,0%4	1,463,861
REACT. WATER REC	1,035,698	0	3 300	0	0	2,444,008
SAC SHIELD	6,198,720	0	25 080	0	0	1,038,998
OTHER PRIMARY CONTAINMENT	43, 474, 200	0	112 200	0	0	6,223,800
CONTAINM. ATMOSPHERIC	533,925	0	1 320	0	U	43,586,400
RIGH PRESSURE CORE SPRAY	258,400	0	1 320	0	0	535,245
LOW PRESSURE CORE SPRAY	118,800	0	1,520	0	0	269,720
REACTOR BLDG CLOSED COOLING	418,880	0	1 080	0	0	119,460
REACTOR CORE ISO COOLING	144 585	ñ	1,980	0	0	420,860
RESIDUAL HEAT REMOVAL	809 609	0	000	0	0	145,245
POOL LINER & RACKS	5 330 180	0	4,620	0	0	814,229
CONTAMINATED CONCRETE	5 888 01A	0	9,900	0	0	5,349,080
OTHER REACTOR BUILDING	15 784 650	U	10,560	0	0	5.899.476
TURBINE	10 757 836	0	37,620	0	0	15,822,270
NUCLEAR STEAM CONDENSATE	4 037 085	0	38,280	0	0	19,792,106
LOW PRESSURE FEEDWATER HEATERS	8 767 440	U	7,920	0	0	4,045,905
MAIN STEAM	700,030	0	27,720	0	0	8,795,160
MOISTURE SEPARATOR REHEATERS	790,020	0	1,980	0	0	792,000
REACTOR FEEDWATER PLINDS	7,953,750	0	17,160	0	0	7,970,910
HIGH PRESSURE FEEDUATED HEATEDE	2,158,065	0	6,600	0	0	2,164,665
OTHER TO BIDG	1,422,573	0	5,280	0	0	1 427 853
RAD WASTE RIDC	54,028,800	0	170,280	0	0	54 199 080
REACTOR RIDG	20, 133, 265	0	47,520	0	0	26 800 785
TG BLDG	0,839,437	1,920,000	96,000	0	0	8 855 437
PAD LASTE & CONTROL	4,499,629	1,260,000	63,000	0	0	5 822 620
CONCENTRATOR BOTTONS	4,139,659	1,140,000	57,000	0	0	5 336 650
OTHER	15,297,858	6,750,000	27,000,000	0	2.072.350	51 120 209
DOCT THI 2 ADDITIONS	4,147,419	1,830,000	287,700	0	103 346	6 368 445
SUBTOTAL DUD CODYC	610,611	0	0	0	0	610 611
SUBTUTAL BUR CUSTS	246,578,591	23,910,000	59,649,060	Ō	3,422,573	331,814,854

TAXES AND SURCHARGES

TOTAL BWP COSTS

331,814,254

0

(a) GTCC Material: Assumes a low density, distributed packaging scheme and final disposal as LLW. High density packaging and geologic repository disposal could reduce disposal costs.

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Appendix B

COMPONENT	CRAME SURCHARGE	CASK HANDLING	CURIE	LINER DOSE RATE	BURIAL	DI SPOSAL COST
VECCEI MALL	83,220	87,400	1,545,460	0	314,526	2,030,606
VESSEL HEAD & ROTTON	0	92,000	214,000	0	331,080	637,080
LIDDED CORE SUPPORT ASSN	0	9,200	21,400	0	33,108	63,708
LIDDER SUBDORT COLUMN	0	9,200	32,400	0	33,108	74,708
LIDDER CORF RARREL	0	4,600	81,340	0	16,554	102,494
UPPER CORE GRID PLATE	0	11,500	373,750	0	41,385	426,635
CUIDE TURES	0	13,800	48,600	0	49,662	112,062
LONER CORE RAPPEL (a)	0	73,600	3,865,600	0	264,864	4,204,064
TNEPMAL SHIELDS(a)	0	13,800	724,800	0	49,662	788,262
COPE SHERED ⁽⁸⁾	0	9,200	7,368,800	0	33,108	7,411,108
LOWER CRID PLATE(a)	0	11,500	1,208,000	0	41,385	1,260,885
LOWER SUPPORT COLUMN	0	2,300	93,470	0	8,277	104,047
LOWER CORE FORGING	0	25,300	356,840	0	91,047	473, 187
NICC INTERNALS	0	18,400	259,520	0	66,216	344,136
BIO SHIFLD CONCRETE	0	0	0	0	2,065,939	2,065,939
PEACTOR CAVITY LINER	0	0	0	0	42,378	42,378
REACTOR COOLANT PLANPS	139,200	0	0	0	347,634	486,834
PRESSURIZER	22,560	0	0	0	297,972	320,532
P HY FHY SIMP PIMP CAVITY PLMP	0	0	0	0	33,108	33,108
PRESSURITER RELIEF TANK	4,380	0	0	0	99,324	103,704
SAFETY INJECTION ACCUM TANKS	33,200	0	0	0	331,080	364,280
STEAM GENERATORS	480,000	0	0	0	1,768,133	2,248,133
REACTOR COOLANT PIPING	29.050	0	0	0	273,141	302,191
REMAINING CONTAM, MATLS	0	0	0	0	4,354,364	4,354,364
CONTAMINATED MATRL OTHR BLD	0	0	0	0	39,489,733	39,489,733
FILTER CARTRIDGES	C	13,800	291,600	0	26,073	331,473
SPENT RESINS	G	46,000	1,495,000	0	165,540	1,706,540
COMPLISTIBLE WASTES	0	138,000	321,000	0	838,046	1,297,046
EVAPORATOR BOTTOMS	0	216,200	2,356,940	0	778,038	3,351,178
POST-THI-2 ADDITIONS	0	0	0	0_	1,288,150	1,288,150
SUBTOTAL PWR COSTS	791,610	795,800	20, 858, 520	0	53,572,634	75,818,564
BARNWELL COUNTY BUSINESS TAX						1,819,646
SOUTH CAROLINA LLRW DISPOSAL T	AX (INSIDE SE C	OMPACT)				152,103,045
SOUTH CAROLINA LLRW DISPOSAL T	AX (OUTSIDE SE	COMPACT)				152,103,045
TOTAL PWR COSTS (INSIDE SE COM	PACT)					229,741,255
TOTAL PWR COSTS (OUTSIDE SE CO	MPACT)					229,741,255

Table B.12 Burial Costs at the South Carolina Site Reference BWR (1996 dollars)

COMPONENT	CRANE SURCHARGE	CASK HANDLING	CURIE	LINER DOSE RATE	BURIAL	DISPOSAL COST
STEAM SEPARATOR	0	64,400	680,400	0	29,218	774,018
FUEL SUPPORT & PIECES	0	32,200	680,400	0	14,650	727,250
CONTROL RODS/INCORES	12,480	18,400	966,400	0	43,868	1,041,148
CONTROL RODS GUIDES	0	27,600	72,240	0	11,671	111,511
JET PUMPS	0	92,000	972,000	0	40.971	1,104,971
TOP FUEL GUIDES	0	165,600	2,928,240	0	70,189	3,164,029
CORE SUPPORT PLATE	0	71,300	251,100	0	32, 198	354,598
CORE SHROUD (a)	0	322,000	16,912,000	0	137,398	17,371,398
REACTOR VESSEL WALL	48,190	50,600	444,400	0	23,424	566,604
SAC SHIELD	75,600	0	0	0	263,043	338,643
REACT. WATER REC	58,000	0	0	0	257,249	315,249
SAC SHIELD	205,200	0	0	0	906,166	1,111,366
OTHER PRIMARY CONTAINMENT	0	0	0	0	10,335,490	10,335,490
CONTAINM. ATMOSPHERIC	4,380	0	0	0	140,295	144,675
HIGH PRESSURE CORE SPRAY	8,300	0	0	0	49,662	57,962
LOW PRESSURE CORE SPRAY	2,820	0	0	0	29,218	32,038
REACTOR BLDG CLOSED COOLING	6,570	0	0	C	93,530	100,100
REACTOR CORE ISO COOLING	2,190	0	0	0	37,991	40,181
RESIDUAL HEAT REMOVAL	19,740	0	0	0	181,266	201,006
POOL LINER & RACKS	31,000	0	0	0	1,113,670	1,194,670
CONTAMINATED CONCRETE	35,040	0	0	0	1,268,616	1,303,656
OTHER REACTOR BUILDING	0	0	0	0	4,147,605	4,147,605
TURBINE	163,560	0	0	0	4,109,695	4,273,256
NUCLEAR STEAM CONDENSATE	33,840	0	0	0	1,061,029	1,094,869
LOW PRESSURE FEEDWATER HEATERS	226,800	0	0	0	2,154,172	2,380,972
MAIN STEAM	8,460	0	0	0	207,587	216,047
MOISTURE SEPARATOR REHEATERS	140,400	0	0	0	2,089,943	2,230,343
REACTOR FEEDWATER PUMPS	21,900	0	0	0	567,057	588,957
HIGH PRESSURE FEEDWATER NEATERS	43,200	0	0	0	353,676	396,876
OTHER TG BLDG	0	0	0	0	14, 196, 710	14, 196, 710
RAD WASTE BLDG	0	0	0	0	7,029,739	7,029,739
REACTOR BLDG	0	147,200	342,400	0	886,467	1,376,067
TG BLDG	0	96,600	224,700	0	598,427	919,727
RAD WASTE & CONTROL	0	87,400	203,300	0	516,485	807,185
CONCENTRATOR BOTTOMS	0	517,500	5,598,060	0	1,862,325	7,977,885
OTHER	0	140,300	485,020	0	504,897	1,130,217
POST-THE-2 ADDITIONS	0	0	0	0	105.283	105.283
TOTAL BWR COSTS	1,197,660	1,833,100	30,760,660	0	55,470,881	89,262,301
BARNWELL COUNTY BUSINESS TAX						2,142,295
SOUTH CAR INA LLRW DISPOSAL TAX	X (INSIDE SE CO	OMPACT)				157, 492, 535
SOUTH CARO NA LLRW DISPOSAL TA	X (OUTSIDE SE	COMPACT)				157,492,535
TOTAL BUR CIVITS (INSIDE SE COMP	ACT)					248,897,132
TOTAL BUR COMES COUTSIDE SE COM	PACT)					248,897,132

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COMPONENT	CRANE	CASK HANDLING	CURIE	LINER DOSE RATE	BURIAL CHARGE	DISPOSAL
ureeri 11411	NCC 78	87 400	1.545.460	0	319,960	2,036,040
PESSEL MALL D. VTAM	0	00 000	214,000	0	336,800	642,800
VESSEL REAU DUI LUM		0 200	21.400	0	33,680	64,280
UPPER LUKE SULTURI ASST		0.200	32.400	0	33,680	75,230
UPPER SUPPORT CULUMN		4,600	81.340	0	16,840	102,780
UPPER CORE DAMACL		11,500	373.750	0	42,100	427,350
CHINE THEE	0	13,800	48,600	0	50,520	112,920
COLUCE LODGS	0	73.600	3.365.600	0	269,440	4,208,640
TUEDMAL CUTCIDE(3)	0	13.800	724.800	0	50,520	789,120
PODE CUDAIN(3)	0	9.200	7.368.800	0	33,680	7,411,680
LONE STROOM	0	11,500	1,208,000	0	42,100	*,261,600
I MUES CIDDODT COLISM	0	2.300	03.470	0	8,420	104,190
LOWER CODE FORGING	0	25.300	356.840	0	92,620	1.74,760
MICL INTERNALS	0	18.400	259,520	0	67,360	345,280
DID CHIELD CONCOSTE	0	0	0	0	2,101,632	2,101,632
DEALTOD CAVITY LINED	0	0	0	0	43,110	43,110
DEALTON CON ANT DI HEDS	130.200	0	0	0	353,640	492,840
DECCIPTED	22.560	0	0	0	303,120	325,680
P HK FHK SIMP PUMP CAVITY PUMP	0	0	0	0	33,680	33,680
DDECCIDITED DEI FFF TANK	4.380	0	0	0	101,040	\$05,420
CAFFTY INJECTION ACCUM TANKS	33.200	0	0	0	336,800	370,000
CTEAM CENEVATORS	480.000	0	0	0	1, 798, 680	2,278,680
DEALTOP COOLANT PIPIES	29,050	0	0	0	277,860	\$05,910
DEMAINING CONTAM MATIS	0	0	0	0	4,429,594	4,4,9,594
CONTAMINATED MATRI OTHR BLD	0	0	0	0	40,171,988	40,171,988
FILTED CARTRINGES	0	13.800	291,600	0	26,523	331,923
CDERT DECINC	C	46.000	1.495.000	0	168,400	1,709 400
COMPLETE: F UACTES	0	138.000	321.000	0	852,525	1,311,525
CURPOSIES PUTTONS		216 200	2 356,940	0	791.480	3,364,120
EVAPURATUR BUILUNS		0	0	0	1.310.405	1.310.415
SUBTOTAL PUR COSTS	791,610	795,890	20,658,520	0	54,498,197	76,744,127
BARNWELL L'YUNTY BUSINESS TAX						1,841,859
SOUTH CAROLINA LLRW DISPOSAL TI SOUTH CAROLINA LLRW DISPOSAL TI	AX (INSIDE SE CAAX (OUTSIDE SE	OMPACT) COMPACT)				152,103,045

GTCC Material: Assumes a low density, distributed packaging scheme and final disposal as LLW. High density packaging and geologic repository disposal could reduce disposal costs. (8)

TOTAL PWR COSTS (INSIDE SE COMPACT) TOTAL PWR COSTS (OUTSIDE SE COMPACT)

230,689,031 230,689,031

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Table B.13 Burial Costs at the South Carolina Site Reference BW/R (1995 dollars)

COMPONENT	CRANE SURCHARGE	CASK HANDLING	CURIE	LINER DOSE RATE	BURIAL	DISPOSAL COST
STEAM SEPARATOR	0	64,400	680,400	0	29,723	774,523
FUEL SUPPORT & PIECES	0	32,200	680,400	0	14,903	727,503
CONTROL RODS/INCORES	12,480	18,400	966,400	0	44.626	1,041,906
CONTROL RODS GUIDES	0	27,600	72,240	0	11.872	111.712
JET PLIMPS	0	92,000	972.000	0	41.679	1,105,679
TOP FUEL GUIDES	0	165,600	2,928,240	0	71,402	3,165,242
CORE SUPPORT PLATE	0	71,300	251,100	0	32,754	355.154
CORE SHROUD ^(a)	0	322,000	16,912,000	0	139,772	17.373.772
REACTOR VESSEL WALL	48,180	50,600	444,400	0	23,829	567,009
SAC SHIELD	75,600	0	0	0	267,588	343,188
REACT. WATER REC	58,000	0	0	0	261,694	319,694
SAC SHIELD	205,200	0	0	0	921,822	1,127,022
OTHER PRIMARY CONTAINMENT	0	0	0	0	10,514,054	10,514,054
CONTRINM. ATMOSPHERIC	4,380	0	0	0	142,719	147,099
HIGH PRESEURE CORE SPRAY	8,300	0	0	0	50,520	58,820
LOW PRESSURE CORE SPRAY	2.820	0	0	0	29,723	32,543
REACTOR BLDG CLOSED COOLING	6,570	0	0	0	95,146	101,716
REACTOR CORE ISO COOLING	2,190	0	0	0	38,648	40,838
RESIDUAL HEAT REMOVAL	19,740	0	0	0	184.398	204,138
POOL LINER & RACKS	81,000	0	0	0	1,132,911	1,213,911
CONTAMINATED CONCRETE	35,040	0	0	0	1,290,533	1,325,573
OTHER REACTOR BUILDING	0	0	0	0	4,219,262	4,219,262
TURBINE	163,560	0	0	0	4,180,698	4,344,258
NUCLEAR STEAM CONDENSATE	33,840	0	0	0	1,079,360	1,113,200
LOW PRESSURE FEEDWATER HEATERS	226,800	0	0	0	2,191,389	2,418,189
MAIN STEAM	8,460	0	0	0	211,174	219,634
MOISTURE SEPARATOR REHEATERS	140,400	0	0	0	2,126,050	2,266,450
REACTOR FEEDWATER PUMPS	21,900	0	0	0	576,854	598,754
HIGH PRESSURE FEEDWATER HEATERS	43,200	0	0	0	359,787	402,987
OTHER TO BLDG	0	0	0	0	14,441,984	14,441,984
RAD WASTE BLDG	0	0	0	0	7,151,190	7,151,190
REACTOR BLDG	0	147,200	342,400	0	901,782	1,391,382
TG BLDG	0	96,600	224,700	0	608,766	930,066
RAD WASTE & CONTROL	5	87,400	203,300	0	525,408	816,108
CONCENTRATOR BOTTOMS	0	517,500	5,598,060	0	1,894,500	8,010,060
OTHER	0	140,300	485,020	0	513,620	1,138,940
POST-THI-2 ADDITIONS	0	0	0	0	107.102	107,102
SUBTOTAL BWR COSTS	1,197,660	1, 323, 100	30,760,660	0	56,429,240	90,220,660
BARNWELL COUNTY BUSINESS TAX						2,165,296
SOUTH CAROLINA LLRW DISPOSAL TA	X (INSIDE SE CO	OMPACT)				157,492,535
SOUTH CAROLINA LLRW DISPOSAL TA	X (OUTSIDE SE	COMPACT)				157,492,535
TOTAL BWR COSTS (INSIDE SE COMP	ACT)					249,878,491
TOTAL BWR COSTS (OUTSIDE SE COM	PACT)					249,878,491

(a) GTCC Material: Assumes a low density, distributed packaging scheme and final disposal as LLW. High density packaging and geologic

repository disposal could reduce disposal costs.

B.29

COMPONENT	CRANE SURCHARGE	CASK HANDLING	CURIE	LINER DOSE RATE	BUR I AL CHARGE	DI SPOSAL CQST
VESSEL WALL	64,030	68,210	1,188,640	0	272,080	1,592,960
VESSEL HEAD & BOTTOM	0	71,800	166,000	ç	286,400	524,200
UPPER CORE SUPPORT ASSM	0	7,180	16,600	0	28,640	52,420
UPPER SUPPORT COLUMN	0	7,180	24,940	0	28,640	60,760
UPPER CORE BARREL	0	3,590	62,560	0	14,320	80,470
UPPER CORE GRID PLATE	0	8,975	287,500	0	35,800	332,275
GUIDE TUBES	0	10,770	\$7,410	0	42,960	91,140
LOWER CORE BARREL (a)	0	57,440	3,129,600	0	229,120	3,416,160
THERMAL SHIELDS(a)	0	10,770	724,800	0	42,960	778,530
CORE SHROUD (a)	0	7,180	10,574,271	0	28,640	10,610,091
LOWER GRID PLATE (a)	0	8,975	1,725,000	0	35,800	1,769,775
LOWER SUPPORT COLUMN	0	1,795	71,900	0	7,160	80,855
LOWER CORE FORGING	0	19,745	274,505	0	78,760	373,010
MISC INTERNALS	0	14,360	199,640	0	57,280	271,280
BIG SHIELD CONCRETE	0	0	0	0	1,787,135	1,787,136
REACTOR CAVITY LINER	0	0	0	0	36,859	36,659
REACTOR COOLANT PUMPS	107,400	0	0	0	300,720	408,120
PRESSURIZER	17,360	0	с	0	257,760	275,120
R.H.S.EHX, SUMP PUMP, CAVITY PUMP	0	0	0	0	28,640	28,640
PRESSURIZER RELIEF TANK	3,370	0	0	0	85,920	89,290
SAFETY INJECTION ACCUM TANKS	25,480	0	0	0	286,400	311,880
STEAM GENERATORS	387,200	0	0	0	1,529,519	1,916,719
REACTOR COOLANT PIPING	22,295	0	0	0	236,280	258,575
REMAINING CONTAM. MATLS	0	0	0	2	3,766,733	3,766,733
CONTAMINATED MATRL OTHR BLD	0	0	0	ь	34,160,503	34, 160, 503
FILTER CARTRIDGES	0	10,770	224,250	0	22,554	257,574
SPENT RESINS	0	35,900	1,150,000	0	143,200	1,329,100
COMBUSTIBLE WASTES	0	107,700	249,000	0	724,950	1,081,650
EVAPORATOR BOTTOMS	0	168,730	1,815,395	0	673,040	2,657,165
POST-TMI-2 ADDITIONS	0	0	0	0	1,114,311	1.114.311
SUBTOTAL PWE COSTS	627,135	621,070	21,922,011	0	46,342,885	69,513,101
SARNWELL COUNTY BUSINESS TAX						1,668,314
SOUTHEAST COMPACT ACCESS FEE (IN-REGION)					47,896,278
SOUTHEAST COMPACT ACCESS FEE (OUT-OF-REGION)					142.394,340
TOTAL PWR COSTS (IN-REGION)						119,077,693
TOTAL PWR COSTS (OUT-OF-REGION))					213,575,755

Table B.14 Burial Costs at the South Carolina Site Reference BWR (1994 dollars)

COMPONENT	CRANE SURCHARGE	CASX HANDLING	CURIE	LINER DOSE	BURIAL	DISPOSAL
CTEAN CEDADATON			The second second second second second		CUARUE	
STEAM SEPARATUR	0	50,260	523,250	0	25.275	508 785
CONTROL BODD (THEORET	0	25,130	523,250	0	12,673	561 053
CONTROL ROUS/INCORES	9,600	14,360	966,400	0	37.948	1 028 308
CONTROL RODS GUIDES	0	21,540	56,520	0	10 096	88 154
JET PUMPS	0	71,800	747,500	0	35 442	954 743
TOP FUEL GUIDES	0	129,240	2,252,160	0	60 717	2 112 117
CORE SUPPORT PLATE	0	55,645	193,285	Ő	27 852	2,442,111
CORE SHROUD	0	251,300	24,150,000	0	118 854	21 520 151
REACTOR VESSEL WALL	37,070	39,490	341,550	0	20 263	24,320,130
SAC SHIELD	58,590	0	0	0	20,203	438, 575
REACT. WATER REC	52,500	0	0	0	227, 343	286,155
SAC SHIELD	159,030	0	0	0	222,033	275,033
OTHER PRIMARY CONTAINMENT	0	0	0	0	183,8/1	942,907
CONTAINM. ATMOSPHERIC	3.370	0	0	0	8,940,692	8,940,692
HIGH PRESSURE CORE SPRAY	6.370	0	0	0	121,362	124,732
LOW PRESSURE CORE SPRAY	2,170	0	0	0	42,960	49,330
REACTOR BLDG CLUSED COOLING	5 055	0	0	0	25,275	27,445
REACTOR CORE ISO COOLING	1 685	0	0	0	80,908	85,963
RESIDUAL HEAT RENOVAL	15 100	0	0	0	32,864	34,549
POOL LINER & RACKS	63 775	0	0	0	156,804	171,994
CONTAMINATED CONCRETE	02,113	0	0	0	963,378	1,026,153
OTHER DEACTOR BUILDING	20,900	0	0	0	1,097,413	1,124,373
TIDRINE	105 040	0	0	0	3,587,876	3,587,876
NUCLEAD STEAM CONDENSATE	125,860	0	0	0	3,555,083	3,680,943
IOU DECCUDE FEEDUATED USATED	26,040	0	0	0	917,840	043 880
LOW PRESSURE FEEDWATER HEATERS	175,770	0	0	0	1.863.462	2 030 232
MAIN STEAM	6,510	0	0	0	179.573	186 087
MUISTURE SEPARATOR REHEATERS	108,810	0	0	0	1 807 900	1 016 710
REACTOR FEEDWATER PUMPS	16,850	0	0	0	490 532	507 793
HIGH PRESSURE FEEDWATER HEATERS	33,480	0	0	ñ	305 047	307,302
OTHER TG BLDG	0	0	0	0	12 280 872	12 200 072
RAD WASTE BLDG	0	0	0	0	6 081 060	12,280,832
REACTOR BLDG	0	114.880	265 600	0	0,001,000	0,081,060
TG BLDG	0	75,390	176 300	0	100,030	1,147,316
RAD WASTE & CONTROL	0	68,210	157 700	0	517,008	767,358
CONCENTRATOR BOTTOMS	0	403.875	4 311 800	0	440,784	672,694
OTHER	0	109 495	374 515	0	1,611,000	6,326,765
POST-TMI-2 ADDITIONS	0	0	370,313	0	436,760	922,770
SUBTOTAL BWR COSTS	933,685	1,430,615	35,039,920	0	91,075	91,075
BARNWELL COUNTY BUSINESS TAY						05,507,180
SOUTHEAST COMPACT ACCESS FEE (IN	-RECTON)					2,049,340
SOUTHEAST COMPACT ACCESS FEE (OH	T-OF-RECIONS					49,593,394
CONTRACT RELEOS FEE (00	(OF REGION)					147.439.820
TOTAL BWR COSTS (IN-REGION)						
TOTAL BWR COSTS (OUT-OF-REGION)						137,031,914
						234,010,340

(a) GTCC Material: Assumes a low density, distributed packaging scheme and final disposal as LLW. High density packaging and geologic repository disposal could reduce disposal costs.

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Table B.15 Burial Costs at the South Carolina Site Reference PWR (1993 dollars)

I DEDONENT	CRANE	CASK HAND: ING	CURIE	LINER DOSE RATE	BURIAL	DISPOSAL COST
1 PROPERT	SAUGUNE	- TOTAL SALTS				
VESSEL WALL	64,030	68,210	1,188,640	0	224,200	1,545,080
VESSEL HEAD & BOTTOM	0	71,800	166,000	0	236,000	473,800
UPPER CORE SUPPORT ASSM	0	7,180	16,600	0	23,600	47,380
UPPER SUPPORT COLUMN	0	7,180	24,940	0	23,600	55,720
UPPER CORE BARREL	0	3,590	62,560	0	11,800	77,950
UPPER CORE GRID PLATE	0	8,975	287,500	0	29,500	325,975
GUIDE TUBES	0	10,770	37,410	0	35,400	83,580
LOWER CORE BARREL (a)	0	57,440	3,129,600	0	128,800	3,375,840
THERMAL SHIELDS(2)	0	10,770	724,800	0	35,400	770,970
CORE SHROUD (a)	0	7,180	10,574,271	0	23,600	10,605,051
LOWER GRID PLATE (a)	0	8,975	1,725,000	0	29,500	1,763,475
LOWER SUPPORT COLUMN	0	1,795	71,900	0	5,900	79,595
LOWER CORE FORGING	0	19,745	274,505	0	64,900	359,150
MISC INTERNALS	0	14,360	199,640	0	47,200	22* .200
BIO SHIELD CONCRETE	0	0	0	0	1,472,640	1,472,0-9
REACTOR CAVITY LINER	0	0	0	0	30,208	30,208
REACTOR COOLANT PUMPS	107,400	0	0	0	247,800	355,200
PRESSURIZER	17,360	0	0	0	212,400	229,760
R. HX, EHX, SUMP PUMP, CAVITY PUMP	0	0	0	0	23,600	23,600
PRESSURIZER RELIEF TANK	3,370	0	0	0	70,800	74,170
SAFETY INJECTION ACCUM TANKS	25,480	0	0	0	236,000	261,480
STEAM GENERATORS	387,200	0	0	0	1,260,358	1,647,558
REACTOR COOLANT PIPING	22,295	0	0	0	194,700	216,995
REMAINING CONTAM. MAILS	0	0	0	0	103,872	3,103,872
CONTAMINATED MATRL OTHR BLD	0	0	C	0	28,14	28,149,013
FILTER CARTRIDGES	0	10,770	224,250	0	18,585	253, 505
SPENT RESINS	0	35,900	1,150,000	0	118,000	1,303,900
COMBUSTIBLE WASTES	0	107,700	249,000	0	597,375	954,075
EVAPORATOR BOTTOMS	0	168,730	1,815,395	0	554,600	2,538,725
POST-TMI-2 ADDITIONS	0	0	0	0	918.217	918.217
SUBTOTAL PWR COSTS	627,135	621,070	21,922,011	0	38, 187, 573	61,357,789
BARNWELL COUNTY BUSINESS TAX						1,472,587
SOUTHEAST COMPACT ACCESS FEE (IN-REGION)					47,896,278
SOUTHEAST COMPACT ACCESS FEE (OUT-OF-REGION)					142.394.340
TOTAL PWR COSTS (IN-REGION)						110,726,654
TOTAL PUR COSTS COUT-OF-REGION)					205,224,716

(a) GTCC Material: Assumes a low density, distributed packaging scheme and final disposal as LLW. High density packaging and reologic repository disposal could reduce disposal costs.

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Table B.15 Burial Costs at the South Carolina Site Reference BWR (1993 dollars)

COMPONENT	CRANE SURCHARGE	HANDLING	CURIE SURCHARGE	LINER D TE	BURIAL	DISPOSAL
STEAM SEPARATOR	0	50,260	523 250	0	20 027	
FUEL SUPPORT & PIECES	0	25,130	523 250	0	20,827	594,257
CONTROL RODS/INCORES	9,600	14 360	966 400	0	10,445	558,823
CONTROL ROOS GUIDES	0	21 540	56 520	0	31,270	1,021,630
JET PUMPS	0	71 800	767 500	0	8,319	86,379
TOP FUEL GUIDES	0	120 240	2 252 140	0	29,205	848,505
CORE SUPPORT PLATE	0	55 6/5	2,222,100	0	50,032	2,431,432
CORE SHROUD (a)	0	35,043	145,285	0	22,951	271,881
REACTOR VESSEL WALL	37 500	20,000	24, 150,000	0	97,940	24,499,240
SAC SHIFLD	58 500	39,490	341,550	0	16.697	434,807
REACT. WATER REC	52,590	0	0	0	101, 72	246,092
SAC SHIELD	150,070	U	0	0	183,372	235,872
OTHER DRIMARY CONTAINMENT	139,030	U	0	0	645,932	804,962
CONTAINM ATMOSPHERIC	7 770	0	0	0	7,367,330	7,367,330
HICH DESCHER CODE CODE	3,370	0	0	0	100,005	103.375
I OU DECOURE CORE SPRAT	6,370	0	0	0	35,400	41,770
DEACTOR BLDG CLOSED BOOK HIS	2,170	0	0	0	20.827	22 007
REACTOR BLUG CLUSED COOLING	5,055	0	0	0	66.670	71 725
REACTOR CORE ISO COOLING	1,685	0	0	0	27.081	28 766
RESIDUAL HEAT REMOVAL	15,190	0	0	0	129 210	166 600
POOL LINER & RACKS	62,775	0	0	0	703 845	854 400
CONTAMINATED CONCRETE	26,960	0	0	0	004 203	030,020
OTHER REACTOR BUILDING	0	0	0	ñ	2 056 400	2 05- 100
TURBINE	125,860	0	0	0	2 020 148	2,730,490
NUCLEAR STEAM CONDENSATE	26,040	0	0	0	756 201	3,033,328
LOW PRESSURE FEEDWATER HEATERS	175,770	0	0	0	1 575 52/	1 702,301
MAIN STEAM	6,510	0	0	0	1/7 074	1,711,304
MOISTURE SEPARATOR REHEATERS	108,810	0	n	0	1 / 20 750	154,482
REACTOR FEEDWATER PUMPS	16,850	0	0	0	1,409,750	1,598,560
HIGH PRESSURE FEEDWATER HEATERS	33,480	0	0	0	404,209	421,059
OTHER TG BLDG	0	0	0	0	252,107	285,587
RAD WASTE BLDG	0	0	0	0	10,119,680	10,119,680
REACTOR BLDG	0	114 880	265 600	0	5,010,929	5,010,929
TG BLDG	0	75 390	174 300	0	631,890	1,012,370
RAD WASTE & CONTROL	0	68 210	157 700	0	420,570	676,260
CONCENTRATOR BOTTOMS	0	403 875	6 311 800	0	368,160	594,070
OTHER	0	109 495	376 515	0	1,321,500	6,043,265
POST-TMI-2 ADDITIONS	ñ	0	378.313	U	359,900	845,910
SUBTOTAL BWR COSTS	933,685	1,430,615	35,039,920	0	39,540,679	75,048
BARNWELL COUNTY BUSINESS TAX						
SOUTHEAST COMPACT ACCESS FEE (IN	-REGION)					1,846,678
SOUTHEAST COMPACT ACCESS FEE (OL	JT-OF-REGION)					49,593,394
TOTAL BWR COSTS (IN-REGION)						128.384.971
TUTAL BWR COSTS (OUT-OF-REGION)						226,231,397

(a) GTCC Material: Assumes a low density, distributed packaging scheme and final disposal as LLW. High density packaging and geologic repository disposal could reduce disposal costs.

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Table B.16 Burial Costs at the South Carolina Site Reference PWR (1991 dollars)

COMPONENT	CRANE SURCHARGE	CASK HANDLING	CURIE SURCHARGE	LINER DOSE RATE	BURIAL CHARGE	DISPOSAL COST
VESSEL WALL	55,670	59,280	1,033,600	0	155,914	1,304,464
VESSEL HEAD & BOTTOM	0	62,400	144,600	0	164,120	371,120
UPPER CORE SUPPORT ASSM	0	6,240	14,460	0	16,412	37,112
UPPER SUPPORT COLUMN	0	6,240	14,460	0	16,412	37,112
UPPER CORE BARREL	0	3,120	54,400	0	8,206	65,726
UPPER CORE GRID PLATE	0	7,800	217,000	0	20,515	245,315
GUIDE TUBES	0	9,360	81,000	0	24,618	114,978
LOWER CORE BARREL (2)	0	49,920	2,409,600	0	131,296	2,590,816
THERMAL SHIELDS(a)	0	9,360	451,800	0	24,618	485,778
CORE SHROUD (a)	0	6,240	8,296,000	0	16,412	8,318,652
LOWER GRID PLATE (a)	0	7,800	1,360,000	0	20,515	1,388,315
LOWER SUPPORT COLUMN	0	1,560	55,000	0	4,103	69,663
LOWER CORE FORGING	0	17,160	238,700	0	45,133	300,993
MISC INTERNALS	0	12,480	173,600	0	32,824	218,904
BIO SHIELD CONCRETE	0	0	0	0	1,024,109	1,024,109
REACTOR CAVITY LINER	0	0	0	0	21,007	21,007
REACTOR COOLANT PUMPS	93,600	0	0	0	172,326	265,926
PRESSURIZER	15,080	0	0	0	147,708	162,788
R.HX, EHX, SUMP PUMP, CAVITY PUMP	0	0	0	0	16,412	16,412
PRESSURIZER RELIEF TANK	2,930	0	0	0	49,236	52,166
SAFETY INJECTION ACCUM TANKS	22,160	0	0	0	164,120	186,280
STEAM GENERATORS	336,000	0	0	0	876,483	1,212,483
REACTOR COOLANT PIPING	19,390	0	0	0	135,399	154,789
REMAINING CONTAM. MATLS	0	0	0	0	2,158,506	2,158,506
CONTAMINATED MATRL OTHR BLD	0	0	0	0	19,575,495	19,575,495
FILTER CARTRIDGES	0	9,360	195,000	0	12,924	217,284
SPENT RESINS	0	31,200	868,000	0	82,060	981,260
COMBUSTIBLE WASTES	0	93,600	216,900	0	415,429	725,929
EVAPORATOR BOTTOMS	0	146,640	339,810	0	385,682	872,132
POST-TMI-2 ADDITIONS	õ	0	0	0	638,550	638,550
SUBTOTAL PWR COSTS	544,830	539,760	16, 163, 930	0	26,556,544	43,805,064
BARNWELL COUNTY BUSINESS TAX (2	2.4%)					1.051.322
TOTAL PWR COSTS						44,856,386

(a) GTCC Material: Assumes a low density, distributed packaging scheme and final disposal as LLW. High density packaging and geologic repository disposal could reduce disposal costs.

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Table B.16 Burial Costs at the South Carolina Site Reference BWR (1991 dollars)

	CRANE	CASK	CURIE	LINER DOSE	DUDTAL	DICROCK
COMPONENT	SURCHARGE	HANDLING	SURCHARGE	RATE	CHARGE	COST
STEAM SEPARATOR	0	13 490	770 000			
FUEL SUPPORT & PIECES	0	43,000	770,000	0	14,484	828, 164
CONTROL RODS/INCORES	084.4	21,640	455,000	0	7,262	484,102
CONTROL RODS GUIDES	4,000	12,480	766,400	0	21,746	805.306
JET PUMPS	0	18,720	43,380	0	5,785	67.885
TOP FUEL GUIDES	0	62,400	850,000	0	20,310	732.710
CORE SUPPORT PLATE	0	112,320	1,958,400	0	34,834	2,105,554
CORE SHROUD (a)	0	48,350	168,020	0	16,002	232, 382
REACTOR VESSEL WALL	33 330	218,400	19,040,000	0	68,110	19,326,510
SAC SHIFID	52,230	34, 520	297,000	0	10,545	374.095
REACT. WATER DEC	50,900	0	0	0	147,544	198,504
SAC SHIELD	42,200	0	0	0	127.603	173, 103
OTHER DRIMARY CONTAINNENT	138,320	0	0	0	449,279	587 500
CONTAINN ATHOODUCAL	0	0	0	0	5.123.334	5 123 334
HIGH DECEMBE CODE CODE	2,930	0	0	0	69,505	72 635
ION DESSURE CORE SPRAY	5,540	0	0	0	24,618	30 158
LOW PRESSURE LURE SPRAT	1,885	0	0	0	14 566	16 451
REACTOR BLDG LLUSED COOLING	4,395	0	0	0	46.446	50 8/1
REALFOR LORE COOLING	1,465	0	0	0	18 874	20,330
RESIDUAL HEAT REMOVAL	13,195	0	0	0	RTO OR	107 177
POOL LINES & RACKS	54,600	0	0	0	551 077	103,133
CONTAMINATED CONCRETE	23,440	0	0	0	638 785	000,577
OTHER REACTOR BUILDING	0	0	0	0	2 054 701	052,225
TURBINE	109,330	0	0	0	2,030,301	2,056,301
NUCLEAR STEAM CONDENSATE	22,620	0	0	0	2,030,934	2,146,264
LOW PRESSURE FEEDWATER HEATERS	152,880	0	0	0	222,904	548,584
MAIN STEAM	5,655	0	0	0	1,007,847	1,220,727
MOISTURE SEPARATOR REHEATERS	94,640	0	0	0	102,944	108,599
REACTOR FEEDWATER PUMPS	14,650	0	0	0	1,035,802	1,130,442
HIGH PRESSURE FEEDWATER HEATERS	29,120	0	0	0	282,574	297,224
OTHER TG BLDG	0	0	0	0	175,280	204,400
RAD WASTE BLDG	0	0	0	0	7,051,580	7,051,580
REACTOR BLDG	0	00 840	231 340	0	3,484,760	3,484,760
TG BLDG	0	65 520	231,360	0	439,431	770,631
RAD WASTE & CONTROL	0	59 280	137 370	0	296,647	513,997
CONCENTRATOR BOTTOMS	0	351 000	917 776	0	256,027	452,677
OTHER	n	05 160	013,375	0	923, 175	2,087,550
POST-TMI-2 ADDITIONS	0	,100	220,313	0	250,283	565,958
SUBTOTAL BWR COSTS	808,035	1,243,320	25,702,650	0	52,190	52,190
BARNWELL COUNTY BUSINESS TAX (2.	4%)					1.326.799

56,610,088

(a) GTCC Material: Assumes a low density, distributed packaging scheme and final disposal as LLW. High density packaging and geologic repository disposal could reduce disposal costs.

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Table B.17 Burial Costs at the South Carolina Site Reference PWR (1988 dollars)

COMPONENT	CRANE	CASK HANDLING	CURIE	LINER DOSE RATE	BURIAL CHARGE	DISPOSAL COST
MACH MILLI	ARIAR LEADING					
VESSEL WALL	38,380	38,000	714,400	0	134,216	924,996
VESSEL HEAD & BOTTOM	0	40,000	100,000	0	141,280	281,280
UPPER CORE SUPPORT ASSM	0	4,000	10,000	0	14,128	28,128
UPPER SUPPORT COLUMN	0	4,000	10,000	0	14,128	28,128
UPPER CORE BARREL	0	2,000	37,600	0	7,064	46,664
UPPER CORE GRID PLATE	0	5,000	150,000	0	17,660	172,660
GUIDE TUBES	0	6,000	56,100	0	21, 192	83,292
LOWER CORE BARREL (a)	0	32,000	1,824,000	0	113,024	1,969,024
THERMAL SHIELDS(a)	0	6,000	360,000	0	21,192	387, 192
CORE SHROUD ^(a)	0	4,000	6,100,000	0	14,128	6,118,128
LOWER GRID PLATE (a)	0	5,000	1,000,000	0	17,660	1,022,660
LOWER SUPPORT COLUMN	0	1,000	36,500	0	3,532	41,032
LOWER CORE FORGING	0	11,000	165,000	0	38,852	214,852
MISC INTERNALS	0	8,000	120,000	0	28,256	156,256
BIO SHIELD CONCRETE	0	0	0	0	881,587	881,587
REACTOR CAVITY LINER	0	0	0	0	18,084	18,084
REACTOR COOLANT PUMPS	36,848	0	0	0	148,344	185, 192
PRESSURIZER	10,480	0	0	0	127,152	137,632
R.HX, EHX, SUMP PUMP, CAVITY PUMP	0	0	0	0	14,128	14,128
PRESSURIZER RELIEF TANK	2,020	0	0	0	42,384	6:,404
SAFETY INJECTION ACCUM TANKS	15,320	0	0	0	141,280	156,600
STEAM GENERATORS	134,848	0	0	0	754,506	889,354
REACTOR COOLANT PIPING	13,405	0	0	0	116,556	129,961
REMAINING CONTAM. MATLS	0	0	0	0	1,858,115	1,858,115
CONTAMINATED MATRI. OTHR BLD	0	0	0	0	16,851,243	16,851,243
FILTER CARTRIDGES	0	6,000	135,000	0	11,126	152,126
SPENT RESINS	0	20,000	600,000	0	70,640	690,640
COMBUSTIBLE WASTES	0	60,000	150,000	0	357,615	567,615
EVAPORATOR BOTTOMS	0	94,000	235,000	0	332,008	661,008
POST-TMI-2 ADDITIONS	0	0	0	0	549,685	549,685
SUBTOTAL PWR COSTS	251,301	346,000	11,803,600	0	22,860,764	35,261,665
BARNWELL COUNTY BUSINESS TAX (2	.4%)					846,280
TOTAL PWR COSTS						36,107,945

Table B.17 Burial Costs at the South Carolina Site Reference BWR (1988 dollars)

COMPONENT	CRANE SURCHARGE	CASK HANDLING	CURIE	LINER DOSE RATE	BURIAL	DISPOSAL
STEAM SEPARATOR	0	28,000	F20 200		max was R L O AN MIL	
FUEL SUPPORT & PIECES	0	20,000	529,200	0	12,468	569,668
CONTROL RODS/INCORES	3 240	14,000	315,000	0	6,252	335,252
CONTROL ROOS GUIDES	3,240	0,000	529,600	0	18,720	559,560
JET PLIMPS	0	12,000	50,000	0	4,980	46,980
TOP FUEL G. YES	0	40,000	450,000	0	17,483	507,483
CORE SUPPORT DI ATE	0	72,000	1,353,600	0	29,987	1,455,587
CORE SHPOUD (a)	0	51,000	116,250	0	13,775	161,025
PEACTOR VESSEL MALL	22 220	140,000	13,230,000	0	58,631	13,428,631
SAC SHIELD	22,220	22,000	205,700	0	9,077	258,997
DEACT WATED DEC	35,280	0	0	0	127,011	162,291
CAP CHIELD	19,551	0	0	0	109,845	129,396
OTHER DRIMARY CONTAINMENT	95,760	0	0	0	386,754	482,514
CONTAINN ATROCOUCOLC	0	0	0	0	4,410,338	4,410,338
LUNIAINM. AIMUSPHERIC	2,020	0	0	0	59,832	61,852
IGH PRESSURE LUKE SPRAT	3,830	0	0	0	21, 192	25.022
LOW PRESSURE CORE SPRAY	1,310	0	0	0	12,539	13.849
REACTOR BLDG CLOSED COOLING	3,030	0	0	0	39,982	43.012
REACTOR CORE COOLING	1,010	0	0	0	16,247	17,257
RESIDUAL HEAT REMOVAL	9,170	0	0	0	77.421	86,591
POOL LINES & RACKS	37,800	0	0	0	475,160	512 960
CONTAMINATED CONCRETE	16,160	0	0	0	541,279	557 439
OTHER REACTOR BUILDING	0	0	0	0	1,770,132	1 770 132
TURBINE	75,980	0	0	0	1.753.461	1 820 441
NUCLEAR STEAM CONDENSATE	15,720	0	0	0	452.767	448 487
LOW PRESSURE FEEDWATER HEATERS	105,840	0	0	0	919,238	1 025 078
MAIN STEAM	3,930	0	0	0	88,618	02 548
MOISTURE SEPARATOR REHEATERS	65,520	0	0	0	801 653	057 173
REACTOR FEEDWATER PUMPS	10,100	0	0	0	267 260	253 340
HIGH PRESSURE FEEDWATER HEATERS	20,160	0	0	0	150 887	171 047
OTHER TG BLDG	0	0	0	0	6 070 236	6 070 236
RAD WASTE BLDG	0	0	0	0	2 000 708	2 000 708
REACTOR BLDG	0	64,000	160,000	0	378 277	602 277
TG BLDG	0	42,000	105,000	0	255 364	402 364
RAD WASTE & CONTROL	0	38,000	95,000	0	220 307	353 307
CONCENTRATOR BOTTOMS	0	225,000	562,500	Ő	794 700	1 582 200
OTHER	0	61,000	152,500	0	215 652	1, 502, 200
POST-TMI-2 ADDITIONS	0	0	D	0	44 027	420,952
SUBTOTAL BWR COSTS	547,631	797,000	17,834,350	0	23,698,131	42,877,112
BARNWELL COUNTY BUSINESS TAX (2.	.4%)					1.029.051
TUTAL BWR COSTS						43,906,162

(a) GTCC Material: Assumes a low density, distributed packaging scheme and final disposal as LLW. High density packaging and geologic repository disposal could reduce disposal costs.

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COMPONENT	CRANE SIRCHARGE	CASK HAMDLING	CURIE SURCHARGE	LINER DOSE RATE	BURIAL CHARGE	DISPOSAL
VESSEL MALL	34.580	26.600	714.400	0	106.400	881.980
VESSEL HEAD & BOTTOM	0	28.000	0	0	112.000	140.600
UPPER CORE SUPPORT ASSM	0	2.800	0	0	11,200	14,000
UPPER SUPPORT COLUMN	0	2,800	0	0	11,200	14,000
UPPER CORE BARREL	0	1,400	37,600	0	5,600	44,600
UPPER CORE GRID PLATE	0	3,500	150,000	0	14,000	167,500
GUIDE TUBES	0	4,200	56,100	0	16,800	77,100
LOWER CORE BARREL ^(a)	0	22,400	1,824,000	0	89,600	1,936,000
THERMAL SHIELDS ⁽²⁾	0	4,200	360,000	0	16,800	381,000
CORE SHROUD ⁽³⁾	0	2,800	6,100,000	0	11,200	6,114,000
LOWER GRID PLATE ^(a)	0	3,500	1,000,000	0	14,000	1,017,500
LOWER SUPPORT COLUMN	0	200	36,500	0	2,800	40,000
LOWER CORE FORGING	0	7,700	165,000	0	30,800	203,500
MISC INTERNALS	0	5,600	120,000	0	22,400	148,000
BIO SHIELD CONCRETE	0	0	0	0	698,880	698,880
REACTOR CAVITY LINER	0	0	0	0	14,336	14,336
REACTOR COOLANT PUMPS	36,848	0	0	0	117,600	154,448
PRESSURIZER	9,680	0	0	0	100,800	110,480
R.HX, EHX, SUMP PUMP, CAVITY PUMP	0	0	0	0	11,200	11,200
PRESSURIZER RELIEF TANK	1,820	0	0	0	33,600	35,420
SAFETY INJECTION ACCUM TANKS	14,520	0	0	0	112,000	126,520
STEAM GENERATORS	134,848	0	0	0	598,136	732,984
REACTOR COOLANT PIPING	12,705	0	0	0	92,400	105,105
REMAINING CONTAM. MATLS	0	0	0	0	1,473,024	1,473,024
CONTAMINATED MATRL OTHR BLD	0	0	0	0	13,358,856	13,358,856
FILTER CARTRIDGES	0	4,200	135,000	0	8,820	148,020
SPENT RESINS	0	14,000	600,000	0	56,000	670,000
COMBUSTIBLE WASTES	0	42,000	0	0	283,500	325,500
EVAPORATOR BOTTOMS	0	65.800	0	0	263.200	329.000
SUBTOTAL PWR COSTS	245,001	242,200	11,298,600	0	17,687,152	29,472,953
BARNWELL COUNTY BUSINESS TAX (2	(%)					707.351

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BARNWELL COUNTY BUSINESS TAX (2. TOTAL PUR COSTS

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Table B.18 Burial Costs at the South Carolina Site Reference BWR (1986 dollars)

COMPONENT	CRANE	CASK	CURIE	LINER DOSE	BURIAL	DISPOSAL
A PART A LANGE A CONTRACT OF THE PARTY OF	SURCHARGE	MARULING	SURCHARGE	RATE	CHARGE	COST
STEAM SEPARATOR	0	19 600	520 200			
FUEL SUPPORT & PIECES	0	§ 800	315 000	0	9,884	558,684
CONTROL RODS/INCORES	2.440	5 600	520 600	0	4,956	329,756
CONTROL RODS GUIDES	0	8,600	329,000	0	14,840	552,480
JET PUMPS	0	28,000	(50 000	0	3,948	12,348
TOP FUEL GUIDES	0	50,400	450,000	0	13,860	491,860
CORE SUPPORT PLATE	ñ	21 700	1,353,600	0	23,772	1,427,772
CORE SHROUD (a)	n	08,000	116,250	0	10,920	148,870
REACTOR VESSEL WALL	20 020	15,000	13,250,000	0	46,480	13,374,480
SAC SHIELD	33 880	13,400	205,700	0	7,196	248,316
REACT. WATER REC	10 551	0	U	0	100,688	134,568
SAC SHIELD	01 060	0	0	0	87,080	106,631
OTHER PRIMARY CONTAINMENT	91,900	0	0	0	306,600	398,560
CONTAINM, ATMOSPHERIC	1 820	0	0	0	3,496,304	3,496,304
HIGH PRESSURE CORE SPRAY	050 5	0	0	0	47,432	49,252
LOW PRESSURE CORE SODAY	3,030	0	0	0	16,800	20,430
REACTOR BLDG CLOSED COOLING	2,270	0	0	0	9,940	11,150
REACTOR CORE COOLING	2,730	0	0	0	31,696	34,426
PESIDIAL NEAT DEMOVAL	910	0	0	0	12,880	13,790
POGI I INES & DACKS	0,4/0	G	0	0	61,376	69.846
CONTANINATED CONCRETE	36,300	0	0	0	376,684	412,984
OTHER REACTOR BULLDING	14,500	0	0	0	429,100	443,660
TIDRINE	70 400	0	0	0	1,403,276	1,403,276
NICIEAD STEAM CONDENSATE	70,180	0	0	0	1,390,060	1,460,240
INU DECOURT FEFTUATED HEATEN	14,520	0	0	0	358,932	373 452
NATH CTEAN	101,640	0	0	0	728,728	830, 368
MOISTURE CEDIDATOR RELEATERS	3,630	0	0	0	70,252	73 882
PEACTOR ECONATER DIMOS	62,920	0	0	0	706,860	769 780
REALIOR FEEDWATER PUMPS	9,100	0	0	0	192,836	201 936
ATTER TO BLOG	19,360	0	0	0	119,616	138 076
DAD WASTE BLOG	0	0	0	0	4.812.192	4 812 192
RAD WASTE BLUG	0	0	0	0	2.378.096	2 378 006
REALTOR BLDG	0	44,800	0	0	200 880	344 680
IG BLDG	0	29,400	0	0	202,440	231 840
RAD WASTE & CONTROL	0	26,600	0	0	174,720	201 320
CONCENTRATOR BOTTOMS	0	157,500	0	0	630,000	787 500
UTHER	0	42.700	0	0	170 800	213 500
SUBTOTAL BWR COSTS	518,831	557,900	16,729,350	0	18,751,124	36,557,205
BARNWELL COUNTY BUSINESS TAX (2.	4%)					877.373
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<u>877,373</u> 37,434,578

(a) GTCC Material: Assumes a low density, distributed packaging scheme and final disposal as LLW. High density packaging and geologic repository disposal could reduce disposal costs.

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Table B.19 Disposition Costs using Waste Vendors with Burial Costs at the Washington Site Reference PWR (1998 dollars)

	VOLUME	SHIPMENT	CONTAINER	LINER DOSE	WASTE VENDOR	DISPOSAL
COMPONENT	CHARGE	CHARGE	CHARGE	RATE CHARGE	CHARGE	COST
VESSEL WALL	116,280	238,649	44,004	2,147,000	0	2,545,924
VESSEL HEAD & BOTTOM	122,400	251,200	46,320	0	0	419,920
UPPER CORE SUPPORT ASSM	12,240	25,120	4,632	151,200	0	193, 192
UPPER SUPPORT COLUMN	12,240	25,120	4,632	151,200	0	193, 192
UPPER CORE BARREL	6,120	12,560	2,316	113,000	0	133,996
UPPER CORE GRID PLATE	15,300	31,400	5,790	282,500	0	334,990
GUIDE TUBES	18,360	37,680	6,948	226,800	0	289,788
LOWER CORE BARREL (a)	97,920	200,960	37,056	1,808,000	0	2,143,936
THERMAL SHIELDS(8)	18,360	37,680	6,948	339,000	0	401,988
CORE SHROUD (a)	12,240	25,120	4,632	26,000	0	267,992
LOWER GRID PLATE (8)	15,300	31,400	5,790	282,500	0	334,990
LOWER SUPPORT COLUMN	3,060	6,280	1,158	56,500	0	66,998
LOWER CORE FORGING	33,660	69,080	12,738	621,500	0	736,978
MISC INTERNALS	24,480	50,240	9,264	452,000	0	535,984
BIO SHIELD CONCRETE	0	0	0	0	3,235,923	3,235,923
REACTOR CAVITY LINER	15,667	6,280	4,632	0	0	26,579
REACTOR COOLANT PUMPS	0	0	0	0	1,247,905	1,247,905
PRESSURIZER	0	0	0	0	323,592	323,592
R.Hx, EHx, SUMP PUMP, CAVITY PUMP	0	0	0	0	19,581	19,581
PRESSURIZER RELIEF TANK	0	0	0	0	45,137	45,137
SAFETY INJECTION ACCUM TANKS	0	0	0	0	507,791	507,791
STEAM GENERATORS	0	0	0	0	4,566,800	4,566,800
REACTOR COOLANT PIPING	0	0	0	0	368,394	368, 394
REMAINING CONTAM. MATLS	0	0	0	0	6,512,503	6,512,503
CONTAMINATED MATRL OTHR BLD	0	0	0	0	50,100,903	50,100,903
FILTER CARTRIDGES	0	0	0	0	89,610	89,610
SPENT RESINS	0	0	0	0	298,701	298,701
COMBUSTIBLE WASTES	0	0	0	0	896,102	896,102
EVAPORATOR BOTTOMS	287,640	590,320	108,852	1,676,341	0	2,663,153
POST-TMI-2 ADDITIONS	476,228	0	0	0	0	476,228
HEAVY OBJECT CHARGE						0
SITE AVAILABILITY CHARGES, (3 YRS)						413,442
SUBTOTAL PWR COSTS	1,287,495	1,639,080	305,712	8,533,541	68,212,943	80,392,213
TAXES & FEES (% OF CHARGES)						523,709
TAXES & FEES (\$/CU.FT.)						599,569
ANNUAL PERMIT FEES (3 YRS)						120,000
TOTAL PWR COSTS						81,635,491

(a) GTCC Material: Assumes a low density, distributed packaging scheme and final disposal as LLW. High density packaging and geologic repository disposal could reduce disposal costs.

Appendix B

Table B.19 Disposition Costs using Waste Vendors with Burial Costs at the Washington Site Reference BWR (1998 dollars)

CON. NENT	VOLUME	CHARGE	CONTAINER	LINER DOSE	WASTE VENDOR	DISPOSAL
AND . MARL	CONSIGE.			MALL STROUMS		
STEAM SEPARATOR	10,802	87,920	32,424	26,600,000	0	26,731,146
FUEL SUPPORT & PIECES	5,416	43,960	16,212	791,000	0	856,588
CONTROL RODS/INCORES	16,218	50,240	9,264	7,600,000	0	7,675,722
CONTROL RODS GUIDES	4,315	37,680	13,896	678,000	0	733,891
JET PUMPS	15,147	125,600	46,320	38,000,000	0	38, 187, 967
TOP FUEL GUIDES	25,949	452,160	83,376	68,400,000	0	68,961,485
CORE SUPPORT PLATE	11,903	100,480	35,898	1,751,500	0	1,899,781
CORE SKROUD (a)	50,796	879,200	162,120	133,000,000	0	134,092,116
REACTOR VESSEL WALL	8,660	125,600	25,476	1. 040,000	0	1,402,736
SAC SHIELD	0	0	0	0	1,156,150	1,156,150
REACT, WATES REC	0	0	0	0	370,562	370,562
SAC SHIELD	0	0	0	0	2,994,078	2,994,078
OTHER PRIMARY CONTAINMENT	0	0	0	0	11,999,265	11,999,265
CONTAINM, ATMOSPHERIC	0	0	0	0	48.302	4 302
HIGH PRESSURE CORE SPRAY	0	0	0	0	117,856	117,856
I ON PRISSURE CORA SPRAY	0	0	0	0	42,505	42,505
REACTOR BLDG CLOSED COC' ING	n	ñ	0	0	115 615	115,615
REACTOR CORE ISO COOLING	0	0	n	0	37 532	37 532
RESIDUAL HEAT REMOVAL	n	0	0	0	355 503	355, 503
DODI I TH J & DACKS	0	ñ	n	ñ	1 673 661	1 473 661
CONTAMINATED CONCRETE	0	0	ñ	ő	2 106 991	2 106 991
OTHER DEACTOR RILLDING	0	0	n	n	2 625 967	2 625 947
TIDDINE	0	0	0	0	7 067 707	7 067 707
HUCLEAD STEAM CONDENSATE	0	0	0	0	034 140	034 140
IOU DECOMPE CECUATED MEATEDS	0	0	0	0	3 136 806	3 136 806
LUW PRESSURE FEEDWATER HEATERS	0	0	0	0	137 178	137 178
MOISTIDE CEDADATOD DEVEATEDS	0	0	0	n	1 773 701	1 773 701
PEACTOR EEEDUATER DIMOS	0	0	0	0	446 581	466 581
NICH DECOMPTER FURTS	0	0	0	0	626 650	626 650
OTHER TO RIDO	0	0	0	0	13 558 135	13 558 135
DAD HASTE DIDC	0	0	0	0	4 630 960	4 630 060
RAU MASTE DLUG	0	0	0	0	3 303 554	3 303 554
TO BLOC	0	0	0	ő	2 173 301	2 173 301
DAD LASTE & CONTLOI	0	0	0	0	1 000 520	1 000 520
CONCENTRATOR BOTTOMS	688 500	1 413 000	260 550	3 978 045	0	6 340 095
OTHER	186 660	383 080	70 638	187 036	a	827 414
DOCT_THI-2 ADDITIONS	38 023	303,000	10,000	101,000	0	38 023
HEAVY OD LECT CHADCE	30,763	•	0	•		0
CITE AVAILABILITY CHAPCES /3 5 VDS)						551 256
CINTATA PUD COSTE	1 063 280	3 608 920	756 176	282 228 581	63 250 678	351 548 608
SUBTUTAL BAR CUSTS	1,003,209	5,070,720	150,114	202,220,301	03,230,410	351,540,090
TAXES & FEES (% OF CHARGES)						12,396,823
TAXES & FEES (\$/CU.FT.)						495,159
ANNUAL PERMIT FEES (3.5 YRS)						140,000
TOTAL HUR COSTS						364,580,680
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(a) GTCC Material: Assumes a low density, distributed packaging scheme and final disposal as LLW. High density packaging or geologic repository disposal could reduce disposal costs.

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COMPONENT	BASE DISPOSAL CHARGE	CASK HANDLING	CURTE	DOSE RATE SURCHARGE	MASTE VENDOR CHARGE	DISPOSAL COST
UCCESI LIAI I	0 370 200	1.140.060	4.560.000	1,142,016	0	9,221,216
VECCEI NEAD & RATTON	1.515.780	1.200.000	6,000	0	0	2,721,720
TEDEE CHOE CIDDODT ACCH	143.100	120.000	3,000	45,792	0	311,892
UTTER UURE JUTTER LAND	132.300	120.000	30,000	42,336	0	324,636
UTER SUTOR RADEL	63.060	60.000	240.000	30, 240	0	393,240
IDEED CODE COID DIATE	157,500	150.000	600,000	75,600	0	983,100
WITTE TURES	233.100	180.000	30,000	62,937	0	566,037
I CASE FORE RAPEL (2)	1.008.000	000.000	3,840,000	483,840	0	6,291,840
THEPHAL SHIFLDS ⁽²⁾	189.000	180,000	720,000	90,720	6	1,179,720
PORCEMENT STATEMO	108,400	120.000	7.320,000	52,032	0	7,600,432
I CALE OF DI ATE (a)	38.280	150.000	1,200,000	18,374	0	1,406,654
LONG SIDDIDT COLLAND	30,960	30,000	120.000	19, 181	0	209,141
I CALE CODE FORCING	634.160	330,000	750,000	208,397	0	1,722,557
MICL INT-0.1AIC	352.000	240.000	600,000	168,960	0	1,360,960
BID SHIFLD CONCRETE	0	0	0	0	3,235,923	3,235,923
PEACTOR CAVITY LINER	172.800	0	3,000	0	0	175,800
PEACTOR COOLANT PLANPS	0	0	0	0	1,247,905	1,247,905
PRESSURIZER	0	0	0	0	323,592	323,592
2 BY FHY SIMP PUMP CAVITY PUMP	0	0	0	0	19,581	19,581
PRESSURIZER RELIEF TANK	0	0	0	0	45,137	45,137
SAFFY INJECTION ACCUM TANKS	0	0	0	0	162,702	162,702
STEAM GENERATORS	0	0	0	0	4,566,800	4,566,800
REACTOR COOLANT PIPING	0	0	0	0	368,394	368,394
REMAINING CONTAM. MATLS	0	0	0	0	6,512,503	6,512,503
CONTAMINATED MATRL OTHR BLD	0	0	0	0	50,100,903	50,100,903
FILTER CARTRIDGES	0	0	0	0	89,610	89,610
SPENT RESINS	0	0	0	0	298, 701	298, 701
COMBUSTIBLE MASTES	0	0	0	0	896,102	896,102
EVAPORATOR BOTTOMS	3,722,400	2,820,000	11,280,000	508, 54	0	18,330,864
POST-TMI-2 ADDITIONS	7,470,863	0	0	0	0	7,470,863
SITE ACCESS FEES. (3 YRS)						615.000
SUPTOTAL PUR COSTS	18, 159, 843	7,870,000	31,302,600	2,948,839	68, 212, 943	129,038,675
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GTCC Material: Assumes a low density, distributed packaging scheme and final disposal as LLW. High density packaging and geologic repository disposal could reduce disposal costs.

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Appendix B

Table B.20 Disposition Costs using Waste Vendors with Burial Costs at the South Carolina Site Reference BWR (1998 dollars)

	BASE DISPOSAL	CASK	CURIE	DOSE RATE	WASTE VENDOR	DISPOSAL
COMPONENT	CHARGE	HANDLING	SURCHARGE	SURCHARGE	CHARGE	COST
STEAM SEPARATOR	146,216	840,000	1,680,000	70.184	0	2.736.400
FUEL SUPPORT & PIECES	64,411	420,000	210,000	30,917	0	725, 329
CONTROL RODS/INCORES	191,770	240,000	960,000	92.049	0	1.683.819
CONTROL RODS GUIDES	53,900	360,000	30,000	19,943	0	463.843
JET PUMPS	155,925	1,200,000	2,400,000	76.844	0	3 850 769
TOP FUEL GUIDES	267,120	2,160,000	8,640,000	128,218	0	11, 195, 338
CORE SUPPORT PLATE	179.080	930,000	195,000	66,260	0	1 370 340
CORE SHROUD (a)	522,900	4,200,000	16,800,000	250, 972	0	21.773 892
REACTOR VESSEL WALL	113,767	660,000	648,000	42.094	0	1.463 861
SAC SHIELD	0	0	0	0	1,156,150	1, 156, 150
REACT. WATER REC	0	0	0	0	370, 562	370, 562
SAC SHIELD	0	0	0	0	2.994.078	2 994 078
OTHER PRIMARY CONTAINMENT	0	0	0	0	11,000,265	11 000 265
CONTAINM. ATMOSPHERIC	0	0	0	0	48.302	48.302
HIGH PRESSURE CORE SPRAY	0	0	0	0	117,856	117 856
LOW PRESSURE CORE SPRAY	0	0	0	0	62 505	42 505
REACTOR BLDG CLOSED COOL ING	0	0	n	0	115 615	115 615
REACTOR CORE ISO COOLING	0	0	0	0	37 532	37 532
RESIDUAL HEAT REMOVAL	0	0	0	0	355 503	355 503
POOL LINER & RACKS	0	0	0	0	1 673 661	1 673 661
CONTAMINATED CONCRETE	0	0	0	0	2 106 001	2 106 001
OTHER REACTOR BUILDING	0	0	0	n	2 625 947	2 625 947
TURBINE	0	0	0	0	7 067 707	7 067 707
NUCLEAR STEAM CONDENSATE	0	0	0	0	034 140	034 140
LOW PRESSURE FEEDWATER HEATERS	0	ñ	0	0	308 351 5	3 136 806
MAIN STEAM	0	0	0	0	137 178	137 178
MOISTURE SEPARATOR REHEATERS	0	0	0	0	1 773 701	1 773 701
REACTOR LEEDWATER PUMPS	0	0	0	0	444 581	466 581
HIGH PRESSURE FEEDWATER NEATERS	0	0	0	0	624 650	626 650
OTHER TO BLDG	0	0	0	0	13 558 135	13 558 135
RAD WASTE BLDG	Ő	0	0	0	040 054 4	040 054 4
REACTOR BLDG	0	0	0	0	3 303 554	3 303 554
TG BLDG	0	0	0	0	2 178 301	2 173 301
RAD WASTE & CONTROL	ñ	0	ů.	n	1 000 520	1 000 520
CONCENTRATOR BOTTOMS	15. 207. 858	6 750 000	27 000 000	2 072 350	1,777,520	51 120 208
OTHER	4.147.419	1,830,000	287 700	103 346	0	241 845 4
POST-THI-2 ADDITIONS	610,611	0	0	103,540	0	610 611
SITE ACCESS FEES. (3.5 YPS)	0.0,011	•				717 500
SUBTCTAL BWR COSTS	21,750,978	19,590,000	58,850,700	2,951,196	63,250,478	167,110,852
TAXES AND SURCHARGES						0
TOTAL BWR COSTS						167,110,852

Table B.21 Burial Costs at the Nevada Site Reference PWR (1991 dollars)

COMPONENT	CRANE SURCHARGE	CASK HANDLING	CURTE	LINER DOSE RATE	BURIAL CHARGE	DISPOSAL
VECCEI LIATI	29 613	45,600	61,993	136,800	122,018	396,025
VESSEL WALL	0	22,000	0	0	128,440	150,440
HODER CORE SUDDORT ASSM	ñ	4.800	0	2,750	12,844	20,394
UPPER CORE SUPPORT ASSA	0	6 800	0	2.750	12,844	20,394
UPPER SUPPORT COLUMN	0	2,400	3,268	8,700	6,422	20,790
UPPER LORE DARREL	n	6 000	12 008	21,750	16,055	55,813
OPPER LURE GRID PLATE	0	7 206	0	1,696	19,266	28,162
GUIDE TUBES	0	38 400	166 291	139,200	102,752	446,643
LOWER LORE DARREL	0	7 200	33 204	26,100	19,266	85,770
THENMAL SHIELDS	0	6 800	706 575	17,400	12.844	741,619
CURE SHROOD	0	6 000	114 100	21,750	16.055	157,905
LOWER GRID PLATE	0	1,200	3 314	4.350	3,211	12,075
LOWER SUPPORT COLOMN	0	13 200	17.318	47,850	35.321	113,689
LOWER CORE FORGING	0	003,01	12 629	34 800	25,688	82,717
MISC INTERNALS	0	9,000	0	0	801,466	801,466
BIU SNIELD CONCRETE	0	0	0	0	16,440	16,440
REALTOR LAVIIT LINER	194 900	0	Ő	0	134 862	319,662
REACTOR COULANT PUMPS	13 212	0	ő	0	115,596	128,808
PRESSURIZER	13,212	0	0	Ő	12 844	12.844
R.HX, EHX, SUMP PUMP, CAVIT PUMP	1 149	0	0	0	38,532	39,680
PRESSURIZER RELIEF TANK	127 200	0	0	0	128,440	251,640
SAFETT INJECTION ALLOW TANKS	627 200	0	0	0	685,934	1.313.134
STEAM GENERATORS	107 800	0	0	0	105,963	213,763
REACTOR COOLANT PIPING	107,000	0	0	0	1.689.243	1,689,243
REMAINING CONTAM. MAILS	0	0	0	0	15,319,745	15.319.745
CONTAMINATED MATRL OTHE BLD	0	7 200	10 204	8 467	10,115	35,985
FILTER CARTRIDGES	0	24,000	30 080	57 400	64 220	184,700
SPENT RESINS	0	24,000	37,000	0	325, 114	358,114
COMBUSTIBLE WASTES	0	112 800	0	68 765	301 834	483, 399
EVAPURATUR BUTTOMS	0	112,000	0	0	499.728	499,728
SUBTOTAL PWR COSTS	1,086,973	350,200	1,179,984	600,529	20,783,101	24,000,788
TOTAL PWR COSTS						24,000,788

Table B.21 Burial Costs at the Nevada Site Reference BWR (1991 dollars)

COMPONENT	CRANE	CASK	CURIE	LINER DOSE	BURIAI	DISPOSAL
COMPONENT	SURCHARGE	HANDLING	SURCHARGE	RATE	CHARGE	COST
STEAM SEPARATOR	0	33,600	23.307	207 760	11 736	374 000
FUEL SUPPORT & PIECES	0	16,800	0	50 400	5 497	270,092
CONTROL RODS/INCORES	0	9,600	50.072	152 640	17 018	72,883
CONTROL RODS GUIDES	0	14,400	0	16 729	4 528	269,330
JET PUMPS	0	48,000	34.680	456 400	15 804	33,037
TOP FUEL GUIDES	0	86,400	116.467	839 520	27 220	1 060 414
CORE SUPPORT PLATE	0	37,200	0	43 217	12 401	1,009,010
CORE SHROUD (a)	0	168,000	1.674.760	1 632 600	57 307	7 730 ///7
REACTOR VESSEL WALL	17,402	26,400	0	30 670	0 087	3,320,403
SAC SHIELD	215,600	0	0	50,010	102 044	63,339
REACT. WATER REC	91,800	0	0	0	00 700	317,040
SAC SHIELD	585,200	0	0	0	77,190	191,598
OTHER PRIMARY CONTAINMENT	0	0	0	0	4 000 574	930,740
CONTAINM. ATMOSPHERIC	928	0	0	0	4,009,070	4,009,576
HIGH PRESSURE CORE SPRAY	30,800	0	0	0	39,920	55,354
LOW PRESSURE CORE SPRAY	1.414	0	0	0	19,200	50,066
REACTOR BLDG CLOSED COOLING	2.742	0	0	0	11,333	12,749
REACTOR CORE 1SO COOLING	714	0	0	0	30,204	39,026
RESIDUAL HEAT REMOVAL	107,800	0	0	0	14,738	15,452
POOL LINES & RACKS	231,000	0	0	0	10,521	178,121
CONTAMINATED CONCRETE	9,824	0	0	0	432,040	663,040
OTHER REACTOR BUILDING	0	0	0	0	492,150	501,974
TURBINE	893 200	0	0	0	1,609,032	1,609,032
NUCLEAR STEAM CONDENSATE	18,668	0	0	0	1,35%,320	2,487,526
LOW PRESSURE FEEDWATER HEATERS	646,800	0	0	0	411,618	430,286
MAIN STEAM	4 762	0	0	0	835,695	1,482,495
MOISTURE SEPARATOR REHEATERS	400 400	0	0	0	80,532	85,274
REACTOR FEEDWATER PUMPS	9 140	0	0	0	810,778	1,211,178
HIGH PPESSURE FEEDWATER HEATERS	123 200	0	0	0	219,986	229,126
OTHER TO BLOG	0	0	0	0	137,206	260,406
RAL WASTE BLDG	0	0	0	0	5,507,507	5,507,507
REACTOR BLDG	0	35 200	0	0	2,727,134	2,727,134
IG BLDG	0	23 100	0	0	546,357	381,557
LAD WASTE & CONTROL	0	20,000	0	0	233,815	256,915
CONCENTRATOR BOTTOMS	0	270,000	0	112 710	201,798	222,698
OTHER	0	73 200	0	102,740	122,475	1,155,215
POST-INI-2 ADDITIONS	0	13,800	0	2,315	195,871	271,446
SUBTOTAL SWR COSTS	3,391,375	862,800	1.699.376	3 604 85	21 525 062	40,844
			1,017,510	3,004,032	21,323,002	31,083,464

TOTAL BUR COSTS

31,083,464

(a) GTCC Material: Assumes a low density, distributed packaging scheme and final disposal as LLW. High density packaging and geologic repository disposal could reduce disposal costs.

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Table B.22 Burial Costs at the Nevada Site Reference PWR (1988 dollars)

COMPONENT	CRAME SURCHARGE	CASK HANDLING	CUR IE SURCHARGE	LINER DOSE RATE	BURIAL CHARGE	DISPOSAL
VESSEL WALL	29,613	45,600	61,993	136,800	107,768	381,775
VESSEL HEAD & BOTTOM	0	22,000	0	0	113,440	135,440
UPPER CORE SUPPORT ASSM	0	4,800	0	2,750	11.344	18,894
UPPER SUPPORT COLUMN	0	4,800	0	2,750	11.344	18,894
UPPER CORE BARREL	0	2,400	3,268	8,700	5.672	20,040
UPPER CORE GRID PLATE	0	6,000	12,008	21,750	14,180	53,938
GUIDE TUBES	0	7,200	0	1,696	17.016	25,912
LOWER CORE BARREL (a)	0	38,400	166,291	139,200	90,752	434 643
THERMAL SHIELDS(a)	0	7,200	33,204	26,100	17.016	83, 520
CORE SHROUD (a)	0	4,800	706,575	17,400	11.344	740 119
LOWER GRID PLATE (a)	0	6,000	114,100	21,750	14,180	156,030
LOWER SLIPPORT COLUMN	0	1,200	3,314	4,350	2.836	11,700
LOWER CONTS FORGING	0	13,200	17,318	47,850	31,196	109,564
MISC INTERNALS	0	9,600	12,629	34,800	22,688	79,717
BIO SHIELD CONCRETE	0	0	0	0	707,866	707.866
REACTOR CAVITY LINER	0	0	0	G	14,520	14,520
REACTOR COOLANT PUMPS	163,200	0	0	0	119,112	282.312
PRESSURIZER	13,212	0	0	0	102,096	115,308
R.HX, EHX, SUMP PUMP, CAVITY PUMP	0	0	0	0	11.344	11.344
PRESSURIZER RELIEF TANK	1,148	0	0	0	34.032	35,180
SAFETY INJECTION ACCUM TANKS	108,800	0	0	0	113,440	222,240
STEAM GEMERATORS	569,600	0	0	0	605,826	1.175.426
REACTOR COOLANT PIPING	95,200	0	0	0	93,588	188,788
REMAINING CONTAM. MATLS	0	0	0	0	1,491,963	1,491,963
CONTAMINATED MATRI. OTHR BLD	0	0	0	0	13,530,613	13,530,613
FILTER CARTRIDGES	0	7,200	10,204	8,467	8,933	34,804
SPENT RESINS	0	24,000	39,080	57,400	56,720	177,200
COMBUSTIBLE WASTES	0	33,000	0	0	287,145	320,145
EVAPORATOR BOTTOMS	0	112,800	0	68,765	266,584	448,149
POST-THI-2 ADDITIONS	0	0	0	0	441.367	441.367
SUBTOTAL PWR COSTS	980,773	350,200	1,179,984	600,529	18,355,925	21,467,411
TOTAL PWR COSTS						21,467,411

(a) GTCC Material: Assumes a low density, distributed packaging scheme and final disposal as LLW. High density packaging and geologic repository disposal could reduce disposal costs.

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Appendix B
Table B.22 Burial Costs at the Nevada Site Reference BWR (1988 dollars)

COMPONENT	CRANE	CASK	CURIE	LINER DOSE RATE	BURIAL	DISPOSAL
Sten wasat	STWIN MARKENING	AATTA		BILL &	- CITAINE	
STEAM SEPARATOR	0	33,600	23, 397	207,760	10,011	274,768
FUEL SUPPORT & PIECES	0	16,800	0	50,400	5,020	72,220
CONTROL RODS/INCCRES	0	9,600	50,072	152,640	15,031	227,343
CONTROL RODS GUIDES	0	14,400	0	16,729	3,999	35,128
JET PUMPS	0	48,000	34,680	466,400	14,038	563,118
TOP FUEL GUIDES	0	86,400	116,467	839,520	24,049	1,066,436
CORE SUPPORT PLATE	0	37,200	0	43,217	11,032	91,449
CORE SHROUD (3)	0	168,000	1,474,760	1,632,400	.47,078	3,322,238
REACTOR VESSEL WALL	17,402	26,400	0	30,670	8,026	82,498
SAC SHIELD	190,400	0	0	0	90,128	280,528
REACT. WATER REC	82,800	0	0	0	88,143	170,943
SAC SHIELD	516,800	0	0	0	310,485	827,285
OTHER PRIMARY CONTAINMENT	0	0	0	0	3,541,313	3,541,313
CONTAINM. ATMOSPHERIC	928	0	0	0	48,070	48,998
HIGH PRESSURE CORE SPRAY	27,200	0	0	0	17,016	44,216
LOW PRESSURE CORE SPRAY	1,414	0	0	0	10,011	11,425
REACTOR BLDG CLOSED COOLING	2,742	0	0	0	32,047	34,789
REACTOR CORE ISO COOLING	714	0	0	0	13,017	13,731
RESIDUAL HEAT REMOVAL	95,200	0	0	0	62,108	157,308
POOL LINES & RACKS	204,000	0	0	0	381,584	585,584
CUSTAMINATED CONCRETE	9,824	0	0	G	434,674	444,498
OTHEN REACTOR BUILDING	0	0	0	0	1,421,120	1,421,120
TURBINE	788,800	0	0	0	1,408,131	2, 196, 931
NUCLEAR STEAM CONDENSATE	18,668	0	0	0	363,547	382,215
LOW PRESSURE FEEDWATER NEATERS	571,200	0	0	0	738,097	1,309,297
MAIN STEAM	4,742	0	0	0	71,127	75,869
MOISTURE SEPARATOR REHEATERS	353,600	0	0	0	716, 90	1,069,590
REACTOR FEEDWATER PUMPS	9,140	0	0	0	194,294	203,434
HIGH PRESSURE FEEDWATER HEATERS	108,800	0	0	0	121,182	229,982
OTHER TG BLDG	0	0	0	0	4,864,307	4,864,307
RAD WASTE BLDG	0	0	0	0	2,408,643	2 4129,643
REACTOR BLDG	0	35,200	0	0	306, 194	341,394
TG BLDG	0	23,100	0	0	206,702	229,802
RAD WASTE & CONTF.JL	0	20,900	0	0	178,398	199,298
CONCENTRATOR BOTTOMS	0	270,000	0	162,740	638,100	1,070,840
OTHER	0	73,200	0	2,375	172,996	248,571
POST-TMI-2 ADDITIONS	0	0	0	0	36.074	36.074
SUBTOTAL BUR COSTS	3,004,375	862,800	1,699,376	3,604,852	19,011,883	28,183,285
TOTAL BWR COSTS						28, 183, 285

(a) GTCC Material: Assumes a low density, distributed packaging scheme and final disposal as LLW. High density packaging and geologic repository disposal could reduce disposal costs.

and the state of the based of the second	CRANE	CASK	CURIE	LINER DOSE	BURIAL	DISPOSAL
COMPONENT	SURCHARGE	HANDLING	SUKLMARGE	KAIL	UARGE	
VESSEL WALL	29.613	30,172	61,613	127,370	78,318	327,087
VESSEL NEAD & BOTTOM	0	31,760	0	0	82,440	114,200
UPPER CORE SUPPORT ASSM	0	3,176	0	5,441	8,764	16,861
UPPER SUPPORT COLUMN	0	3,175	0	5,441	5,244	16,861
UPPER CORE BARREL	0	1,583	3,248	6,704	4,122	15,662
IPPER CORE GRID PLATE	0	3,970	11,958	16,759	10,305	42,992
GUIDE TURES	0	4.164	0	5,646	12,366	22,776
OVER CORE BARREL (a)	0	25,408	165,971	107,259	65,952	364,590
INFEMAL SHIFLDS(a)	0	4.764	33,144	20,111	12,366	70,385
CORE SHROUD (a)	0	3,176	705,965	13,407	8,244	730,793
OWER GRID PLATE (8)	0	3,970	114,000	16,759	10,305	145,034
OWER SUPPORT COLUMN	0	794	3,304	3,352	2,061	9,511
OWER CORE FORGING	0	8.734	17.208	36,870	22,671	85,484
MISC INTERNALS	0	6.352	12,549	26,815	16,488	62,204
BIO SHIELD CONCRETE	0	0	0	0	514,425	514,426
REACTOR CAVITY LINER	0	0	0	0	10,552	10,552
REACTOR COOLANT PUMPS	65,768	0	0	0	86,562	152,330
PRESSURIZER	13,212	0	0	0	74,196	87,408
R. HX. EHX. SUMP PUMP, CAVITY PUMP	0	0	0	0	8,244	8,244
PRESSURIZER RELIEF TANK	1,148	0	0	0	24,732	25,880
SAFETY INJECTION ACCUM TANKS	24,312	0	0	0	82,440	106,752
STEAM GENERATORS	250,048	0	0	0	440,271	690,319
REACTOR COOLANT PIPING	16,698	0	0	0	68,013	84,711
REMAINING CONTAM, MATLS	0	0	0	0	1,084,251	1,084,251
CONTAMINATED MATRL OTHR BLD	0	0	0	0	9,833,072	9,833,072
FILTER CARTRIDGES	0	4,764	10,144	28,079	6,492	49,478
SPENT RESINS	0	15,080	38,880	59,032	41,220	155,012
COMBUSTIBLE WASTES	0	47.6 0	0	0	208,676	256,316
EVAPORATOR BOTTOMS	0	74.635	0	68,486	193.734	336.856
SUBTOTAL PWR COSTS	400,800	274,724	1,177,984	547,530	13,019,007	15,420,045

TOTAL PWR COSTS

15,420,045

(a) GTCC Material: Assumes a low density, distributed packaging scheme and final disposal as LLW. High density packaging and geologic repository disposal could reduce disposal costs.

'fable B.23 Burial Costs at the Nevada Site Reference BWR (1986 dollars)

COMPONENT	CRANE SURCHARGE	CASK HANDLING	CURIE SURCHARGE	LINER DOSE RATE	BURIAL CHARGE	DISPOSAL COST
STEAM SEPARATOR	0	22.232	23.257	291,200	7,275	343,964
FUEL SUPPORT & PIECES	0	11,116	0	46,926	3,648	61,690
CONTROL RODS/INCORES	0	6,352	49,992	342,400	10,923	409,667
CONTROL PODS GUIDES	0	9,528	0	20,829	2,906	33,263
JET PUMPS	0	31,760	34,480	680,000	10,202	756,442
TOP FUEL GUIDES	0	57,168	115.747	1,224,000	17,477	1,414,392
CORF SUPPORT PLATE	0	24.614	0	53,809	8,017	86,440
CORE SHROUD (a)	0	111,160	1,473,360	1,792,000	34,213	3,410,733
REACTOR VESSEL	17,402	17,468	0	38,187	5,833	73,889
SAC SHIFLD	48.836	0	0	0	65,499	114,335
REACT. WAIER REC	35,970	0	0	0	64,056	100,026
SAC SHIFLD	138,730	0	0	0	225,638	364,369
OTHER DRIMARY CONTAINAFAT	0	0	0	0	2,573,571	2,573,571
CONTAINH ATMOSPHERI'	928	0	0	0	34,934	35,862
HIGH PRESSURE CORE SPRAY	4.528	0	0	0	12,366	16,894
LOW PRESSURE CORE SPRAY	1.416	0	0	0	7,275	8,689
REACTOR BLDG CLOSED COOLING	2.742	0	0	0	23,289	26,031
REACTOR CORE ISO COOLING	714	0	0	0	9.460	10,174
RESIDUAL HEAT REMOVAL	12,898	0	0	0	45,136	58,034
DODI I THES & PACKS	51,810	0	0	0	277,308	329,118
CONTAMINATED CONCRETE	9.824	0	0	0	315,889	325,713
OTHER REACTOR BUILDING	0	0	0	0	1,032,767	1,032,767
TUDRINE	128 215	0	0	0	1,023,328	1,151,543
NUCLEAR STEAM CONDENSATE	18,668	0	0	0	264,200	282,868
LOW PRESSURE FEEDWATER HEATERS	140,687	0	0	0	536,396	677,083
MAIN STEAM	4.742	0	0	0	51,690	56,432
MOISTURE SEPARATOR REUEATERS	86,164	0	0	0	520,403	606,567
REACTOR FEEDWATER PUMPS	. 40	0	0	0	141,199	150,339
HIGH PRESSURE FEEDWATER HEATERS	2 12	0	0	0	88,067	115,779
OTHER TO BLDG	0	0	0	0	3,535,027	3,535,027
RAD WASTE BLDG	0	0	0	0	1,750,428	1,750,428
REACTOR BLDG	0	50,816	0	0	226,481	277,297
TG BLDG	0	33,348	U	0	152,890	186,238
RAD WASTE & CONTROL	0	30,172	0	0	131,954	162,126
CONCENTRATOR BOTTOMS	0	178,650	0	162,320	463,725	804,695
OTHER	1	48,434	00	5.163	125.721	179,318
SUBTOTAL BWR COSTS	741,126	632,818	1,696,836	4,656,832	13,799,189	21,526,801
TOTAL SWR COSTS						21,526,801

(a) GTCC Material: Assumes a low density, distributed packaging scheme and final disposal as LLW. High density packaging and geologic repository disposal could reduce disposal costs.

References

- Konzek, G. J., and R. I. Smith, "Technology, Safety and Costs of Decommissioning a Reference Pressurized Water Reactor Power Station - Technical Support for Decommissioning Matters Related to Preparation of the Final Decommissioning Rule," (Report prepared by Pacific Northwest Laboratory, Richland, Washington), NUREG/CR-0130, Addendum 4, U.S. Nuclear Regulatory Commission, July 1988.
- Konzek, G. J., and R. I. Smith, "Technology, Safety and Costs of Decommissioning a Reference Boiling Water Reactor Power Station - Technical Support for Decommissioning Matters Related to Preparation of the Final Decommissioning Rule," (Report prepared by Pacific Northwest Laboratory, Richland, Washington), NUREG/CR-0672, Addendum 3, U.S. Nuclear Regulatory Commission, July 1988.

Appendix C

Bureau of Labor Statistics on the World Wide Web

Appendix C

Bureau of Labor Statistics on the World Wide Web

The U.S. Department of Labor, Bureau of Labor Statistics, maintains and periodically updates many parameters relating to the economy of the United States. For use in the adjustment formula in Section 3, the labor adjustment factor for December 1997 was obtained from the "Monthly Labor Review" publication and the energy adjustment factors for the last quarter of calendar year 1997 were obtained from the "Producer Price Indexes" publication.

These dates were chosen to agree with the effective dates of the waste burial rate schedules. As an alternative to using these values, more current adjustment factors can be obtained by accessing the Bureau of Labor Statistics databases on the World Wide Web. Instructions on how to access and obtain the specific adjustment factors used in this report follow below. Appendix C

Bureau of Labor Statistics World Wide Web Home Page

1

How to Obtain Reports of Energy and Labor Adjustment Factors

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NUREG-1307, Rev. 8

C.2

Appendix D

Historical Values of Burial Cost Adjustment Factors

Appendix D

Historical Values of Burial Cost Adjustment Factors

B, is evaluated by recalculating the burial cost of low-level wastes (LLW) from decommissioning the reference PWR and the reference BWR, based on the price schedules provided for the available burial sites in the year of interest, with consideration given to surcharges which were imposed as a result of the Low-Level Radioactive Waste Policy Amendments Act of 1985 (LLRWPAA). The results of these recalculations, excluding any surchages or penalties imposed as a result of the LLRWP'A, are presented in Table 2.1, by site and by year. Pecause the LLRWPAA surcharges and penalties ceased effective January 1, 1993, the values of B, calculated for the years 1993 and later reflect just the basic charges plus any fees or surcharges imposed by the states and compacts within which the disposal sites are located. As noted in the footnotes to Table D.1, the Nevada LLW disposal site ceased operation on December 31, 1992, and is therefore not included in the calculations for the years 1993 and later.

Table D.1 Historical Values of B, as a Function of LLW Burial Site, Waste Vendor, and Year

	Values o	of B _x (PWR/B charges, No F	WR) ^(a) Penalties)
Year	as in ton	Nevada	South Carolina
1598	3.165/14.403(6)	/(c)	15.886/13.948 ^(d)
	4.538/15.203 ^(b, e)) /(c)	7.173/6.968 ^(d, e)
1997	3.112/6.264 ^(b)	/(c)	15.852/13.837 ^(d)
1996	2.845/3.294(b)	/(c)	12.771/10.379 ^(d)
1995	2.015/1.878 ^(b)	/(c)	12.824/10.420 ^(d)
1994	2.521/2.373 ^(b)	/(c)	11.873/9.794(1)
	/	/	6.619/5.714 ⁽⁸⁾
1993	2.002/1.943(%)	/(c)	11.408/9.434(1)
	/	/	6.155/5.354(8)
1991	1.326/1.184	1.334/1.296	2.494/2.361
1988	1.223/1.093	1.193/1.175	2.007/1.831
1986	1.000/1.000	0.857/0.898	1.678/1.561

Values o (With Surcha	f B _x (PWR/BWR rges, No Penalti	() es) ^(h)
and the state of the second	A AND A CHARTER	A.S.A.
/	/	/
/	/	/
/	/	
/	/	/
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2.765/2.302	2.773/2.414	3.933/3.478
1.942/1.652	1.913/1.734	2.727/2.390
1.360/1.279	1.217/1.177	2.038/1.840
	Values o (With Surcha / / / 2.765/2.302 1.942/1.652 1.360/1.279	Values of B _x (PWR/BWR (With Surcharges, No Penalti / / / / / / / 2.765/2.302 2.773/2.414 1.942/1.652 1.913/1.734 1.360/1.279 1.217/1.177

Values of B_x (PWR/BWR)

(With Surcharges Including Penalties)⁽⁰⁾

1998 ⁽ⁱ⁾	/	/	/
1997 ⁽ⁱ⁾	/	/	
1996 ⁽ⁱ⁾	/	/	/
1995 ⁽ⁱ⁾	/	/	/
1994 ⁽ⁱ⁾	/	/	/
1993 ⁽ⁱ⁾	/	/	/
1991	4.204/3.420	4.213/3.532	5.372/4.596
1988	2.662/2.211	2.633/2.293	3.446/2.949
1986	1.720/1.559	1.577/1.457	2.397/2.120

(a) The values presented in this table are developed in Appendix B, with ɛ!l values normalized to the 1986 Washington (PWR/BWR) values with no LLRWPAA surcharges or penalties by dividing the calculated burial costs for each site and year by the Washington site burial costs calculated for the year 1986.

- (b) Effective 1/1/93, the Washington site is not accepting waste from outside the Northwest and Rocky Mountain Compacts.
- (c) Nevada site closed 12/31/92
- (d) Effective 7/1/95, access is allowed for all states except North Carolina.
- (e) Effective with the 1998 update of NUREG-1307, turning over the majority of LLW to waste vendors for disposition is considered a possibility.
- (f) Includes \$220/ft' out-of-region access fee.
- (g) Includes \$74/ft3 in-region access fee.
- (h) Waste originating from a state that has met LLR WPAA milestones, and is outside the compact where the LLW disposal facility is located.
- No LLRWPAA surcharges or penalties after 12/31/92
- (j) Waste originating from a state that has not met LLRWPAA milestones, and is outside the compact where the LLW disposal facility is located.

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Changes in Decommissioning Waste Disposal	MONTH	YEAR
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Supersr de, JUREG-1307, Revision 7, dated November 1997. ABSTRACT (200 words or less) A requirement placed upon nuclear power reactor licensees by the U.S. Nuclear Regulatory Commust annually adjust the estimate of the cost of decommissioning their plants, in dollars of the cur to provide reasonable assurance that adequate funds for decommissioning will be available when revised penodically, explains the formula that is acceptable to the NRC for determining the minimure requirements for nuclear power plants. The sources of information used in the formula are identi-	mission (NRC) is tha rent year, as part of i needed. This repor im decommissioning fied, and the values of	t licensees the process t, which is I fund
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REPORT ON WASTE BURIAL CHARGES

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