U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

NUREG-1307
Revision 18

Report on Waste Burial Charges

Report on Waste Burial Charges: Changes in Decommissioning Waste Disposal Costs at Low-Level Waste Burial Facilities

Draft Report for Comment

Office of Nuclear Materials Safety and Safeguards

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Prepared by:
S. Short*
M. Toyooka*

Pacific Northwest National Laboratory*
P.O. Box 999, Richland, WA 99352

R. Turtil, K. Lois, E. Tabakov, NRC Project Managers

Office of Nuclear Materials Safety and Safeguards

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ABSTRACT

Pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR) 50.75, "Reporting and Recordkeeping for Decommissioning Planning," the U.S. Nuclear Regulatory Commission (NRC) requires nuclear power reactor licensees to adjust annually, in current year dollars, their estimate of the cost to decommission their plants. The annual updates are part of the process for providing reasonable assurance that adequate funds for decommissioning will be available when needed. This NUREG, which is periodically revised, describes the formula in 10 CFR 50.75(c) that is acceptable to the NRC for determining the minimum decommissioning fund requirements for nuclear power reactor licensees. This formula is based on the estimated cost of decommissioning a reference pressurized-water reactor (PWR) and a reference boiling-water reactor (BWR) in 1986 and is escalated to current year dollars using an adjustment factor provided in 10 CFR 50.75(c)(2). The primary purpose of this report is to provide the technical basis, including references, for the estimated cost of decommissioning the reference PWR and reference BWR, and to develop the escalation factor for the low-level radioactive waste (LLW) burial cost portion of the adjustment factor. Escalation factors for the other portions of the adjustment factor (i.e., labor and energy costs), are also provided in this report.

This 18th revision of NUREG-1307, "Changes in Decommissioning Waste Disposal Costs at Low-Level Waste Burial Facilities," contains burial cost escalation factors updated to the year 2020 for the reference PWR and for the reference BWR. As presented in Table 2-1, "Values of B_x as a Function of LLW Burial Site and Year," multiple burial cost escalation factors are provided that reflect various LLW burial scenarios for each reactor type. These were developed because licensees may have the option to ship waste to one or more of the four currently operating LLW disposal facilities in the United States (U.S.), and the cost of disposal varies among each of the four facilities. In addition, there are various limitations on LLW disposal facility access by reactors, based upon the state in which the reactor is located. The different LLW burial scenarios are described in detail in Section 1.2, "LLW Disposal Cost Scenarios."

The currently operating LLW disposal facilities are located in 1) Texas, 2) South Carolina, 3) Washington, and 4) Utah. The Texas, South Carolina, and Washington facilities are the host disposal sites for the Texas LLW Disposal Compact (Texas Compact), the Atlantic Interstate LLW Management Compact (Atlantic Compact), and the Northwest Compact on LLW Management (Northwest Compact), respectively (Appendix E provides additional information about LLW compacts), and are referred to in this report as compact-affiliated disposal facilities. The Washington LLW disposal facility also accepts LLW generated in the three member-states of the Rocky Mountain LLW Compact (Rocky Mountain Compact). The fourth site (Utah) is not associated with a specific LLW compact, and so is referred to in this report as a non-compact disposal facility. Nuclear power plant facilities located within the LLW compacts for the compact-affiliated disposal facilities can dispose of their LLW at the affiliated disposal facility or, in some cases, can dispose of a portion of their LLW at the non-compact disposal facility. Nuclear power plants not located within an LLW compact having a compact-affiliated disposal facility can dispose of their LLW at either the Texas or Utah disposal facilities. The Utah site accepts only Class A LLW while the Texas site will accept Class A, B, and C LLW (see Section 1.1 for definitions of these LLW classes). For plants that have no disposal site available within their designated LLW compact, this report assumes that the cost for disposal of Class A LLW is the same as that for the Utah disposal facility, and the cost for disposal of Class B and C LLW is the same as that for the Texas disposal facility, and includes accounting for out-of-compact fees.

In the 2019 decommissioning fund status reporting cycle, in which licensees provided decommissioning trust fund data to the NRC by March 31, 2019, as required by 10 CFR 50.75(f), 74 of the 98 operating reactors in the U.S. applied LLW burial cost escalation factors based on the Table 2-1 scenario in which non-compact affiliated generators used the Utah and Texas disposal sites. In this current revision to NUREG-1307, estimated 2020 disposal costs for this scenario are approximately 0.5 percent lower for the reference PWR and 4.4 percent lower for the reference BWR, compared to 2018 disposal costs. Decreases in disposal costs are due to decreases in disposal fees for the Texas disposal facility.

In the same 2019 NRC reporting cycle, four of the 98 operating plants in the U.S. applied LLW burial cost escalation factors based on the Table 2-1 scenario in which compact affiliated generators used only the Texas disposal site. In this current revision to NUREG-1307, estimated 2020 disposal costs for Texas LLW compact affiliated generators are approximately 5.5 percent lower for the reference PWR and 10.8 percent lower for the reference BWR, compared to 2018 disposal costs. Decreases in disposal costs were due to simplification of the disposal fee structure, including elimination of certain categories of charges for volume and radioactivity and certain categories of surcharges for weight, dose rate, and cask handling. In addition, the curie inventory charge decreased from year 2018.

Also in the 2019 NRC reporting cycle, 13 of the 98 operating plants in the U.S. applied LLW burial cost escalation factors based on the Table 2-1 scenario in which compact affiliated generators used only the South Carolina disposal site, or used a combination of both the South Carolina disposal site and the non-compact disposal facility. (The South Carolina disposal site accepts LLW from facilities located in South Carolina, New Jersey, and Connecticut, all members of the Atlantic Compact.) In this current revision to NUREG-1307, estimated 2020 disposal costs using only the South Carolina disposal site, are approximately 2 percent higher for the reference PWR and 1.5 percent higher for the reference BWR, compared to 2018 disposal costs. The estimated disposal costs using the combination of both the South Carolina disposal site and the non-compact disposal facility are approximately 0.6 percent higher for both the PWR and BWR, compared to 2018 disposal costs. Increases in disposal costs were due to increases in charges for weight, activity (or curie), and irradiated hardware.

Lastly, in the 2019 NRC reporting cycle, one of the 98 operating plants in the U.S. applied an LLW burial cost escalation factor based on the Table 2-1 scenario in which a compact affiliated generator used only the Washington disposal site. The estimated 2020 disposal cost using only the Washington disposal site, which accepts LLW from the 11 member-states of the Northwest and Rocky Mountain Compacts, are approximately 1.54 percent and 2.3 percent higher for the reference PWR and BWR, respectively, compared to 2018 disposal costs. Increases in disposal costs were derived mostly from increases in LLW volume and container charges.

Licensees may use the escalation factors from this NUREG in their cost analyses, or they may generate and report site-specific cost estimates that result in a total cost estimate of no less than the amount estimated by using the 10 CFR 50.75(c) formula and cost escalation factors presented in this NUREG. In the 2019 NRC reporting cycle, six of the 98 operating plants in the U.S. reported cost data using site-specific cost estimates.

Revision 18 to NUREG-1307 assumes that LLW generated from day-to-day plant operations would be disposed of using the licensee's operating funds, and thus would not rely on decommissioning funds identified in the formula calculation. However, facilities located in states that are members of a LLW compact with no available LLW disposal site may be forced to provide interim storage for this waste (although most LLW could potentially be disposed of at

the non-compact disposal facility located in Utah, or at the compact-affiliated disposal facility located in Texas). Accordingly, some of the LLW may ultimately need to be disposed of during decommissioning following interim storage. For those plants operating through extended license terms, this volume can become significant and the disposal cost would not be accounted for in a decommissioning trust fund based on the formula calculation.

The views expressed in this report are not necessarily those of the NRC. NUREG-1307, Revision 18, is not a substitute for NRC regulations. The approaches and methods described in this NUREG are provided for information only. Publication of this report does not necessarily constitute NRC approval or agreement with the information contained herein.

FOREWORD

Nuclear power reactor licensees are required by Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50.75, "Reporting and Recordkeeping for Decommissioning Planning," to annually adjust the estimated decommissioning costs of their nuclear facilities to ensure adequate funds are available for decommissioning. The regulation (10 CFR 50.75(c)(2)) references NUREG-1307 as the appropriate source for obtaining the escalation factor for waste burial/disposition costs. This 18th revision of NUREG-1307 provides current, as of July 2020, waste burial/disposition costs using the compact-affiliated disposal facilities located in Andrews County, Texas; Barnwell, South Carolina; and Richland, Washington, and the non-compact disposal facility in Clive, Utah. In addition, this revision includes a disposal cost scenario that provides for disposal of low-level radioactive waste (LLW) using a combination of non-compact and compact-affiliated disposal facilities. 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 NUREG is specifically prepared for the use of power reactor licensees, it also can be a valuable source of information for material licensees on current waste burial/disposition costs.

On July 1, 2000, the South Carolina disposal facility became the host disposal facility for the newly formed Atlantic Compact, comprised of the States of Connecticut, New Jersey, and South Carolina. Effective July 1, 2008, LLW from States that are not members of the Atlantic Compact was no longer accepted at the South Carolina disposal facility. The South Carolina Public Service Commission annually determines the costs of waste disposal at the South Carolina disposal facility and provides the site operator with an allowable operating margin.

The Richland, Washington, facility only accepts LLW from the Northwest and Rocky Mountain Compacts. The Northwest Compact is comprised of the States of Idaho, Montana, Oregon, Utah, Washington, Wyoming, Alaska, and Hawaii. The Rocky Mountain Compact is comprised of the States of Colorado, Nevada, and New Mexico. The costs of disposal for this facility are determined annually based on waste generator volume projections and a maximum annual 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. The Andrews County, Texas, facility or Texas Compact Waste Facility (CWF), accepts LLW from both the Texas Compact and out-of-compact generators. The fees for LLW disposal are determined by the Texas Commission on Environmental Quality. Out-of-compact generators, however, must submit an import petition to the Texas Compact Commission for approval prior to shipping. The State of Texas also limits total non-compact waste disposed at the CWF to 30-percent of licensed capacity.

Since the South Carolina and Washington LLW disposal facilities are available only to licensees located within their respective compacts, an alternative available to licensees is to dispose of decommissioning Class A LLW at a non-compact disposal facility. Costs for this scenario are based on a price quote received from the operator of the non-compact disposal facility located in Utah. Revision 18 to NUREG-1307 provides waste burial/disposition cost escalation factors for this scenario, in addition to the standard scenario of disposing of 100-percent of decommissioning LLW at a compact-affiliated disposal facility.

In addition to currently available, traditional LLW disposal alternatives, staff continues to evaluate LLW disposal trends and evolving industry practices that may impact minimum decommissioning fund formula cost calculations provided for in 10 CFR 50.75. The U.S. Nuclear Regulatory Commission is aware that some LLW disposal methods, such as the

disposal of very low-level waste at other-than traditional LLW sites, and other alternatives as authorized under 10 CFR 20.2002, "Method for obtaining approval of proposed disposal procedures," may be less costly than disposal at traditional LLW sites. However, these alternatives are often subject to case-by-case approvals and thus, the impact on future LLW disposal practices, costs, and cost savings, is difficult to forecast and quantify. Accordingly, the final version of NUREG-1307, Revision 18, does not consider the use of alternative disposal methods or their potential impact to minimum decommissioning fund formula calculations. Revision 18 to NUREG-1307 assumes that LLW generated during plant operations is disposed of using operating funds. Nuclear power plants that are members of a LLW Compact that has no disposal site available for LLW may be forced to provide interim storage for this waste, although most LLW may be able to be disposed of at the non-compact disposal facility located in Utah or at the compact-affiliated disposal facility located in Texas. The LLW volume could be significant for plants with extended operating periods (e.g., beyond 40-years), and the disposal cost of this additional volume would not be accounted for in a decommissioning trust fund based on the formula calculation.

For licensees having no disposal site available within their designated LLW Compact, NUREG-1307, Revision 18, assumes that the cost for disposal of Class A LLW is the same as that for the Utah disposal facility, and the cost for disposal of Class B and C LLW is the same as that for the Texas disposal facility including accounting for out-of-compact fees. Accordingly, given these considerations, licensees may want to set aside additional funds to avoid significant future shortfalls in funding and any associated potential enforcement actions.

John R. Tappert, Director
Division of Rulemaking, Environmental, and Financial Support
Office of Nuclear Materials Safety and Safeguards
U.S. Nuclear Regulatory Commission

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ABBREVIATIONS AND ACRONYMS

BIO	biological
BLDG	building
BLS	U.S. Department of Labor, Bureau of Labor Statistics
BWR	boiling water reactor
B_x	LLW burial cost escalation factor
CFR	Code of Federal Regulations
CHG	charge
CONTAINM	containment
CONTAM	contaminated
CNS	Chem-Nuclear Systems, L.L.C.
DHEC	South Carolina Department of Health and Environmental Control
ECI	Employment Cost Index
EHx	excess letdown heat exchanger
E_x	energy cost escalation factor
ft^3	cubic foot
F_x	cost escalation factor for diesel and other fuels for transportation and other heavy equipment operation
gal	gallon
GTCC	greater-than-Class C LLW
ID	identification number
ISFSI	interim spent fuel storage installation
lbs	pounds
LLW	low-level radioactive waste
LLRWPAA	Low-Level Radioactive Waste Policy Amendments Act of 1985
L_x	labor cost escalation factor
MATRL or Matl	material
Misc	miscellaneous
mR/h	millirem per hour
MWt	megawatt-thermal
NA	not available
NPP	nuclear power plant
NRC	U.S. Nuclear Regulatory Commission
P	reactor power level
P_x	cost escalation factor for industrial electric power
PNNL	Pacific Northwest National Laboratory
PPI	Producer Price Index
PWR	pressurized water reactor
RAD	radioactive
RCW	Revised Code of Washington

REACT	reactor
R/hr	rem per hour
R.Hx	regenerative heat exchanger
SAC	sacrificial
TAC	Texas Administrative Code
TG	turbine-generator
TMI	Three Mile Island Unit 2 Nuclear Power Plant
U.S.	United States
VEN	vendor

1 INTRODUCTION

Nuclear power reactor licensees are required by Title 10 of the *Code of Federal Regulations* (10 CFR) 50.75, "Reporting and Recordkeeping for Decommissioning Planning," to annually adjust the estimated decommissioning costs (in current year dollars) of their nuclear facilities to ensure adequate funds are available for decommissioning. This is one step of a multi-step process for providing reasonable assurance to the U.S. Nuclear Regulatory Commission (NRC) that adequate funds for decommissioning are planned for and accumulated beginning in licensing and through operations. This NUREG provides escalation factors for the waste burial/disposition component of the decommissioning funding formula, as required by 10 CFR 50.75(c)(2). This NUREG also provides the regional escalation factors for the labor and energy components of the decommissioning fund requirement. Together, these escalation factors are used to adjust the NRC minimum decommissioning fund requirement by means of an "adjustment factor." The term "adjustment factor," as used in this NUREG and in 10 CFR 50.75(c)(2), refers to increases and decreases in estimated decommissioning costs subsequent to issuance of the 10 CFR 50.75 regulations. The base decommissioning fund requirements in these regulations were established in 1986 dollars. The adjustment factor escalates the cost, in 1986 dollars, to costs in today's dollars. This NUREG is updated periodically to reflect changes in waste burial/disposition costs and accounts for changes in the labor and energy values.

This NUREG provides the development of a formula for estimating decommissioning costs that are acceptable to the NRC. Sources of information used in the formula are identified. Values developed for the escalation of radioactive waste burial/disposition costs, by site and by year, are also provided. Licensees may use the formula, the coefficients, and the burial/disposition cost escalation factors from this NUREG 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 other data sources needed to complete the formula calculation, (i.e., U.S. Department of Labor, Bureau of Labor Statistics), are summarized in Chapter 2. The development of the formula and its coefficients, with sample calculations, are presented in Chapter 3. Price schedules for low-level radioactive waste (LLW) burial/disposition for the year 2020 are given in Appendix A for compact-affiliated and non-compact disposal facilities. Calculations to determine the burial/disposition escalation factors, LLW burial cost escalation factor (B_x), for each site and year of evaluation are summarized in Appendix B.

1.1 Definitions

This section provides the definition of key terms utilized throughout this NUREG.

LLW is a general term for a wide range of items that have become contaminated with radioactive material or have become radioactive through exposure to neutron radiation. Radioactive materials are present at nuclear power plants undergoing decommissioning as the result of plant operations prior to permanent shutdown and as the result of decommissioning activities. Examples include radioactively contaminated equipment, piping, tanks, hardware, and tools; concrete debris and soil; liquid radioactive waste (radwaste) treatment residues; and radioactively contaminated protective shoe covers and clothing; cleaning rags, mops, and filters. The radioactivity in these wastes can range from just above natural background levels to much higher levels, such as seen in components from inside the reactor vessel of a nuclear power plant. LLW from decommissioning activities is typically shipped to a disposal site specifically licensed for disposal of LLW.

LLW Classification. 10 CFR 61.55(a)(2) defines three classes of LLW acceptable for routine near-surface disposal based on its radiological and physical characteristics:

(i) Class A waste is waste that is usually segregated from other waste classes at the disposal site. The physical form and characteristics of Class A waste must meet the minimum requirements set forth in § 61.56(a). If Class A waste also meets the stability requirements set forth in § 61.56(b), it is not necessary to segregate the waste for disposal. (e.g., dry active waste, protective shoe covers and clothing)

(ii) Class B waste is waste that must meet more rigorous requirements on waste form to ensure stability after disposal. The physical form and characteristics of Class B waste must meet both the minimum and stability requirements set forth in § 61.56. (e.g., primary resin, primary filters)

(iii) Class C waste is waste that not only must meet more rigorous requirements on waste form to ensure stability but also requires additional measures at the disposal facility to protect against inadvertent intrusion. The physical form and characteristics of Class C waste must meet both the minimum and stability requirements set forth in § 61.56. (e.g., radioactive components)

LLW Compacts. The Low-Level Radioactive Waste Policy Amendments Act of 1985 (LLRWPAA) makes each state responsible for disposing of the LLW generated within its boundaries and establishes a mechanism for states to enter into compacts to establish regional LLW disposal facilities. Appendix E identifies the compacts that have been formed and the states affiliated with each. Appendix E also identifies the states that are not affiliated with any compact.

Compact-affiliated Disposal Facility. An LLW disposal facility that has been established by a compact in accordance with the LLRWPAA. Four compacts, representing 16 states, have established three LLW disposal facilities: (1) Northwest Compact and Rocky Mountain Compact – U.S. Ecology disposal facility located in Richland, Washington, (2) Atlantic Compact – EnergySolutions disposal facility located in Barnwell, South Carolina, and (3) Texas Compact – Waste Control Specialists disposal facility located in Andrews County, Texas.

Non-compact Disposal Facility. An LLW disposal facility that was established outside of the framework of the LLRWPAA and is not affiliated with a compact. Only one LLW disposal facility meets this definition – the EnergySolutions disposal facility located in Clive, Utah.

1.2 LLW Disposal Cost Scenarios

NUREG-1307, Revision 18, contains disposal costs updated to the year for the referenced pressurized-water reactor (PWR) and the referenced boiling-water reactor (BWR). Three scenarios for estimating these costs are presented. The first scenario assumes that 100-percent of the LLW generated during decommissioning is disposed of at one of the three compact-affiliated disposal facilities located in Washington, South Carolina, and Texas. This is the third revision of NUREG-1307 to include costs for the Texas site, which became operational in 2012. Year 2020 B_x escalation factors, expressed as a ratio of 2020 disposal costs to the original 1986 disposal costs, are also provided. For historical purposes, disposal costs for the referenced reactors and B_x escalation factors at the Washington and South Carolina sites for the years 2012, 2016, and 2018 are also provided. See previous revisions of NUREG-1307 for disposal costs prior to 2012.

The second scenario provides for disposing of LLW using a combination of non-compact and compact-affiliated disposal facilities. For a PWR under this scenario, 93-percent of the LLW is assumed to be disposed of at a non-compact disposal facility (Utah) and the remaining 7-percent is assumed to be disposed of at a compact-affiliated disposal facility. For a BWR under this scenario, 95-percent of the LLW is assumed to be disposed of at a non-compact disposal facility (Utah) and the remaining 5-percent is assumed to be disposed of at a compact-affiliated disposal facility. This scenario, which is considered an acceptable alternative for licensees, allows nuclear power plant licensees to take advantage of potentially lower disposal costs for much of their LLW. B_x escalation factors for these "alternative" disposal costs are also provided.

The third scenario provides for disposing of all LLW at non-compact disposal facilities or compact-affiliated disposal facilities that accept out-of-compact waste.

NUREG–1307, Revision 18, assumes that LLW generated during plant operations is disposed of using operating funds. Plants that are members of a LLW Compact that has no disposal site available for LLW may be forced to provide interim storage for this waste (although most LLW may be able to be disposed of at the non-compact disposal facility located in Utah or at the compact-affiliated disposal facility located in Texas). Some of this waste may ultimately need to be disposed of during decommissioning. This LLW could be significant for plants with extended operating periods (e.g., beyond 40-years), and the disposal cost of this additional volume would not be accounted for in a decommissioning trust fund based on the formula calculation.

For plants that have no disposal site available within their designated LLW Compact, NUREG-1307, Revision 18, assumes that the cost for disposal of Class A LLW is the same as that for the Utah disposal facility, and that the cost for disposal of Class B and C LLW is the same as that for the Texas disposal facility, including accounting for out-of-compact fees. As new disposal scenarios become available, they will be incorporated into subsequent revisions of NUREG-1307.

2 DECOMMISSIONING COST ELEMENTS

The elements of decommissioning costs under 50.75(c)(2) are assigned to three categories: (1) those that are proportional to labor costs, labor cost escalation waste (L_x); (2) those that are proportional to energy costs, energy cost escalation factor (E_x); and (3) those that are proportional to burial costs, LLW burial cost escalation factor (B_x). The adjustment of the total decommissioning cost estimate can be expressed by:

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

where A, B, and C are coefficients representing the percent or portion of the total 1986 dollar costs 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 escalation factor, January of 1986 to the latest month of Year X for which data are available,

E_x = energy cost escalation factor, January of 1986 to the latest month of Year X for which data are available, and,

B_x = LLW burial/disposition cost escalation factor, January of 1986 to the latest month of Year X for which data are available.

For labor and energy cost escalation factors used in calculating the total decommissioning cost estimate for years subsequent to 1986, L_x and E_x are based on the U.S. Department of Labor, Bureau of Labor Statistics national producer price indexes, national consumer price indexes, and 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 (Reference 1) and the reference BWR (Reference 2) based on the price schedules provided by the available disposal facilities for the year of interest. The results of these recalculations are presented in Table 2-1, by site and by year. These recalculations are performed by an NRC contractor.

Effective January 1, 1993, radioactive waste from states that are not members of the Northwest Compact (comprised of Idaho, Montana, Oregon, Utah, Washington, Wyoming, Alaska, and Hawaii) or Rocky Mountain Compact (comprised of Colorado, Nevada, and New Mexico) was no longer accepted at the Washington disposal site.

Effective July 1, 2000, the South Carolina LLW burial site applied different price schedules for waste from states within and outside the then newly created Atlantic Compact (comprised of South Carolina, Connecticut, and New Jersey). Effective July 1, 2008, radioactive waste from States that are not members of the Atlantic Compact was no longer accepted at the South Carolina disposal site.

Beginning in the Spring of 2012, a new LLW disposal facility became available for disposal of waste from States within the Texas Compact (comprised of Texas and Vermont). Disposal costs for this facility were included in NUREG-1307 Revision 16 for the first time.

Licensees not located in the Northwest, Rocky Mountain, Atlantic, or Texas Compacts should use the B_x values for "Generators Located in States Not Affiliated with a Compact having a Disposal Facility" (see footnote (c) in Table 2-1).

Effective with Revision 8 of this NUREG (December 1998), the scenario to use a combination of waste vendors, or non-compact disposal facilities, and compact-affiliated disposal facilities was made available, and was referred to as "Direct Disposal with Vendors."

Effective with Revision 15 of this NUREG (ML130223A030, January 2013), the nomenclature for the two disposal scenarios as used in the previous revisions of NUREG-1307, (referred to as "Direct Disposal" and "Direct Disposal with Vendors,") was changed to "Compact-Affiliated Disposal Facility Only" and "Combination of Compact-Affiliated and Non-Compact Disposal Facilities," to better describe these scenarios. The B_x values for this scenario are also provided in Table 2-1 (see footnotes (d) and (e) in Table 2-1). The decision rests with the licensees to determine the scenario that best represents their particular situation.

Table 2-1 Values of B_x as a Function of LLW Burial Site and Year[a]

	B_x Values for Washington Site[f]				B_x Values for South Carolina Site				B_x Values for Texas Site[b]				B_x Values for Generators Located in the Unaffiliated States and those Located in Compact-Affiliated States having no Disposal Facility[c]	
	Compact-Affiliated Disposal Facility Only[e]		Combination of Compact-Affiliated and Non-Compact Disposal Facilities[d,e]		Compact-Affiliated Disposal Facility Only[e]		Combination of Compact Affiliated and Non-Compact Disposal Facilities[d,e]		Compact-Affiliated Disposal Facility Only[e]		Combination of Compact Affiliated and Non-Compact Disposal Facilities[d,e]			
Year	PWR	BWR*	PWR	BWR	PWR	BWR*	PWR*	BWR	PWR*	BWR	PWR	BWR	PWR*	BWR*
2020	11.019	9.328	8.866	7.549	32.973	28.727	11.679	12.948	8.040	7.399	11.016	10.359	12.793	12.837
2018	10.854	9.118	8.697	7.186	32.329	28.314	11.607	12.872	8.508	8.293	11.054	10.731	12.853	13.422
2016	8.706	7.290	8.129	6.668	30.061	26.329	10.971	12.111	8.508	8.293	10.672	10.441	12.471	13.132
2012	7.335	6.704	7.375	6.076	30.581	27.295	13.885	14.160	NA	NA	NA	NA	NA	NA

(a) The values shown in this table for the years 2020 and 2018 are developed in Appendix B, with all values normalized to the 1986 Washington PWR and BWR values by dividing the calculated burial costs for each site and year by the Washington site burial costs calculated for the year 1986. Refer to previous revisions of NUREG-1307 for development of values prior to 2018.

(b) Effective with NUREG-1307, Revision 16, the Compact Waste Facility (CWF) in Andrews County, Texas, is available as a full-service (i.e., Class A, B, and C) LLW disposal facility for waste generators located in States affiliated with the Texas Compact. Hence, B_x values are not available for earlier versions of NUREG-1307.

(c) Effective with NUREG-1307, Revision 16, the CWF in Andrews County, Texas, is also available as a full-service (i.e., Class A, B, and C) LLW disposal facility for waste generators located in States not affiliated with the Texas Compact. Out-of-compact generators, however, must submit an import petition to the Texas Compact Commission for approval prior to shipping. The State of Texas also limits total non-compact waste disposed at the CWF to 30-percent of licensed capacity and imposes additional fees on LLW disposed of from out-of-compact generators. With the availability of this full-service disposal facility to out-of-compact waste generators and the Clive, Utah disposal facility for any Class A LLW generated in the U.S., the Generic LLW Disposal Site scenario used in previous versions of NUREG-1307 is replaced with this scenario, which provides B_x values representing a composite of the disposal rates for these two disposal facilities. These B_x factors are recommended for use for plants that currently have no disposal site available within their designated LLW Compact.

(d) Effective with NUREG-1307, Revision 8 (Reference 3), an alternative disposal scenario was introduced in which the bulk of the LLW is assumed to be dispositioned by waste vendors. Effective with NUREG-1307, Revision 14, the bulk of the LLW is assumed to be dispositioned at the Clive, Utah disposal facility.

(e) Effective with NUREG–1307, Revision 15, the nomenclature for the two disposal scenarios, referred to as “Direct Disposal” and “Direct Disposal with Vendors” in previous revisions of NUREG-1307, was changed to “Compact-Affiliated Disposal Facility Only” and “Combination of Compact-Affiliated and Non-Compact Disposal Facilities” to better describe these scenarios.

(*) The six columns highlighted with an asterisk reflect B_x LLW burial cost escalation factor data used by the 92 operating power reactor licensees that utilized the minimum decommissioning fund formula in decommissioning trust fund status reports submitted to the NRC in 2019.

3 DEVELOPMENT OF COST ESCALATION FACTORS AND COST ADJUSTMENT FACTOR

The minimum decommissioning fund requirement, or minimum formula amount, for radiological decommissioning of a nuclear power plant, was established using January 1986 dollars, and is defined in Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50.75(c) as follows (where P is power level of the nuclear power reactor in megawatt-thermal (MWt))[1]:

For a pressurize water reactor (PWR) (10 CFR 50.75(c)(1)(i)) –

Greater than or equal to 3400 MWt……$105 million

Between 1200 MWt and 3400 MWt……$(75 + 0.0088P) million
(For a PWR of less than 1200 MWt, use P=1200 MWt)

For a BWR (10 CFR 50.75(c)(1)(ii)) –

Greater than or equal to 3400 MWt……$135 million

Between 1200 MWt and 3400 MWt……$(104 + 0.009P) million
(For a BWR of less than 1200 MWt, use P=1200 MWt)

The minimum formula amount represents an actual base-year (1986) cost estimate to decommission a nuclear power plant. These 1986 costs are derived from studies finalized in the late 1970s and early 1980s (References 6 and 7) and adjusted to 1986 dollars through addendums to these PWR and boiling water reactor (BWR) documented studies (References 1 and 2).

Present day minimum formula amounts rely on an adjustment factor that is applied to the initial cost estimate. In this way, the adjustment factor accounts for, or escalates, the initial formula amount to a dollar figure that incorporates inflation and other cost escalation factors.

In 10 CFR 50.75(c)(2), the adjustment factor is defined to be at least equal to 0.65L + 0.13E + 0.22B, where L and E are cost escalation factors for labor and energy, respectively, and values are to be taken from regional data of U.S. Department of Labor, Bureau of Labor Statistics, and B is a cost escalation factor for waste burial and is to be taken from this report.

In summary, the adjustment factor incorporated in 10 CFR 50.75(c)(2) provides a mechanism for escalating the decommissioning fund requirement (minimum formula amount) to current year dollars to reflect inflation and other changes in economic conditions since January 1986. This section summarizes how the coefficients (i.e., 0.65, 0.13, and 0.22) in the adjustment factor were originally developed and provides updated L, E, and B cost escalation factors for use in calculating the minimum decommissioning fund requirement in current year (2020) dollars.

[1] The energy input in a heat engine is measured as MWt.

3.1 Development of the Cost Adjustment Factor

For the purpose of adjusting the 1986 minimum decommissioning formula cost estimate into today's dollars, the U.S. Nuclear Regulatory Commission (NRC), working with Pacific Northwest National Laboratory, determined that the total decommissioning cost could be divided into three principal components (major cost drivers) for cost escalation purposes. These components are: (1) labor, materials, and services, (2) electric power and diesel or other fuels for transportation, and (3) radioactive waste burial/disposition. The major elements contributing to each of these three components are provided in Table 3-1. The percent, or portion, of the total decommissioning cost, in January 1986 dollars, categorized as labor, materials, and services, is defined by the coefficient A. The percent, or portion, of the total decommissioning cost, in January 1986 dollars, categorized as energy and radioactive waste transportation, is defined by the coefficient B. The percent, or portion, of the total decommissioning cost, in January 1986 dollars, categorized as radioactive waste burial/disposition, is defined by the coefficient C.

Table 3-1 Evaluation of the Coefficients A, B, and C in January 1986 Dollars

	Reference PWR Values		Reference BWR Values	
Cost Category	**1986 $ (millions)**	**Coefficient**	**1986 $ (millions)**	**Coefficient**
Staff Labor	17.98[a]		35.12[b]	
Special Equipment	1.64[a]		4.03[b	
Misc. Supplies	3.12[a]		3.71[b]	
Specialty Contractor	12.9[a]		21.1[b]	
Nuclear 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[b]	
Pre-engineering	7.4[a]		7.4[b]	
Post-TMI-backfits	0.9[a]		0.1[b]	
Environmental Surveillance	0.31[a]		--	
License 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[c]	
Subtotal	**14.39**	**B = 0.14**	**16.38**	**B = 0.12**
Burial	22.48[d]	**C = 0.22**	29.98[c]	**C = 0.22**
Total	**103.54**		**133.31**	

Note: All costs include a 25-percent 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.

Per Table 3-1, the C (LLW burial associated) coefficient, or that percentage representing the portion of decommissioning cost attributable to low-level radioactive waste (LLW) burial charges, are the same (.22) for both PWRs and BWRs. The A (labor associated) and B (energy associated) coefficients differ only slightly between the two reactor types. Consequently, due to the close similarity in these coefficients, and uncertainty contained within the labor and energy assessments used in developing the minimum formula, the formula in 10 CFR 50.75(c)(2) was

simplified. The simplified formula is a composite of the two reactor types by averaging the A and B coefficients derived from the separate PWR and BWR estimates. Hence, the 10 CFR 50.75(c)(2) formula for determining the decommissioning cost of both PWR and BWR reactor types assume the same coefficients, as follows:

$$A_{average} = 0.65 \qquad B_{average} = 0.13 \qquad C_{average} = 0.22$$

All costs categorized as labor, materials, and services are escalated from 1986 dollars to current year dollars by multiplying coefficient A (0.65) by a labor cost escalation factor (L_x). All costs categorized as energy and radioactive waste transportation are escalated from 1986 dollars to current year dollars by multiplying coefficient B (0.13) by an energy cost escalation factor (E_x). Values for L_x and E_x for years subsequent to 1986 are based on the national producer price indexes, national consumer price indexes, and local conditions for a given site, as described below in Sections 3.2 and 3.3, respectively. All costs categorized as radioactive waste burial/disposition are escalated from 1986 dollars to current year dollars by multiplying coefficient C (0.22) by a burial cost escalation factor B_x. The values to be used in determining B_x are derived from published cost schedules at the three compact-affiliated disposal facilities and a price quote from the non-compact disposal facility located in Utah, as described in Section 3.4.

Note that values for B_x for year 8 and earlier, are provided in Table 2-1 for information purposes only; licensees will need only the 2020 figures for the minimum formula calculation required by March 31, 2021.

In summary, a simple equation was developed and incorporated into 10 CFR 50.75(c) to determine the minimum decommissioning fund requirement, or minimum formula amount, escalated to current year dollars. This equation is as follows:

Estimated cost (Year X) = [1986 $ Cost]*($A*L_x + B*E_x + C*B_x$) where:

Estimated cost (Year X) = estimated decommissioning costs in Year X (e.g., 2020) dollars,

[1986 $ Cost] = estimated decommissioning costs in 1986 dollars (base cost for PWR/BWR in 1986 dollars),

A = percent or portion (also referred to as coefficient) of the [1986 $ Cost] attributable to labor, materials, and services (0.65),

B = percent or portion (also referred to as coefficient) of the [1986 $ Cost] attributable to energy and radioactive waste transportation (0.13),

C = percent or portion (also referred to as coefficient) of the [1986 $ Cost] attributable to radioactive waste burial/disposition (0.22),

L_x = labor, materials, and services cost escalation, January of 1986 to latest month of Year X for which Producer Price Index (PPI) data are available,

E_x = energy (electricity and fuel oil) and waste transportation cost escalation, January of 1986 to latest month of Year X for which Consumer Price Index (CPI) data are available,

B_x = LLW burial/disposition cost escalation, January of 1986 to the latest month of Year X for which data are available,

= $(R_x + \Sigma S_x) / (R1986 + \Sigma S1986)$, where:

R_x = radioactive waste burial/disposition costs (excluding surcharges) in Year X dollars,

ΣS_x = summation of surcharges in Year X dollars,

R1986 = radioactive waste burial costs (excluding surcharges) in 1986 dollars, and

ΣS1986 = summation of surcharges in 1986 dollars.

3.2 Labor Cost Escalation Factors

In addition to costs categorized as labor, certain materials and services are also assumed to escalate at the same rate as labor and therefore included in coefficient A. Examples of these costs include container costs, certain equipment costs, insurance costs, and costs of supplies and materials. Table 3-1 provides additional examples.

Current employment cost indexes for labor (column 3,Table 3-2, below) can be obtained from the "Employment Cost Indexes," published by the U.S. Department of Labor, Bureau of Labor Statistics (BLS) (Reference 4). Specifically, the appropriate regional data from Table 6 of Reference 4 entitled "Employment Cost Index for total compensation, for private industry workers, by bargaining status, census region and division, and metropolitan area status" should be used. These indexes may also be obtained from BLS databases available on the Internet (see Appendix C for instructions).

In order to calculate the current L_x for a particular region, it must be recognized that the BLS "re-indexed" the Employment Cost Index (ECI) in 2005, to 100. Accordingly, two (2) BLS cost index numbers are required to calculate the current L_x value: 1) the base labor cost escalation factor in 2005 (provided below in Table 3-2), and 2) the current Employment Cost Index (ECI) from the BLS. The December 2005 base labor cost escalation factors, by region, are presented in column 2 of Table 3-2, and current ECIs, for the sake of example, are presented in column 3. The base labor cost escalation factor is the value of L_x at the time the BLS most recently re-indexed the ECI (December 2005). As such, current values of L_x (column 4) are obtained from the simple proportion:

$$L_{x(current)}/ECI_{(current)} = \text{Base } L_{x(2005)}/100$$

For example, to calculate L_x with a 2005 base value for the Northeast region in first quarter 2020,

$$L_x/141.7 = 2.16/100$$

or

$$L_x = 2.16*141.7/100 = 3.06$$

Table 3-2 Regional Factors for Labor Cost Adjustment

Region	Base L_x	Qtr 1 2020 ECI (Dec 2005 = 100)	L_x (Qtr 1 2020)
Northeast	2.16	141.7	3.06
South	1.98	136.7	2.71
Midwest	2.08	137.5	2.86
West	2.06	142.9	2.94

3.3 Energy Cost Escalation Factors

The cost escalation factor for energy, E_x, is a weighted average of the following components: industrial electric power for onsite decommissioning, cost escalation factor for industrial electric power (P_x), and diesel or other fuels for transportation and heavy equipment operation, F_x. For the reference PWR, E_x is given by:

$$E_x\ (PWR) = 0.58P_x + 0.42F_x$$

and for the reference BWR E_x is given by:

$$E_x\ (BWR) = 0.54P_x + 0.46F_x$$

These equations are derived from Table 6-3 of Reference 1 and Table 5-3 of Reference 2. The 0.58 and 0.54 coefficients for P_x are calculated as the ratio of energy cost to the total energy and fuel for transportation cost for the reference PWR and BWR, respectively. The 0.42 and 0.46 coefficients for F_x are calculated as the ratio of fuel for transportation cost to the total energy and fuel for transportation cost for the reference PWR and BWR, respectively.

The current values of P_x and F_x are calculated from the Producer Price Indexes (PPI), available in the "PPI Detailed Report," published by the U.S. Department of Labor, BLS (Reference 5). These indexes also can be obtained from BLS databases available on the Internet (see Appendix C for instructions). Because the energy cost category is the cost of the electricity and fuel needed to provide essential systems and services to the plant during decommissioning, the indexes used to calculate P_x should be taken from data for industrial electric power (PPI Commodity Code 0543). The transportation cost category is assumed to escalate with the cost of diesel fuel or light fuel oils. The indexes used to calculate F_x should therefore be taken from data for light fuel oils (PPI Commodity Code 0573). The BLS data available for these PPI commodity codes are currently available by region.

P_x and F_x are the values of current producer price indexes (PPI Codes 0543 and 0573, respectively) divided by the corresponding indexes for January 1986. 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 (latest data available) are[2]:

P_x = 233.5 (March 2020 value of code 0543) ÷
114.2 (January 1986 value of code 0543) = 2.045

F_x = 164.8 (March 2020 value of code 0573) ÷
82.0 (January 1986 value of code 0573) = 2.010

The value of E_x for the reference PWR is therefore

E_x (PWR) = [(0.58 × 2.045) + (0.42 × 2.010)] = 2.030.

This value of E_x = 2.030 should then be used in the equation to adjust the energy cost (to March 2020 dollars) for decommissioning a PWR.

For the reference BWR,

E_x (BWR) = [(0.54 × 2.045) + (0.46 × 2.010)] = 2.029.

3.4 Waste Burial Cost Escalation Factors

The waste burial cost escalation factors, B_x, for the year 2020 are provided in Table 2-1 for each of the LLW disposal sites.

To calculate the B_x for a particular LLW burial site, the cost of disposal of each of the radioactive materials identified in Table 3-3 was first estimated using the year 2020 price schedules provided in Appendix A of this report for each of the LLW disposal facilities. The cost of disposal for each of the radioactive materials was calculated based on numerous factors, including its classification (e.g., Class A, B, and C), its weight and volume, the number of packages, the number of shipments, its activity, and its surface dose rate. These factors are reported in NUREG/CR-0130 and NUREG/CR-0672 (References 6 and 7), and associated Addendums 3 and 2 (References 8 and 9), respectively. The estimated disposal cost was summed for all radioactive materials and then divided by the1986 disposal cost estimate identified in Table 3-1 to develop the year 2020 B_x factors reported in Table 2-1.

A comparison of the year 2020 B_x factors in Table 2-1 to the corresponding year 2018 B_x factors reported in Revision 17 of NUREG-1307, shows that the values increased for both the Washington site and the South Carolina site. These changes were influenced by increases in

[2] The PPI values for industrial electric power and light fuel oils decreased by 3.1 percent and 23 percent, respectively, from NUREG-1307, Revision 17. These decreases were likely heavily influenced by the global COVID-19 pandemic. It is unclear at this time whether these decreases are temporary or will be sustained into the future when most of the current operating plant will be decommissioned. Future updates of NUREG-1307 will reassess these variables. Regardless, these cost categories contribute less than 15 percent of the estimated decommissioning costs and so the PPI reductions do not have a significant effect on the cost of decommission.

the disposal price schedules provided by the operators of those disposal facilities (see Appendix A).

Table 3-3 Radioactive Materials Included in the Estimate of LLW Burial Cost

PWR	BWR
Vessel Wall	Steam Separator
Vessel Head & Bottom	Fuel Support Pieces
Upper Core Support Assembly	Control Rods & In-core Instruments
Upper Support Column	Control Rod Guide Tubes
Upper Core Barrel	Jet Pump Assemblies
Upper Core Grid Plate	Top Fuel Guide
Guide Tubes	Core Support Plate
Lower Core Barrel	Core Shroud
Thermal Shields	Reactor Vessel Wall
Core Shroud	Sacrificial Shield
Lower Grid Plate	Reactor Water Recirculation
Lower Support Column	Other Primary Containment
Lower Core Forging	Containment Atmospheric Control
Miscellaneous Internals	High Pressure Core Spray
Biological Shield Concrete	Low Pressure Core Spray
Reactor Cavity Liner	Reactor Building Closed Cooling
Reactor Coolant Pumps	Reactor Core Isolation Cooling
Pressurizer	Residual Heat Removal
Heat Exchangers, Sump Pump, Cavity Pump	Pool Liner & Racks
Pressurizer Relief Tank	Contaminated Concrete
Safety Injection Accumulator Tanks	Other Reactor Building
Steam Generators	Turbine
Reactor Coolant Piping	Nuclear Steam Condensate
Other Containment Building	Low Pressure Feedwater Heaters
Other Buildings	Main Steam
Filter Cartridges	Moisture Separator Reheaters
Spent Resins	Reactor Feedwater Pumps
Combustible Wastes	High Pressure Feedwater Heaters
Evaporator Bottoms	Other Turbine-Generator Building
Post-TMI-2 Additions	Radwaste and Control Building
	Concentrator Bottoms
	Decontamination Solutions, Filter Sludges, & Spent Resins
	Post-TMI-2 Additions

Regarding changes to the disposal price schedules, the following summarizes the changes:

- For the Washington disposal facility, the volume and shipment disposal rates, the dose rate charge per container, the charges per container, and the annual site charges increased while fees such as those for environmental site surveillance did not change from year 2018.

- For the South Carolina disposal facility, all of the charges and surcharges increased except for the Atlantic Compact Commission administrative surcharge, which remained unchanged.

- For the Utah disposal facility, the disposal rates for both solid and liquid LLW did not change from year 2018.

- For the Texas disposal facility, simplification of the disposal fee structure resulted in the elimination of the Class A LLW – Shielded waste volume charge category, the Carbon-14 inventory charge category, the weight surcharge category for containers weighing 10,000 to 50,000 pounds, all dose rate surcharge categories except for containers having surface dose rates greater than 500 R/hour, and the surcharge category for shielded waste cask handling. In addition, the curie inventory charge decreased from year 2018.

3.5 Sample Calculations of Estimated Reactor Decommissioning Costs

Four sample calculations are provided in this section to demonstrate the use of the decommissioning cost equation developed above using the appropriate cost escalation factors of L_x for labor, material, and services; E_x for energy and fuel for waste transportation; and B_x for radioactive waste burial/disposition. The coefficients A, B, and C (0.65 coefficient for labor, 0.13 coefficient for energy, and 0.22 coefficient for LLW burial) used in the examples are developed in Table 3-1. Waste generators with no LLW compact disposal site availability should use the B_x values for the generic LLW disposal site scenario (i.e., the column in Table 2-1 titled "B_x Values for Generators Located in the Unaffiliated States and those Located in Compact-Affiliated States having no Disposal Facility"). Sample decommissioning costs for other years are provided in Appendix D.

Example 1 (No Compact-Affiliated Disposal Facilities)

Scenario Description
Reactor Type: BWR
Thermal Power Rating: 3,400 MWt
Location of Plant: Midwest Compact
LLW Disposition Preference: Non-Compact Disposal Facilities
LLW Burial Location: Non-Compact Disposal Sites (Texas and Utah)

Base Cost (1986 Dollars) = $135 million [from 10 CFR 50.75(c)(1)]

L_x = 2.86 [from Table 3-2]

E_x = 2.029 [from Section 3.3]

B_x = 12.837 [from Table 2-1]

Decommissioning Cost (2020 dollars)
= ($135 million)×[(0.65)×(2.86)+(0.13)×(2.029)+(0.22)×(12.837)] = $668 million

Example 2 (Compact-Affiliated Disposal Facility Only)

Scenario Description
Reactor Type: PWR
Thermal Power Rating: 3,400 MWt
Location of Plant: Texas Compact
LLW Disposition Preference: Compact-Affiliated Disposal Facility Only
LLW Burial Location: Texas

Base Cost (1986 Dollars) = $105 million [from 10 CFR 50.75(c)(1)]

L_x = 2.71 [from Table 3-2]

E_x = 2.030 [from Section 3.3]

B_x = 8.040 [from Table 2-1]

Decommissioning Cost (2020 dollars)
= ($105 million)×[(0.65)×(2.71)+(0.13)×(2.030)+(0.22)×(8.040)] = $398 million

Example 3 (Combination of Compact-Affiliated and Non-Compact Disposal Facilities)

Scenario Description
Reactor Type: PWR
Thermal Power Rating: 3,400 MWt
Location of Plant: Atlantic Compact
LLW Disposition Preference: Combination of Compact-Affiliated and Non-Compact Disposal Facilities
LLW Burial Location: South Carolina and Utah

Base Cost (1986 Dollars) = $105 million [from 10 CFR 50.75(c)(1)]

L_x = 3.06 [from Table 3-2]

E_x = 2.030 [from Section 3.3]

B_x = 11.679 [from Table 2-1]

Decommissioning Cost (2020 dollars)
= ($105 million)×[(0.65)×(3.06)+(0.13)×(2.030)+(0.22)×(11.679)] = $506 million

Example 4 (Compact-Affiliated Disposal Facility Only)

Scenario Description
Reactor Type: BWR
Thermal Power Rating: 3,400 MWt
Location of Plant: Northwest Compact
LLW Disposition Preference: Compact-Affiliated Disposal Facility Only
LLW Burial Location: Washington

Base Cost (1986 Dollars) = $135 million [from 10 CFR 50.75(c)(1)]

L_x = 2.94 [from Table 3-2]

E_x = 2.029 [from Section 3.3]

B_x = 9.326 [from Table 2-1]

Decommissioning Cost (2020 dollars)
= ($135 million)×[(0.65)×(2.94)+(0.13)×(2.029)+(0.22)×(9.326)] = $571 million

4 REFERENCES

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9. Murphy, E.S., “Technology, Safety and Costs of Decommissioning a Reference Boiling-Water Reactor Power Station–Classification of Decommissioning Wastes,” (Report prepared by Pacific Northwest Laboratory, Richland, Washington), NUREG/CR-0672, Addendum 2, U.S. Nuclear Regulatory Commission, September 1984.

APPENDIX A
LOW-LEVEL WASTE BURIAL/DISPOSITION PRICES FOR THE CURRENT YEAR

This appendix contains the price schedules for burial/disposition of low-level radioactive waste (LLW) at the Texas, Washington, and South Carolina sites for the year 2020. Also provided is a price quote for the non-compact disposal facility located in Utah. These schedules are used to calculate the burial/disposition costs discussed in Appendix B.

A.1 Texas LLW Disposal Site

Beginning in the Spring of 2012, a new facility located in Texas became available for disposal of LLW from states within the Texas Compact (comprised of Texas and Vermont). The Texas facility, or Texas Compact Waste Facility (CWF), also accepts LLW from out-of-compact generators. The fees for LLW disposal are determined by the Texas Commission on Environmental Quality. Out-of-compact generators, however, must submit an import petition to the Texas Compact Commission for approval prior to shipping. The state of Texas also limits total non-compact waste disposed at the CWF to 30-percent of licensed capacity and charges additional fees for out-of-compact LLW.

The current approved rate schedule for disposal of LLW at the CWF is provided in Section 336.1310 (Subchapter N) of Title 30 of the Texas Administrative Code (TAC). This rate schedule is provided in Exhibit A-1. Effective November 8, 2018, the schedule no longer includes a separate waste volume charge for shielded Class A LLW, a Carbon-14 inventory charge, surcharges for weights less than or equal to 50,000 pounds, surcharges for dose rates less than or equal to 500 R/hour, or surcharges for shielded waste cask handling. Also, the curie inventory charge was reduced about 27 percent from 2018. The fees in this exhibit are the maximum disposal rates that can be charged to in-compact generators. Fees charged to out-of-compact generators must be greater than these rates. Various established Texas fees charged to out-of-compact LLW currently amounts to an additional 31.25-percent on top of the rates shown in Exhibit A-1. In addition, it is assumed that an additional 20-percent in fees/taxes is charged for out-of-compact LLW.

A.2 South Carolina LLW Disposal Site

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 South Carolina facility was extended to all states except North Carolina. In June 2000, prohibition on waste from North Carolina was lifted.

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, is through customer-specific contracts.

In the years between 2001 and 2008, the maximum allowable volume of LLW disposed of at the South Carolina LLW disposal site from all sources was governed by a schedule contained in the Atlantic Interstate Low-Level Radioactive Waste Compact Implementation Act, which was enacted into law July 1, 2000. This schedule is shown in Table A-1.

Table A-1 Schedule of Maximum Allowable LLW Disposal at the South Carolina Disposal Facility[(a)]

Fiscal Year	Maximum Allowable LLW Volume from All Sources (ft^3)
2001	160,000
2002	80,000
2003	70,000
2004	60,000
2005	50,000
2006	45,000
2007	40,000
2008	35,000

[(a)] Reference: Code of Laws of South Carolina, 1976, Section 1, Title 48, Chapter 46.

Effective July 1, 2008, out-of-compact waste was prohibited from disposal at the South Carolina disposal site.

Weight charges, curie surcharges, irradiated hardware charges, and dose rate surcharges all increased approximately 1.5 percent from the 2018 Atlantic Compact rates, while the Atlantic Compact Commission administrative surcharge remained constant. One category of weight charges, for packages greater than 75 lbs/ft^3 and less than 120 lbs/ft^3, increased about 10 percent. As a result of these changes, the cost to disposition the LLW for a boiling water reactor (BWR) increased approximately 1.5 percent and for a pressurized water reactor (PWR) increased approximately 2 percent compared to 2018. The rate schedule for the South Carolina LLW disposal site, effective July 1, 2020, is presented in Exhibit A-2.

A.3 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. For 2020, the permit fees range from $424 to $42,400. Hospitals, universities, research centers, and industries pay the lower fees; nuclear power plants (NPPs) pay the highest fee of $42,400. Permit fees for NPPs 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 a one-time only 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 also is assessed an annual site availability charge based on cumulative volume and dose rate at the surface of all containers disposed. This restructured rate schedule was established in a settlement agreement between U.S. Ecology Washington, Inc., (the operator of the Washington disposal facility) and several large waste generators and was accepted by the Washington Utilities and Transportation Commission. The

rate design for the restructured rate schedule was for an original period of six years and has been renewed on this schedule since 1996. The rates are updated annually to adjust for inflation and other factors. A significant element of the rate design is the imposition of a revenue requirement that limits the profit that U.S. Ecology can earn each year. Any revenue earned in excess of this requirement must be returned to the waste generators who used the disposal facility during the year. Hence, disposal rates can vary significantly from year to year depending on the projected LLW volume and its characteristics that are received at the facility each year.

Compared with the 2018 rate schedule used in Revision 17 of NUREG-1307, the 2020 schedule reflects increases in rates as follows: volume (55.4 percent), shipment (29.8 percent), container (51.1 percent), and dose rate (greater than 220 percent). As a result of these rate changes, subject to the limitations described in the previous paragraph, the cost to disposition the LLW from both a PWR and a BWR increased by 1.54 percent and 2.3 percent, respectively. The rate schedule for the Washington LLW disposal site, effective May 1, 2020, is presented in Exhibit A-3.

A.4 Non-compact Disposal Facility

In the 1990s rapidly increasing fees for disposal of low-level radioactive waste spawned the creation of a niche market for firms specializing in the management and disposal of LLW. Increasingly, NPP licensees began to outsource LLW management functions to waste vendors for a negotiated fee (usually $/pound of LLW processed) and disposing of Class A LLW at the non-compact disposal facility in Utah. Waste vendors could manage waste from generation to disposal (including packaging, transportation, and volume reduction) or any subset of these functions that the licensee desired.

The vendor determined the most efficient disposition process for each waste stream. These take into consideration sorting into clean and contaminated streams, recycling where possible, volume reduction through the many techniques currently commercially available, and disposal of the residual LLW at the most cost-effective disposal site; including the non-compact disposal facility located in Utah. The vendor's profit was 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 was at minimization, recycling, volume reduction, and obtaining volume discounts for packaging, transportation, and disposal, the greater its profit.

The decommissioning analyses reported in NUREG/CR-0130 and NUREG/CR-0672 did not consider the possible use of waste vendors or non-compact Class A, LLW disposal facilities, given that these market niches essentially did not exist at the time. Beginning with Revision 8, NUREG-1307 (Reference 3) included a scenario that provided for contracting with waste vendors to manage the disposition bulk LLW generated during decommissioning. This new scenario did not modify or alter in any way the bases for the decommissioning fund requirement specified in Title 10 of the *Code of Federal Regulations* Part 50.75, "Reporting and Recordkeeping for Decommissioning Planning." It merely provided an alternative burial cost escalation factor (B_x) that reflected the scenario of disposing of LLW using a combination of waste vendors, non-compact disposal facilities, and compact-affiliated disposal facilities.

In support of the analysis performed for NUREG-1307, Revision 8, several waste vendors were surveyed to develop a representative cost for waste vendor services. Each vendor was asked to provide a generic price quote for processing two waste streams: activated and contaminated

concrete and contaminated metal. Vendors were asked to provide these quotes as a price per pound of waste, or as a range of prices 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 to be developed assuming the vendor had a contract with a licensee engaged in a large decommissioning project.

Based on the results of the survey, NUREG-1307, Revision 8, introduced an alternative B_x that assumed the use of waste vendor services and disposal of Class A LLW at the non-compact disposal facility located in Utah as an alternative to disposal of all decommissioning LLW at a compact-affiliated disposal facility. The scenario was introduced to provide potential savings from the use of waste vendors. For a PWR under this scenario, 98-percent of the waste was assumed to be dispositioned by waste vendors and the remaining 2-percent was assumed to be disposed of at a compact-affiliated disposal facility. For a BWR under this scenario, 96-percent of the waste was assumed to be dispositioned by waste vendors and the remaining 4-percent was assumed to be disposed of at a compact-affiliated disposal facility. These proportions were determined from a component-by-component analysis of the reference BWR and PWR. The portions of waste assumed to be dispositioned by waste vendors were priced at the rates obtained from the vendor surveys, and the portions of waste assumed to be disposed of at compact-affiliated disposal facilities were priced at rates obtained for those facilities.

In support of Revision 18 of NUREG-1307, a similar survey was conducted. In response to this survey, a price quote to disposition the components of the reference PWR and BWR at the Utah disposal facility was obtained. Unit costs, exclusive of taxes, were provided for several different categories of components, which are provided in Table A-2. The updated rates are unchanged from the 2018 rates. These rates assume no volume discounts, which can be substantial. The development of the B_x factor for the “Combination of Compact-Affiliated and Non-Compact Disposal Facilities” scenario and the “Non-Compact Disposal Facilities” scenario was based on these rates and assumed a 10 percent tax.

Table A-2 Price Quotes for Disposition of Class A LLW at the Non-Compact Disposal Facility Located in Clive Utah

Component Class	Cost	Per Unit
Large Components	$398	ft^3
Debris	$165	ft^3
Oversize Debris	$188	ft^3
Resins/Filters	$523	ft^3
Combustibles	$653	ft^3
Evaporator Bottoms	$27	gal

Exhibit A-1

Texas Commission on Environmental Quality
Chapter 336 – Radioactive Substance Rules

SUBCHAPTER N: FEES FOR LOW-LEVEL RADIOACTIVE WASTE DISPOSAL

EFFECTIVE November 8, 2018

§336.1310. Rate Schedule.

Fees charged for disposal of party-state compact waste must be equal to or less than the compact waste disposal fees under this section. Additionally, fees charged for disposal of nonparty compact waste must be greater than the compact waste disposal fees under this section.

Figure: 30 TAC §336.1310[1]

Disposal Rate for the Compact Waste Disposal Facility

1. Base Disposal Charge:

1A. Waste Volume Charge	Charge per cubic foot ($/ft3)
Class A LLW	$100
Class B and C LLW	$1,000
Sources – Class A	$500

1B. Radioactivity Charge	
Curie Inventory Charge ($/mCi)	$0.40
Maximum Curie Charge (per shipment) (excluding C-14)	$220,000/shipment

[1] The TAC Title 30, Part 1, Chapter 336, Subchapter N, Rule §336.1310 is available at: https://texreg.sos.state.tx.us/public/readtac$ext.TacPage?sl=R&app=9&p_dir=&p_rloc=&p_tloc=&p_ploc=&pg=1&p_tac=&ti=30&pt=1&ch=336&rl=1310

2. Surcharges to the Base Disposal Charge:

2A. Weight Surcharge - Weight (lbs.) of Container	Surcharge ($/container)
Greater than 50,000 lbs	$20,000

2B. Dose Rate Surcharge - Surface Dose Rate (R/hour) of Container	Surcharge per cubic foot ($/ft3)
Greater than 500 R/hour	$400

2C. Irradiated Hardware Surcharge	
Surcharge for special handling per shipment	$75,000/shipment

Adopted February 28, 2013 Amended to be Effective November 8, 2018

Exhibit A-2

Pursuant to 48-46-40(A)(2), S.C.C.

Uniform Schedule of Maximum Disposal Rates for Atlantic Compact Regional Waste

EFFECTIVE JULY 1, 2020

The Uniform Schedule of Maximum Disposal Rates for Atlantic Compact Regional Waste is a permanent ceiling on disposal rates applicable to Atlantic Compact waste that is adjusted each year in accordance with the Producer Price Index. South Carolina may charge Atlantic Compact generators less than the Uniform Maximum Schedule but cannot charge regional generators more than this rate.

THE MINIMUM CHARGE PER SHIPMENT, EXCLUDING SURCHARGES AND SPECIFIC OTHER CHARGES, IS $1,000.00

1. WEIGHT CHARGES (not including surcharges)

A. Base weight charge

Density Range	**Weight Rate**
i) Equal to or greater than 120 lbs./ft^3	$8.298 per pound
ii) Equal to or greater than 75 lbs./ft^3 and less than 120 lbs./ft^3	$9.9128 per pound
iii) Equal to or greater than 60 lbs./ft^3 and less than 75 lbs./ft^3	$11.202 per pound
iv) Equal to or greater than 45 lbs./ft^3 and less than 60 lbs./ft^3	$14.523 per pound
v) Less than 45 lbs./ft^3	$14.423 per pound multiplied by: (45 ÷ pounds per cubic foot of the package)

B. Dose multiplier on base weight charge

Container Dose Level	**Multiplier on Weight Rate, above**
0 mR/hr - 200 mR/hr	1.00
>200 mR/hr - 1 R/hr	1.08
>1R/hr - 2R/hr	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

C. Biological Waste: Add $1.803 per pound to rate calculated above

2. SURCHARGES

A.	Millicurie surcharge	$0.621 per millicurie*

*In lieu of above, generator may opt for an alternative millicurie charge of $1.242 per millicurie applicable only to millicuries with greater than 5-year half-life. Such election must be provided in writing to the disposal site operator prior to July 1, 2020.

MAXIMUM MILLICURIE CHARGE IS $248,400 PER SHIPMENT (400,000 MCI).

B.	Irradiated hardware charges (See Note B under Miscellaneous)	$94,310 per shipment
C.	Special nuclear material surcharge	$18.857 per gram
D.	Atlantic Compact Commission administrative surcharge	$6.00 per cubic foot (*Subject to change during year)*

Exhibit A-2

NOTES

A. Surcharges for the Barnwell Extended Care Fund and the Decommissioning Trust Fund are included in the rates.

B. Irradiated hardware: As a general rule, billing as irradiated hardware pertains to shipments of exceptionally high activity that require clearing of the site and special off-loading into a slit trench. These generally include TN-RAM[2] and other horizontally offloaded cask shipments. In addition to items of irradiated hardware, shipments considered irradiated hardware, for purposes of disposal, have included certain sealed sources and materials with exceptionally high levels of radioactivity.

C. Large components (e.g., steam generators, reactor pressure vessels, coolant pumps).

Disposal fees for large components (e.g., steam generators, reactor pressure vessels, reactor coolant pumps, or items that will not fit into standard sized disposal vaults) are based on the generally applicable rates, in their entirety, except that the weight and volume used to determine density and weight related charges is calculated as follows:

i. For packages where the large component shell qualifies as the disposal vault per Department of Health and Environmental Control (DHEC) regulations, weight and volume calculations are based on all sub-components and material contained within the inside surface of the large component shell, including all internals and any stabilization media injected by the shipper, but excluding the shell itself and all incidental external attachments required for shipping and handling; and

ii. For packages with a separate shipping container that qualifies as the disposal vault per DHEC regulations, weight and volume calculations are based on the large component, all sub-components, and material contained within the inside surface of the shipping container, including any stabilization media injected by the shipper (including that between the large component and the shipping container), but excluding the shipping container itself and all incidental external attachments required for shipping and handling.

D. Co-mingled shipments from brokers and processors: For containers that include waste from different generators (DHEC permittees), the weight and density of the waste from each generator will be assessed separately for purposes of the weight charge in I.A. The dose of the container as a whole will be used to assess the dose multiplier in I.B. The millicurie charge 2.A. above, applies individually to each portion of waste in the shipment from each generator. The disposal site operator will provide guidelines for application of this method.

E. Transport vehicles with additional shielding features may be subject to an additional handling fee, which will be provided upon request.

F. In certain circumstances, the disposal site operator may assess additional charges for necessary services that are not part of and are additional to disposal rates established by the State of South Carolina. These include decontamination services and special services as described in the Barnwell Site Disposal Criteria.

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[2] TN-RAM is a radioactive material cask used to transport irradiated non-fuel bearing solid materials.

G. The disposal site operator has established the following policies and procedures, which are provided herein for informational purposes:

i. Terms of payment are net 30 days upon presentation of invoices. A per-month service charge of one and one-half percent (1½ percent) shall be levied on accounts not paid within thirty (30) days.

ii. Company purchase orders or a written letter of authorization and substance acceptable to Chem-Nuclear Systems, L.L.C. (CNS) shall be received before receipt of radioactive waste material at the Barnwell Site and shall refer to CNS Radioactive Material License, the Barnwell Site Disposal Criteria, and subsequent changes thereto.

iii. All shipments shall receive a CNS shipment identification number and conform to the Prior Notification Plan.

Exhibit A-3

U.S. ECOLOGY WASHINGTON, INC.
RICHLAND, WASHINGTON FACILITY
RADIOACTIVE WASTE DISPOSAL

SCHEDULE OF CHARGES
EFFECTIVE MAY 1, 2020
SCHEDULE A, 32nd REVISION

Note: Rates in this Schedule A are subject to adjustment in accordance with the rate adjustment mechanism adopted in the Commission's Sixth Supplemental Order in Docket No. UR-950619 as extended by Commission Order in Docket Nos. UR-010623 and UR-010706, and TL-070848.

SITE AVAILABILITY CHARGE

1. Rates

Block	Block Criteria	Annual Charge per Generator in $
0	No site use at all	$324
1	Greater than zero but less than or equal to 10 ft^3 and 50 mR/h	620
2	Greater than 10 ft^3 or 50 mR/h* but less than or equal to 20 ft^3 and 100 mR/h*	1,190
3	Greater than 20 ft^3 or 100 mR/h* but less than or equal to 40 ft^3 and 200 mR/h*	2,283
4	Greater than 40 ft^3 or 200 mR/h* but less than or equal to 80 ft^3 and 400 mR/h*	4,385
5	Greater than 80 ft^3or 400 mR/h* but less than or equal to 160 ft^3 and 800 mR/h*	8,421
6	Greater than 160 ft^3 or 800 mR/h* but less than or equal to 320 ft^3 and 1,600 mR/h*	16,150
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*	31,011
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*	59,532
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*	114,301
10	Greater than 2,560 ft^3 or 12,800 mR/h* but less than or equal to 5,120 ft^3 and 25,600 mR/h*	151,119
11	Greater than 5,120 ft^3 or 25,600 mR/h*	151,119

* 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

a. 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. *"Educational research Institution" means a state or independent, not-for-profit, post-secondary educational institution.*

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 Health.

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. 3–8, the entire site availability charge will also be due and payable as of January 1, although those customers may make 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 the beginning of each calendar month. These customers may pay in advance if they wish.

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.

Exhibit A-3

SCHEDULE A (Continued)

DISPOSAL RATES

1. Volume: $236.50 per cubic foot

2. Shipment: $19,020 per manifested shipment

3. Container: $15,590 per container on each manifest.

4. Dose Rate:

Block No	Dose Rate at Container Surface	Charge per Container in $
1	Less than or equal to 200 mR/h	$129
2	Greater than 200 mR/h but less than or equal to 1,000 mR/h	9,172
3	Greater than 1,000 mR/h but less than or equal to 10,000 mR/h	36,670
4	Greater than 10,000 mR/h but less than or equal to 100,000 mR/h	54,900
5	Greater than 100,000 mR/h	922,300

EXTRAORDINARY VOLUMES

Waste shipments qualifying as an “extraordinary volume” under RCW 81.108.020(3) are charged a rate equal to 51.5 percent 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 percent of those set forth above; provided, however, that such waste must satisfy the quantity requirements for “extraordinary volume” under Revised Code of Washington (RCW) 81.108.020(3)[3].

SCHEDULE B
Surcharges and Other Special Charges
Fourteenth Revision

ENGINEERED CONCRETE BARRIERS

72" x 8' barrier	$15,204.00 each
84" x 8' barrier	$20,756.00 each

[3] RCW 81.108.020(3) - "Extraordinary volume" means volumes of low-level radioactive waste delivered to a site caused by nonrecurring events, outside normal operations of a generator, that are in excess of twenty thousand cubic feet or twenty percent of the preceding year's total volume at such site, whichever is less.
http://leg.wa.gov/ or (http://app.leg.wa.gov/RCW/default.aspx?cite=81.108.020)

SURCHARGE FOR HEAVY OBJECTS

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

SCHEDULE C
Tax and Fee Rider
First Revision

The rates 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 U.S. Ecology Washington, Inc. as listed below:

Perpetual Care and Maintenance Fees	$1.75 per cubic foot
Business & Occupation Tax	3.3 percent of rates and charges
Site Surveillance Fee	$26.00 per cubic foot
Surcharge (RCW 43.200.233)	$6.50 per cubic foot
Commission Regulatory Fee	1.0 percent of rates and charges

APPENDIX B
CALCULATION OF LOW-LEVEL WASTE BURIAL/DISPOSITION COST ESCALATION FACTORS

The calculations necessary to determine the costs for burial/disposition of radioactive wastes resulting from decommissioning the reference pressurized water reactor (PWR) and the reference boiling water reactor (BWR) are performed using spreadsheet models. The spreadsheets evaluate the burial/disposition costs for each of the items originally budgeted in the PWR and BWR decommissioning studies and in Addendums 4 and 3 (References 1 and 2), respectively, to those reports. The costs are based on the published price schedules from the compact-affiliated disposal facilities and a price quote from the non-compact disposal facility located in Utah.

The LLW burial cost escalation factor (B_x)values reported in this document reflect the updated rate schedules and price quote. All the calculations are based on the same inventory of radioactive wastes as was postulated in the 1986 and 1978–1980 analyses. Starting in 1988, the inventories also included post-Three Mile Island (TMI)-2 contributions from the reference PWR and the reference BWR (References 1 and 2).

B.1 Generators Located in States Not Affiliated with a Compact having a Disposal Facility

Both the Utah and Texas disposal facilities are available for the disposal of all low-level radioactive waste (LLW) regardless of whether a generator has a compact-affiliated disposal facility available for disposal of their LLW or not. The Utah facility can only dispose of Class A LLW, while the Texas facility is a full-service disposal facility and so can dispose of Class A, B, and C LLW (subject to the constraints described in Section A.3). For the year 2020, B_x = 12.793 and 12.837 for a PWR and BWR, respectively, for disposal of most Class A LLW at the Utah non-compact site, and for the remainder of LLW at the Texas LLW disposal site. The B_x values include the additional fees imposed for the disposal of non-compact LLW at the Texas disposal facility. The B_x values are summarized in Table 2-1. These B_x values should be used by generators located in States not affiliated with a compact having a disposal facility.

Waste burial costs for the year 2020 were developed using both the rate schedules for the Texas disposal facility provided in Exhibit A-1, and the associated additional fees for out-of-compact waste, and the price quote for the non-compact disposal facility provided in Table A-2. The spreadsheet calculations for the current year, which are too voluminous to present here, are summarized in Table B-1 and Table B-2 for PWR and BWR plants, respectively. For comparison purposes, Table B-3 and Table B-4 provide summaries of waste burial/disposition costs for 2018, respectively, for both PWR and BWR plants. These estimates were originally reported in Revision 17 of NUREG-1307.

B.2 Texas LLW Disposal Site

For the year 2020, B_x = 8.040 and 7.399 for a PWR and BWR, respectively, at the Texas disposal facility. These B_x values reflect the adjustment in waste burial costs at the Texas LLW disposal site normalized to the 1986 Washington LLW disposal site burial costs.

Waste burial costs for the year 2020 were developed using the rate schedules provided in Exhibit A-1. The spreadsheet calculations for the current year, which are too voluminous to

present here, are summarized in Table B-5 and Table B-6 for PWR and BWR plants, respectively. For comparison purposes, Table B-7 and Table B-8 provide summaries of the waste burial costs at the Texas LLW disposal site for 2018, respectively, for both PWR plants and BWR plants. These estimates originally were reported in Revision 17 of NUREG-1307.

B.3 South Carolina LLW Disposal Site

For the year 2020, B_x = 32.973 and 28.727 for a PWR and BWR, respectively, at the South Carolina disposal facility. These B_x values reflect the adjustment in waste burial costs at the South Carolina LLW disposal site normalized to the 1986 Washington LLW disposal site burial costs. B_x values for several previous revisions of NUREG-1307 are summarized in Table 2-1.

Waste burial costs for the year 2020 were developed using the rate schedules provided in Exhibit A-2. The spreadsheet calculations for the current year, which are too voluminous to present here, are summarized in Table B-9 and Table B-10 for PWR and BWR plants, respectively. For comparison purposes, Table B-11 and Table B-12 provide summaries of the waste burial costs at the South Carolina LLW disposal site for 2018, respectively, for both PWR plants and BWR plants. These estimates originally were reported in Revision 17 of NUREG-1307.

B.4 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 BWR. These estimates are the basis for the minimum decommissioning fund requirement specified in Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50.75(c), which is in 1986 dollars. Thus, B_x = 1.0/1.0 (for PWR/BWR) for 1986.

For the year 2020, B_x = 11.019 and 9.326 for a PWR and BWR, respectively, at the Washington disposal facility. These B_x values reflect the adjustment in waste burial costs at the Washington LLW disposal site since 1986. B_x values for several previous revisions of NUREG-1307 are summarized in Table 2-1.

Waste burial costs for the year 2020 were developed using the rate schedule provided in Exhibit A-1. The spreadsheet calculations for the current year, which are too voluminous to present here, are summarized in Table B-13 and Table B-14 for PWR and BWR plants, respectively. For comparison purposes, Table B-15 and B-16 provide summaries of the waste burial costs at the Washington LLW disposal site for 2018, respectively, for both PWR plants and BWR plants. These estimates originally were reported in Revision 17 of NUREG-1307.

B.5 Combination of Non-Compact and Compact-Affiliated Disposal Facilities

For the year 2020, B_x = 8.866 and 7.549 for a PWR and BWR, respectively, for disposal of most Class A LLW at the Utah non-compact disposal site, and for the remainder of LLW at the Washington LLW disposal site. B_x = 11.679 and 12.948 for a PWR and BWR, respectively, for disposal of most Class A LLW at the Utah non-compact disposal site, and for the remainder of LLW at the South Carolina disposal site. B_x = 11.016 and 10.359 for a PWR and BWR, respectively, for disposal of most Class A LLW at the Utah non-compact site, and for the remainder of LLW at the Texas LLW disposal site. B_x values are summarized in Table 2-1.

Waste burial costs for the year 2020 were developed using both the rate schedules for the compact-affiliated disposal facilities provided in Exhibits A-1, A-2, and A-3 and for the price quote for the non-compact disposal facility provided in Table A-2. The spreadsheet calculations for the current year, which are too voluminous to present here, are summarized in Table B-17 through Table B-22 for the Texas, South Carolina, and Washington LLW disposal sites, respectively, for both PWR and BWR plants. For comparison purposes, Table B-23 through Table B-28 provide summaries of the Texas, South Carolina, and Washington waste burial/disposition costs for 2018, respectively, for both PWR and BWR plants. These estimates were originally reported in Revision 17 of NUREG-1307.

B.6 Other

As other LLW burial sites come into service in the interstate compacts, values for B_x will be calculated using the price schedules for each of those sites and will be incorporated into subsequent issues of this NUREG. 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 NUREG postulate placing this material in an LLW disposal facility, the disposal costs for this material may be significantly overestimated compared with high-density packaging and geologic repository disposal. It may also be feasible to store GTCC waste in independent spent fuel storage installations (ISFSIs) or other interim storage facilities, as permitted by 10 CFR Part 72, “Licensing Requirements for the Independent Storage of Spent Nuclear Fuel, High-Level Radioactive Waste, and Reactor-Related Greater Than Class C Waste.”

Table B-1 PWR Disposition Costs for Generators Located in States Not Affiliated with a Compact having a Disposal Facility (2020 dollars)

REFERENCE PWR COMPONENT	BASE DISPOSAL CHARGE	IRRADIATED HARDWARE HANDLE SURCHARGE	CASK HANDLE SURCHARGE	WEIGHT SURCHARGE	CURIE CHARGE	DOSE RATE SURCHARGE	VENDOR CHARGES	DISPOSAL COST
VESSEL WALL	0	0	0	0	0	0	785,840	785,840
VESSEL HEAD & BOTTOM	0	0	0	0	0	0	1,751,200	1,751,200
UPPER CORE SUPPORT ASSM	0	0	0	0	0	0	82,720	82,720
UPPER SUPPORT COLUMN	0	0	0	0	0	0	82,720	82,720
UPPER CORE BARREL	200,000	150,000	0	0	400,000	80,000	0	830,000
UPPER CORE GRID PLATE	500,000	375,000	0	0	1,100,000	200,000	0	2,175,000
GUIDE TUBES	0	0	0	0	0	0	124,080	124,080
LOWER CORE BARREL[a]	3,200,000	2,400,000	0	0	7,040,000	1,280,000	0	13,920,000
THERMAL SHIELDS[a]	600,000	450,000	0	0	1,320,000	240,000	0	2,610,000
CORE SHROUD[a]	400,000	300,000	0	0	13,420,000	160,000	0	14,280,000
LOWER GRID PLATE[a]	500,000	375,000	0	0	2,200,000	200,000	0	3,275,000
LOWER SUPPORT COLUMN	100,000	75,000	0	0	220,000	40,000	0	435,000
LOWER CORE FORGING	1,100,000	825,000	0	0	1,000,000	440,000	0	3,365,000
MISC INTERNALS	800,000	600,000	0	0	800,000	320,000	0	2,520,000
BIO SHIELD CONCRETE	0	0	0	0	0	0	5,161,728	5,161,728
REACTOR CAVITY LINER	0	0	0	0	0	0	105,882	105,882
REACTOR COOLANT PUMPS	0	0	0	0	0	0	1,838,760	1,838,760
PRESSURIZER	0	0	0	0	0	0	1,576,080	1,576,080
R.Hx,EHx,SUMP PUMP,CAVITY PUMP	0	0	0	0	0	0	82,720	82,720
PRESSURIZER RELIEF TANK	0	0	0	0	0	0	248,160	248,160
SAFETY INJECTION ACCUM TANKS	0	0	0	0	0	0	827,200	827,200
STEAM GENERATORS	0	0	0	0	0	0	9,352,284	9,352,284
REACTOR COOLANT PIPING	0	0	0	0	0	0	682,440	682,440
REMAINING CONTAM. MATLS	0	0	0	0	0	0	10,879,334	10,879,334
CONTAMINATED MATRL OTHR BLD	0	0	0	0	0	0	98,666,555	98,666,555
FILTER CARTRIDGES	315,000	0	0	0	1,320,000	0	0	1,635,000
SPENT RESINS	2,000,000	0	0	0	4,400,000	800,000	0	7,200,000
COMBUSTIBLE WASTES - CLASS A	0	0	0	0	0	0	5,010,143	5,010,143
COMBUSTIBLE WASTES - CLASS B	3,150,000	0	0	0	210,000	0	0	3,360,000
EVAPORATOR BOTTOMS	0	0	0	0	0	0	2,088,546	2,088,546
POST-TMI-2 ADDITIONS	0	0	0	0	0	0	3,216,998	3,216,998
SUBTOTAL PWR COSTS	**12,865,000**	**5,550,000**	**0**	**0**	**33,430,000**	**3,760,000**	**142,563,388**	**198,168,388**
OUT-OF-COMPACT TAXES & FEES (% OF CHARGES)								31,972,875
TOTAL PWR COSTS								**230,141,263**

[a] GTCC Material: Assumes a low-density, distributed packaging scheme and final disposal as LLW. High-density packaging, ISFSI storage, and geologic repository disposal could reduce disposal costs.

Table B-2 BWR Disposition Costs for Generators Located in States Not Affiliated with a Compact having a Disposal Facility (2020 dollars)

REFERENCE BWR COMPONENT	BASE DISPOSAL CHARGE	IRRADIATED HARDWARE HANDLE SURCHARGE	CASK HANDLE SURCHARGE	WEIGHT SURCHARGE	CURIE CHARGE	DOSE RATE SURCHARGE	VENDOR CHARGES	DISPOSAL COST
STEAM SEPARATOR	353,146	1,050,000	0	0	3,081,200	141,258	0	4,625,604
FUEL SUPPORT & PIECES	176,573	525,000	0	0	280,074	70,629	0	1,052,276
CONTROL RODS/INCORES	529,719	600,000	0	0	1,776,800	211,888	0	3,118,407
CONTROL RODS GUIDES	0	0	0	0	0	0	29,212	29,212
JET PUMPS	494,404	1,500,000	0	0	4,405,152	197,762	0	6,597,318
TOP FUEL GUIDES	847,550	5,400,000	0	0	12,075,520	339,020	0	18,662,091
CORE SUPPORT PLATE	0	0	0	0	0	0	80,334	80,334
CORE SHROUD[a]	1,659,786	10,500,000	0	0	31,871,600	663,914	0	44,695,301
REACTOR VESSEL WALL	0	0	0	0	0	0	58,424	58,424
SAC SHIELD Neutron-Activated Matl	0	0	0	0	0	0	657,275	657,275
REACT. WATER REC	0	0	0	0	0	0	642,669	642,669
SAC SHIELD Contaminated Matl	0	0	0	0	0	0	2,263,948	2,263,948
OTHER PRIMARY CONTAINMENT	0	0	0	0	0	0	25,823,618	25,823,618
CONTAINM. ATMOSPHERIC	0	0	0	0	0	0	350,547	350,547
HIGH PRESSURE CORE SPRAY	0	0	0	0	0	0	124,152	124,152
LOW PRESSURE CORE SPRAY	0	0	0	0	0	0	73,031	73,031
REACTOR BLDG CLOSED COOLING	0	0	0	0	0	0	233,698	233,698
REACTOR CORE ISO COOLING	0	0	0	0	0	0	94,940	94,940
RESIDUAL HEAT REMOVAL	0	0	0	0	0	0	452,790	452,790
POOL LINER & RACKS	0	0	0	0	0	0	2,782,466	2,782,466
CONTAMINATED CONCRETE	0	0	0	0	0	0	3,169,528	3,169,528
OTHER REACTOR BUILDING	0	0	0	0	0	0	10,363,041	10,363,041
TURBINE	0	0	0	0	0	0	21,737,789	21,737,789
NUCLEAR STEAM CONDENSATE	0	0	0	0	0	0	2,651,011	2,651,011
LOW PRESSURE FEEDWATER HEATERS	0	0	0	0	0	0	5,382,355	5,382,355
MAIN STEAM	0	0	0	0	0	0	518,517	518,517
MOISTURE SEPARATOR REHEATERS	0	0	0	0	0	0	5,221,687	5,221,687
REACTOR FEEDWATER PUMPS	0	0	0	0	0	0	2,999,382	2,999,382
HIGH PRESSURE FEEDWATER HEATERS	0	0	0	0	0	0	883,670	883,670
OTHER TG BLDG	0	0	0	0	0	0	35,470,959	35,470,959
RAD WASTE BLDG	0	0	0	0	0	0	17,563,858	17,563,858
REACTOR BLDG - CLASS A	0	0	0	0	0	0	1,510,638	1,510,638
REACTOR BLDG - CLASS B	3,285,317	0	0	0	221,500	0	0	3,506,817
TG BLDG - CLASS A	0	0	0	0	0	0	1,019,872	1,019,872
TG BLDG - CLASS B	2,217,404	0	0	0	149,500	0	0	2,366,904
RAD WASTE & CONTROL - CLASS A	0	0	0	0	0	0	880,311	880,311
RAD WASTE & CONTROL - CLASS B	1,913,345	0	0	0	129,000	0	0	2,042,345
CONCENTRATOR BOTTOMS - CLASS A	0	0	0	0	0	0	516,031	516,031
CONCENTRATOR BOTTOMS - CLASS B	5,226,561	0	0	0	11,440,000	0	0	16,666,561
OTHER	0	0	0	0	0	0	1,270,732	1,270,732
POST-TMI-2 ADDITIONS	0	0	0	0	0	0	262,910	262,910
SUBTOTAL BWR COSTS	**16,703,806**	**19,575,000**	**0**	**0**	**65,430,346**	**1,624,472**	**145,089,394**	**248,423,017**
OUT-OF-COMPACT TAXES & FEES (% OF CHARGES)								59,416,833
TOTAL BWR COSTS								**307,839,851**

[a] GTCC Material: Assumes a low-density, distributed packaging scheme and final disposal as LLW. High-density packaging, ISFSI storage, and geologic repository disposal could reduce disposal costs.

Table B-3 PWR Disposition Costs for Generators Located in States Not Affiliated with a Compact having a Disposal Facility (2018 dollars)

REFERENCE PWR COMPONENT	BASE DISPOSAL CHARGE	IRRADIATED HARDWARE HANDLE SURCHARGE	CASK HANDLE SURCHARGE	WEIGHT SURCHARGE	CURIE CHARGE	DOSE RATE SURCHARGE	VENDOR CHARGES	DISPOSAL COST
VESSEL WALL	0	0	0	0	0	0	785,840	785,840
VESSEL HEAD & BOTTOM	0	0	0	0	0	0	1,751,200	1,751,200
UPPER CORE SUPPORT ASSM	0	0	0	0	0	0	82,720	82,720
UPPER SUPPORT COLUMN	0	0	0	0	0	0	82,720	82,720
UPPER CORE BARREL	200,000	150,000	5,000	0	440,000	60,000	0	855,000
UPPER CORE GRID PLATE	500,000	375,000	12,500	0	1,100,000	150,000	0	2,137,500
GUIDE TUBES	0	0	0	0	0	0	124,080	124,080
LOWER CORE BARREL[a]	3,200,000	2,400,000	80,000	0	7,040,000	960,000	0	13,680,000
THERMAL SHIELDS[a]	600,000	450,000	15,000	0	1,320,000	180,000	0	2,565,000
CORE SHROUD[a]	400,000	300,000	10,000	0	13,420,000	120,000	0	14,250,000
LOWER GRID PLATE[a]	500,000	375,000	12,500	0	2,200,000	150,000	0	3,237,500
LOWER SUPPORT COLUMN	100,000	75,000	2,500	0	220,000	30,000	0	427,500
LOWER CORE FORGING	1,100,000	825,000	27,500	0	1,375,000	330,000	0	3,657,500
MISC INTERNALS	800,000	600,000	20,000	80,000	1,100,000	240,000	0	2,840,000
BIO SHIELD CONCRETE	0	0	0	0	0	0	5,161,728	5,161,728
REACTOR CAVITY LINER	0	0	0	0	0	0	105,882	105,882
REACTOR COOLANT PUMPS	0	0	0	0	0	0	1,838,760	1,838,760
PRESSURIZER	0	0	0	0	0	0	1,576,080	1,576,080
R.Hx,EHx,SUMP PUMP,CAVITY PUMP	0	0	0	0	0	0	82,720	82,720
PRESSURIZER RELIEF TANK	0	0	0	0	0	0	248,160	248,160
SAFETY INJECTION ACCUM TANKS	0	0	0	0	0	0	827,200	827,200
STEAM GENERATORS	0	0	0	0	0	0	9,352,284	9,352,284
REACTOR COOLANT PIPING	0	0	0	0	0	0	682,440	682,440
REMAINING CONTAM. MATLS	0	0	0	0	0	0	10,879,334	10,879,334
CONTAMINATED MATRL OTHR BLD	0	0	0	0	0	0	98,666,555	98,666,555
FILTER CARTRIDGES	315,000	0	15,000	0	1,320,000	31,500	0	1,681,500
SPENT RESINS	2,000,000	0	50,000	0	4,400,000	600,000	0	7,050,000
COMBUSTIBLE WASTES - CLASS A	0	0	0	0	0	0	5,010,143	5,010,143
COMBUSTIBLE WASTES - CLASS B	3,150,000	0	150,000	0	288,750	315,000	0	3,903,750
EVAPORATOR BOTTOMS	0	0	0	0	0	0	2,088,546	2,088,546
POST-TMI-2 ADDITIONS	0	0	0	0	0	0	3,216,998	3,216,998
SUBTOTAL PWR COSTS	**12,865,000**	**5,550,000**	**400,000**	**80,000**	**34,223,750**	**3,166,500**	**142,563,388**	**198,848,638**
OUT-OF-COMPACT TAXES & FEES (% OF CHARGES)								32,364,019
TOTAL PWR COSTS								**231,212,657**

[a] GTCC Material: Assumes a low-density, distributed packaging scheme and final disposal as LLW. High-density packaging, ISFSI storage, and geologic repository disposal could reduce disposal costs.

Table B-4 BWR Disposition Costs for Generators Located in States Not Affiliated with a Compact having a Disposal Facility (2018 dollars)

REFERENCE BWR COMPONENT	BASE DISPOSAL CHARGE	IRRADIATED HARDWARE HANDLE SURCHARGE	CASK HANDLE SURCHARGE	WEIGHT SURCHARGE	CURIE CHARGE	DOSE RATE SURCHARGE	VENDOR CHARGES	DISPOSAL COST
STEAM SEPARATOR	353,146	1,050,000	70,000	0	3,083,000	141,258	0	4,697,404
FUEL SUPPORT & PIECES	176,573	525,000	35,000	0	385,185	52,972	0	1,174,730
CONTROL RODS/INCORES	529,719	600,000	20,000	0	1,802,000	211,888	0	3,163,607
CONTROL RODS GUIDES	0	0	0	0	0	0	29,212	29,212
JET PUMPS	494,404	1,500,000	100,000	0	4,412,880	197,762	0	6,705,046
TOP FUEL GUIDES	847,550	5,400,000	180,000	0	15,928,800	339,020	0	22,695,371
CORE SUPPORT PLATE	0	0	0	0	0	0	80,334	80,334
CORE SHROUD[a]	1,659,786	10,500,000	350,000	0	33,479,000	663,914	0	46,652,701
REACTOR VESSEL WALL	0	0	0	0	0	0	58,424	58,424
SAC SHIELD Neutron-Activated Matl	0	0	0	0	0	0	657,275	657,275
REACT. WATER REC	0	0	0	0	0	0	642,669	642,669
SAC SHIELD Contaminated Matl	0	0	0	0	0	0	2,263,948	2,263,948
OTHER PRIMARY CONTAINMENT	0	0	0	0	0	0	25,823,618	25,823,618
CONTAINM. ATMOSPHERIC	0	0	0	0	0	0	350,547	350,547
HIGH PRESSURE CORE SPRAY	0	0	0	0	0	0	124,152	124,152
LOW PRESSURE CORE SPRAY	0	0	0	0	0	0	73,031	73,031
REACTOR BLDG CLOSED COOLING	0	0	0	0	0	0	233,698	233,698
REACTOR CORE ISO COOLING	0	0	0	0	0	0	94,940	94,940
RESIDUAL HEAT REMOVAL	0	0	0	0	0	0	452,790	452,790
POOL LINER & RACKS	0	0	0	0	0	0	2,782,466	2,782,466
CONTAMINATED CONCRETE	0	0	0	0	0	0	3,169,528	3,169,528
OTHER REACTOR BUILDING	0	0	0	0	0	0	10,363,041	10,363,041
TURBINE	0	0	0	0	0	0	21,737,789	21,737,789
NUCLEAR STEAM CONDENSATE	0	0	0	0	0	0	2,651,011	2,651,011
LOW PRESSURE FEEDWATER HEATERS	0	0	0	0	0	0	5,382,355	5,382,355
MAIN STEAM	0	0	0	0	0	0	518,517	518,517
MOISTURE SEPARATOR REHEATERS	0	0	0	0	0	0	5,221,687	5,221,687
REACTOR FEEDWATER PUMPS	0	0	0	0	0	0	2,999,382	2,999,382
HIGH PRESSURE FEEDWATER HEATERS	0	0	0	0	0	0	883,670	883,670
OTHER TG BLDG	0	0	0	0	0	0	35,470,959	35,470,959
RAD WASTE BLDG	0	0	0	0	0	0	17,563,858	17,563,858
REACTOR BLDG - CLASS A	0	0	0	0	0	0	1,510,638	1,510,638
REACTOR BLDG - CLASS B	3,285,317	0	160,000	0	304,563	328,532	0	4,078,411
TG BLDG - CLASS A	0	0	0	0	0	0	1,019,872	1,019,872
TG BLDG - CLASS B	2,217,404	0	105,000	0	205,563	221,740	0	2,749,707
RAD WASTE & CONTROL - CLASS A	0	0	0	0	0	0	880,311	880,311
RAD WASTE & CONTROL - CLASS B	1,913,345	0	95,000	0	177,375	191,335	0	2,377,055
CONCENTRATOR BOTTOMS - CLASS A	0	0	0	0	0	0	516,031	516,031
CONCENTRATOR BOTTOMS - CLASS B	5,226,561	0	130,000	520,000	11,440,000	640,480	0	17,957,041
OTHER	0	0	0	0	0	0	1,270,732	1,270,732
POST-TMI-2 ADDITIONS	0	0	0	0	0	0	262,910	262,910
SUBTOTAL BWR COSTS	**16,703,806**	**19,575,000**	**1,245,000**	**520,000**	**71,218,365**	**2,988,901**	**145,089,394**	**257,340,466**
OUT-OF-COMPACT TAXES & FEES (% OF CHARGES)								64,544,366
TOTAL BWR COSTS								**321,884,832**

[a] GTCC Material: Assumes a low-density, distributed packaging scheme and final disposal as LLW. High-density packaging, ISFSI storage, and geologic repository disposal could reduce disposal costs.

Table B-5 PWR Burial Costs at the Texas Site (2020 dollars)

REFERENCE PWR COMPONENT	BASE DISPOSAL CHARGE	IRRADIATED HARDWARE HANDLE SURCHARGE	CASK HANDLE SURCHARGE	WEIGHT SURCHARGE	CURIE CHARGE	DOSE RATE SURCHARGE	DISPOSAL COST
VESSEL WALL	380,000	2,850,000	0	0	7,668,000	1,520,000	12,418,000
VESSEL HEAD & BOTTOM	400,000	3,000,000	0	0	8,000	0	3,408,000
UPPER CORE SUPPORT ASSM	40,000	300,000	0	0	4,000	0	344,000
UPPER SUPPORT COLUMN	40,000	300,000	0	0	40,000	0	380,000
UPPER CORE BARREL	200,000	150,000	0	0	400,000	80,000	830,000
UPPER CORE GRID PLATE	500,000	375,000	0	0	1,100,000	200,000	2,175,000
GUIDE TUBES	60,000	450,000	0	0	40,000	0	550,000
LOWER CORE BARREL[(a)]	3,200,000	2,400,000	0	0	7,040,000	1,280,000	13,920,000
THERMAL SHIELDS[(a)]	600,000	450,000	0	0	1,320,000	240,000	2,610,000
CORE SHROUD[(a)]	400,000	300,000	0	0	13,420,000	160,000	14,280,000
LOWER GRID PLATE[(a)]	500,000	375,000	0	0	2,200,000	200,000	3,275,000
LOWER SUPPORT COLUMN	100,000	75,000	0	0	220,000	40,000	435,000
LOWER CORE FORGING	1,100,000	825,000	0	0	1,000,000	440,000	3,365,000
MISC INTERNALS	800,000	600,000	0	0	800,000	320,000	2,520,000
BIO SHIELD CONCRETE	2,496,000	0	0	0	800,000	0	3,296,000
REACTOR CAVITY LINER	51,200	0	0	0	4,000	0	55,200
REACTOR COOLANT PUMPS	420,000	0	0	240,000	31,064	0	691,064
PRESSURIZER	360,000	0	0	0	2,028	0	362,028
R.Hx,EHx,SUMP PUMP,CAVITY PUMP	40,000	0	0	0	4,716	0	44,716
PRESSURIZER RELIEF TANK	120,000	0	0	0	1,616	0	121,616
SAFETY INJECTION ACCUM TANKS	400,000	0	0	0	32,576	0	432,576
STEAM GENERATORS	2,136,200	0	0	640,000	1,760,000	0	4,536,200
REACTOR COOLANT PIPING	330,000	0	0	0	119,200	0	449,200
REMAINING CONTAM. MATLS	5,260,800	0	0	0	89,516	0	5,350,316
CONTAMINATED MATRL OTHR BLD	47,711,100	0	0	0	73,700	0	47,784,800
FILTER CARTRIDGES	315,000	0	0	0	1,320,000	0	1,635,000
SPENT RESINS	2,000,000	0	0	0	4,400,000	800,000	7,200,000
COMBUSTIBLE WASTES - CLASS A	697,500	0	0	0	93,000	0	790,500
COMBUSTIBLE WASTES - CLASS B	3,150,000	0	0	0	210,000	0	3,360,000
EVAPORATOR BOTTOMS	940,000	0	0	0	5,522,000	0	6,462,000
POST-TMI-2 ADDITIONS	1,555,608	0	0	0	0	0	1,555,608
SUBTOTAL PWR COSTS	**76,303,408**	**12,450,000**	**0**	**880,000**	**49,723,416**	**5,280,000**	**144,636,824**
OUT-OF-COMPACT TAXES & FEES (% OF CHARGES)							0
TOTAL PWR COSTS							**144,636,824**

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

Table B-6 BWR Burial Costs at the Texas Site (2020 dollars)

REFERENCE BWR COMPONENT	BASE DISPOSAL CHARGE	IRRADIATED HARDWARE HANDLE SURCHARGE	CASK HANDLE SURCHARGE	WEIGHT SURCHARGE	CURIE CHARGE	DOSE RATE SURCHARGE	DISPOSAL COST
STEAM SEPARATOR	353,146	1,050,000	0	0	3,081,200	4,625,604	4,625,604
FUEL SUPPORT & PIECES	176,573	525,000	0	0	280,074	1,052,276	1,052,276
CONTROL RODS/INCORES	529,719	600,000	0	0	1,776,800	3,118,407	3,118,407
CONTROL RODS GUIDES	14,126	450,000	0	0	40,012	504,138	504,138
JET PUMPS	494,404	1,500,000	0	0	4,405,152	6,597,318	6,597,318
TOP FUEL GUIDES	847,550	5,400,000	0	0	12,075,520	18,662,091	18,662,091
CORE SUPPORT PLATE	38,846	1,200,000	0	0	260,044	1,498,890	1,498,890
CORE SHROUD[(a)]	1,659,786	10,500,000	0	0	31,871,600	44,695,301	44,695,301
REACTOR VESSEL WALL	28,252	1,500,000	0	0	864,006	2,392,257	2,392,257
SAC SHIELD Neutron-Activated Matl	317,831	0	0	0	68,003	385,834	385,834
REACT. WATER REC	310,768	0	0	0	17,581	328,349	328,349
SAC SHIELD Contaminated Matl	1,094,753	0	0	0	61,932	1,156,684	1,156,684
OTHER PRIMARY CONTAINMENT	12,487,243	0	0	0	706,420	13,193,662	13,193,662
CONTAINM. ATMOSPHERIC	169,510	0	0	0	9,589	179,099	179,099
HIGH PRESSURE CORE SPRAY	60,035	0	0	0	3,396	63,431	63,431
LOW PRESSURE CORE SPRAY	35,315	0	0	0	1,998	37,312	37,312
REACTOR BLDG CLOSED COOLING	113,007	0	0	0	6,393	119,400	119,400
REACTOR CORE ISO COOLING	45,909	0	0	0	2,597	48,506	48,506
RESIDUAL HEAT REMOVAL	218,951	0	0	0	12,386	231,337	231,337
POOL LINER & RACKS	1,345,486	0	0	0	76,116	1,421,602	1,421,602
CONTAMINATED CONCRETE	1,532,654	0	0	0	86,704	1,619,358	1,619,358
OTHER REACTOR BUILDING	5,011,142	0	0	0	283,487	5,294,629	5,294,629
TURBINE	4,965,233	0	0	0	280,890	5,246,122	5,246,122
NUCLEAR STEAM CONDENSATE	1,281,920	0	0	0	72,520	1,354,440	1,354,440
LOW PRESSURE FEEDWATER HEATERS	2,602,686	0	0	0	147,237	2,749,923	2,749,923
MAIN STEAM	250,734	0	0	0	14,184	264,918	264,918
MOISTURE SEPARATOR REHEATERS	2,524,994	0	0	0	142,842	2,667,836	2,667,836
REACTOR FEEDWATER PUMPS	685,103	0	0	0	38,757	723,860	723,860
HIGH PRESSURE FEEDWATER HEATERS	427,307	0	0	0	24,173	451,480	451,480
OTHER TG BLDG	17,152,301	0	0	0	970,328	18,122,629	18,122,629
RAD WASTE BLDG	8,493,161	0	0	0	480,469	8,973,631	8,973,631
REACTOR BLDG - CLASS A	730,483	0	0	0	98,500	828,983	828,983
REACTOR BLDG - CLASS B	3,285,317	0	0	0	221,500	3,506,817	3,506,817
TG BLDG - CLASS A	493,168	0	0	0	66,500	559,668	559,668
TG BLDG - CLASS B	2,217,404	0	0	0	149,500	2,366,904	2,366,904
RAD WASTE & CONTROL - CLASS A	425,682	0	0	0	57,400	483,082	483,082
RAD WASTE & CONTROL - CLASS B	1,913,345	0	0	0	129,000	2,042,345	2,042,345
CONCENTRATOR BOTTOMS - CLASS A	1,737,478	0	0	0	580,800	2,318,278	2,318,278
CONCENTRATOR BOTTOMS - CLASS B	5,226,561	0	0	0	11,440,000	16,666,561	16,666,561
OTHER	614,474	0	0	0	131,600	746,074	746,074
POST-TMI-2 ADDITIONS	127,133	0	0	0	0	127,133	127,133
SUBTOTAL BWR COSTS	**82,039,489**	**22,725,000**	**0**	**0**	**71,037,210**	**177,426,170**	**177,426,170**
OUT-OF-COMPACT TAXES & FEES (% OF CHARGES)							0
TOTAL BWR COSTS							**177,426,170**

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

Table B-7 PWR Burial Costs at the Texas Site (2018 dollars)

REFERENCE PWR COMPONENT	BASE DISPOSAL CHARGE	IRRADIATED HARDWARE HANDLE SURCHARGE	CASK HANDLE SURCHARGE	WEIGHT SURCHARGE	CURIE CHARGE	DOSE RATE SURCHARGE	DISPOSAL COST
VESSEL WALL	684,000	2,850,000	95,000	380,000	8,360,000	1,140,000	13,509,000
VESSEL HEAD & BOTTOM	720,000	3,000,000	100,000	0	11,000	0	3,831,000
UPPER CORE SUPPORT ASSM	72,000	300,000	10,000	0	5,500	80,000	467,500
UPPER SUPPORT COLUMN	72,000	300,000	10,000	0	55,000	80,000	517,000
UPPER CORE BARREL	200,000	150,000	5,000	0	440,000	60,000	855,000
UPPER CORE GRID PLATE	500,000	375,000	12,500	0	1,100,000	150,000	2,137,500
GUIDE TUBES	108,000	450,000	15,000	0	55,000	60,000	688,000
LOWER CORE BARREL[(a)]	3,200,000	2,400,000	80,000	0	7,040,000	960,000	13,680,000
THERMAL SHIELDS[(a)]	600,000	450,000	15,000	0	1,320,000	180,000	2,565,000
CORE SHROUD[(a)]	400,000	300,000	10,000	0	13,420,000	120,000	14,250,000
LOWER GRID PLATE[(a)]	500,000	375,000	12,500	0	2,200,000	150,000	3,237,500
LOWER SUPPORT COLUMN	100,000	75,000	2,500	0	220,000	30,000	427,500
LOWER CORE FORGING	1,100,000	825,000	27,500	0	1,375,000	330,000	3,657,500
MISC INTERNALS	800,000	600,000	20,000	80,000	1,100,000	240,000	2,840,000
BIO SHIELD CONCRETE	2,496,000	0	0	490,000	1,100,000	0	4,086,000
REACTOR CAVITY LINER	51,200	0	0	0	5,500	0	56,700
REACTOR COOLANT PUMPS	420,000	0	0	240,000	42,713	0	702,713
PRESSURIZER	360,000	0	0	80,000	2,789	0	442,789
R.Hx,EHx,SUMP PUMP,CAVITY PUMP	40,000	0	0	0	6,485	0	46,485
PRESSURIZER RELIEF TANK	120,000	0	0	20,000	2,222	0	142,222
SAFETY INJECTION ACCUM TANKS	400,000	0	0	80,000	44,792	0	524,792
STEAM GENERATORS	2,136,200	0	0	640,000	2,420,000	0	5,196,200
REACTOR COOLANT PIPING	330,000	0	0	70,000	163,900	0	563,900
REMAINING CONTAM. MATLS	5,260,800	0	0	0	123,085	0	5,383,885
CONTAMINATED MATRL OTHR BLD	47,711,100	0	0	0	101,338	0	47,812,438
FILTER CARTRIDGES	315,000	0	15,000	0	1,320,000	31,500	1,681,500
SPENT RESINS	2,000,000	0	50,000	0	4,400,000	600,000	7,050,000
COMBUSTIBLE WASTES - CLASS A	697,500	0	0	0	127,875	0	825,375
COMBUSTIBLE WASTES - CLASS B	3,150,000	0	150,000	0	288,750	315,000	3,903,750
EVAPORATOR BOTTOMS	1,692,000	0	235,000	0	7,592,750	890,000	10,409,750
POST-TMI-2 ADDITIONS	1,555,608	0	0	0	0	0	1,555,608
SUBTOTAL PWR COSTS	**77,791,408**	**12,450,000**	**865,000**	**2,080,000**	**54,443,697**	**5,416,500**	**153,046,605**
OUT-OF-COMPACT TAXES & FEES (% OF CHARGES)							0
TOTAL PWR COSTS							**153,046,605**

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

Table B-8 BWR Burial Costs at the Texas Site (2018 dollars)

REFERENCE BWR COMPONENT	BASE DISPOSAL CHARGE	IRRADIATED HARDWARE HANDLE SURCHARGE	CASK HANDLE SURCHARGE	WEIGHT SURCHARGE	CURIE CHARGE	DOSE RATE SURCHARGE	DISPOSAL COST
STEAM SEPARATOR	353,146	1,050,000	70,000	0	3,083,000	141,258	4,697,404
FUEL SUPPORT & PIECES	176,573	525,000	35,000	0	385,185	52,972	1,174,730
CONTROL RODS/INCORES	529,719	600,000	20,000	0	1,802,000	211,888	3,163,607
CONTROL RODS GUIDES	25,427	450,000	30,000	0	55,030	28,252	588,708
JET PUMPS	494,404	1,500,000	100,000	0	4,412,880	197,762	6,705,046
TOP FUEL GUIDES	847,550	5,400,000	180,000	0	15,928,800	339,020	22,695,371
CORE SUPPORT PLATE	69,923	1,200,000	77,500	0	357,610	77,692	1,782,725
CORE SHROUD[(a)]	1,659,786	10,500,000	350,000	0	33,479,000	663,914	46,652,701
REACTOR VESSEL WALL	50,853	1,500,000	55,000	0	1,188,014	56,503	2,850,371
SAC SHIELD Neutron-Activated Matl	317,831	0	0	140,000	93,506	0	551,338
REACT. WATER REC	310,768	0	0	50,000	24,173	0	384,942
SAC SHIELD Contaminated Matl	1,094,753	0	0	380,000	85,156	0	1,559,909
OTHER PRIMARY CONTAINMENT	12,487,243	0	0	0	971,327	0	13,458,570
CONTAINM. ATMOSPHERIC	169,510	0	0	10,000	13,185	0	192,696
HIGH PRESSURE CORE SPRAY	60,035	0	0	20,000	4,670	0	84,705
LOW PRESSURE CORE SPRAY	35,315	0	0	10,000	2,747	0	48,062
REACTOR BLDG CLOSED COOLING	113,007	0	0	0	8,790	0	121,797
REACTOR CORE ISO COOLING	45,909	0	0	0	3,571	0	49,480
RESIDUAL HEAT REMOVAL	218,951	0	0	50,000	17,031	0	285,982
POOL LINER & RACKS	1,345,486	0	0	180,000	104,659	0	1,630,146
CONTAMINATED CONCRETE	1,532,654	0	0	280,000	119,218	0	1,931,872
OTHER REACTOR BUILDING	5,011,142	0	0	0	389,794	0	5,400,936
TURBINE	4,965,233	0	0	820,000	386,223	0	6,171,456
NUCLEAR STEAM CONDENSATE	1,281,920	0	0	130,000	99,715	0	1,511,635
LOW PRESSURE FEEDWATER HEATERS	2,602,686	0	0	420,000	202,451	0	3,225,137
MAIN STEAM	250,734	0	0	20,000	19,503	0	290,237
MOISTURE SEPARATOR REHEATERS	2,524,994	0	0	260,000	196,408	0	2,981,402
REACTOR FEEDWATER PUMPS	685,103	0	0	60,000	53,291	0	798,394
HIGH PRESSURE FEEDWATER HEATERS	427,307	0	0	80,000	33,238	0	540,545
OTHER TG BLDG	17,152,301	0	0	0	1,334,201	0	18,486,502
RAD WASTE BLDG	8,493,161	0	0	0	660,645	0	9,153,807
REACTOR BLDG - CLASS A	730,483	0	0	0	135,438	0	865,920
REACTOR BLDG - CLASS B	3,285,317	0	160,000	0	304,563	328,532	4,078,411
TG BLDG - CLASS A	493,168	0	0	0	91,438	0	584,606
TG BLDG - CLASS B	2,217,404	0	105,000	0	205,563	221,740	2,749,707
RAD WASTE & CONTROL - CLASS A	425,682	0	0	0	78,925	0	504,607
RAD WASTE & CONTROL - CLASS B	1,913,345	0	95,000	0	177,375	191,335	2,377,055
CONCENTRATOR BOTTOMS - CLASS A	3,127,461	0	432,500	1,730,000	798,600	2,129,164	8,217,725
CONCENTRATOR BOTTOMS - CLASS B	5,226,561	0	130,000	520,000	11,440,000	640,480	17,957,041
OTHER	1,106,053	0	152,500	610,000	180,950	191,394	2,240,897
POST-TMI-2 ADDITIONS	127,133	0	0	0	0	0	127,133
SUBTOTAL BWR COSTS	**83,986,029**	**22,725,000**	**1,992,500**	**5,770,000**	**78,927,875**	**5,471,906**	**198,873,311**
OUT-OF-COMPACT TAXES & FEES (% OF CHARGES)							0
TOTAL BWR COSTS							**198,873,311**

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

Table B-9 PWR Burial Costs at the South Carolina Site (2020 dollars)

REFERENCE PWR COMPONENT	BASE DISPOSAL CHARGE	CASK HANDLING	CURIE SURCHARGE	LINER DOSE RATE	DOSE RATE SURCHARGE	DISPOSAL COST
VESSEL WALL	4,935,650	3,528,110	9,439,200	0	2,369,112	20,272,073
VESSEL HEAD & BOTTOM	3,144,401	3,713,800	12,420	0	0	6,870,621
UPPER CORE SUPPORT ASSM	296,853	371,380	6,210	0	94,993	769,436
UPPER SUPPORT COLUMN	274,449	371,380	62,100	0	87,824	795,753
UPPER CORE BARREL	130,707	185,690	496,800	0	62,739	875,936
UPPER CORE GRID PLATE	326,768	464,225	1,242,000	0	156,848	2,189,841
GUIDE TUBES	483,616	557,070	62,100	0	130,576	1,233,362
LOWER CORE BARREL[(a)]	2,091,312	2,971,040	7,948,800	0	1,003,830	14,014,982
THERMAL SHIELDS[(a)]	392,121	557,070	1,490,400	0	188,218	2,627,809
CORE SHROUD[(a)]	303,574	371,380	15,152,400	0	145,716	15,973,070
LOWER GRID PLATE[(a)]	326,768	464,225	2,484,000	0	156,848	3,431,841
LOWER SUPPORT COLUMN	82,895	92,845	248,400	0	39,790	463,929
LOWER CORE FORGING	900,641	1,021,295	1,552,500	0	432,308	3,906,743
MISC INTERNALS	793,024	742,760	1,242,000	0	380,652	3,158,436
BIO SHIELD CONCRETE	19,329,960	0	1,242,000	0	0	20,571,960
REACTOR CAVITY LINER	358,464	0	6,210	0	0	364,674
REACTOR COOLANT PUMPS	6,240,096	0	48,227	0	0	6,288,323
PRESSURIZER	2,831,985	0	3,148	0	0	2,835,133
R.Hx,EHx,SUMP PUMP,CAVITY PUMP	261,414	0	7,322	0	0	268,736
PRESSURIZER RELIEF TANK	784,242	0	2,509	0	0	786,751
SAFETY INJECTION ACCUM TANKS	3,033,317	0	50,574	0	0	3,083,891
STEAM GENERATORS	22,836,096	0	2,732,400	0	0	25,568,496
REACTOR COOLANT PIPING	2,486,844	0	185,058	0	0	2,671,902
REMAINING CONTAM. MATLS	43,962,249	0	138,974	0	0	44,101,223
CONTAMINATED MATRL OTHR BLD	338,203,055	0	114,419	0	0	338,317,474
FILTER CARTRIDGES	448,092	557,070	1,490,400	0	53,771	2,549,333
SPENT RESINS	1,784,304	1,856,900	4,968,000	0	856,466	9,465,670
COMBUSTIBLE WASTES – CLASS A	4,558,407	0	144,383	0	0	4,702,789
COMBUSTIBLE WASTES – CLASS B	2,676,456	5,570,700	326,025	0	214,116	8,787,297
EVAPORATOR BOTTOMS	8,386,229	8,727,430	8,572,905	0	1,145,523	26,832,087
POST-TMI-2 ADDITIONS	15,490,124	0	0	0	0	15,490,124
SUBTOTAL PWR COSTS	**488,154,111**	**32,124,370**	**61,471,883**	**0**	**7,519,330**	**589,269,694**
ATLANTIC COMPACT COMMISSION ADMINISTRATIVE SURCHARGE						3,883,494
TOTAL PWR COSTS (INSIDE COMPACT)						**593,153,189**

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

Table B-10 BWR Burial Costs at the South Carolina Site (2020 dollars)

REFERENCE BWR COMPONENT	BASE DISPOSAL CHARGE	CASK HANDLING	CURIE SURCHARGE	LINER DOSE RATE	DOSE RATE SURCHARGE	DISPOSAL COST
STEAM SEPARATOR	304,168	2,599,660	3,477,600	0	146,001	6,527,429
FUEL SUPPORT & PIECES	133,853	1,299,830	434,700	0	64,250	1,932,633
CONTROL RODS/INCORES	432,927	742,760	1,987,200	0	207,805	3,370,693
CONTROL RODS GUIDES	112,062	1,114,140	62,100	0	41,463	1,329,765
JET PUMPS	323,111	3,713,800	4,968,000	0	155,093	9,160,004
TOP FUEL GUIDES	553,904	6,684,840	17,884,800	0	265,874	25,389,418
CORE SUPPORT PLATE	404,299	2,878,195	403,650	0	149,591	3,835,734
CORE SHROUD[(a)]	1,084,728	12,998,300	34,776,000	0	520,670	49,379,698
REACTOR VESSEL WALL	236,092	2,042,590	1,341,360	0	87,354	3,707,396
SAC SHIELD Neutron-Activated Matl	4,975,957	0	105,570	0	0	5,081,527
REACT. WATER REC	2,153,013	0	27,294	0	0	2,180,307
SAC SHIELD Contaminated Matl	12,886,264	0	96,149	0	0	12,982,413
OTHER PRIMARY CONTAINMENT	90,386,064	0	1,096,717	0	0	91,482,781
CONTAINM. ATMOSPHERIC	1,107,808	0	14,888	0	0	1,122,695
HIGH PRESSURE CORE SPRAY	608,415	0	5,273	0	0	613,688
LOW PRESSURE CORE SPRAY	248,444	0	3,102	0	0	251,545
REACTOR BLDG CLOSED COOLING	870,882	0	9,925	0	0	880,807
REACTOR CORE ISO COOLING	300,031	0	4,032	0	0	304,063
RESIDUAL HEAT REMOVAL	1,797,490	0	19,230	0	0	1,816,720
POOL LINER & RACKS	11,100,548	0	118,170	0	0	11,218,718
CONTAMINATED CONCRETE	12,241,898	0	134,608	0	0	12,376,506
OTHER REACTOR BUILDING	32,749,565	0	440,113	0	0	33,189,678
TURBINE	41,064,319	0	436,081	0	0	41,500,400
NUCLEAR STEAM CONDENSATE	8,377,796	0	112,587	0	0	8,490,383
LOW PRESSURE FEEDWATER HEATERS	18,225,783	0	228,586	0	0	18,454,369
MAIN STEAM	1,638,632	0	22,021	0	0	1,660,653
MOISTURE SEPARATOR REHEATERS	16,501,719	0	221,763	0	0	16,723,481
REACTOR FEEDWATER PUMPS	4,477,389	0	60,171	0	0	4,537,560
HIGH PRESSURE FEEDWATER HEATERS	3,211,661	0	37,529	0	0	3,249,190
OTHER TG BLDG	112,096,292	0	1,506,434	0	0	113,602,726
RAD WASTE BLDG	55,505,782	0	745,929	0	0	56,251,710
REACTOR BLDG – CLASS A	4,773,959	0	152,921	0	0	4,926,880
REACTOR BLDG – CLASS B	11,948,150	5,942,080	343,879	0	955,852	19,189,961
TG BLDG – CLASS A	3,223,028	0	103,241	0	0	3,326,269
TG BLDG – CLASS B	7,840,974	3,899,490	232,099	0	627,278	12,599,840
RAD WASTE & CONTROL – CLASS A	2,781,982	0	89,114	0	0	2,871,096
RAD WASTE & CONTROL – CLASS B	7,094,214	3,528,110	200,273	0	567,537	11,390,134
CONCENTRATOR BOTTOMS – CLASS A	24,401,031	16,062,185	901,692	0	4,299,095	45,664,003
CONCENTRATOR BOTTOMS – CLASS B	7,334,414	4,827,940	12,916,800	0	1,292,213	26,371,367
OTHER	8,603,832	5,663,545	204,309	0	214,391	14,686,076
POST-TMI-2 ADDITIONS	1,265,935	0	0	0	0	1,265,935
SUBTOTAL BWR COSTS	**515,378,415**	**73,997,465**	**85,925,907**	**0**	**9,594,466**	**684,896,253**
ATLANTIC COMPACT COMMISSION ADMINISTRATIVE SURCHARGE						4,020,364
TOTAL BWR COSTS (INSIDE COMPACT)						**688,916,617**

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

Table B-11 PWR Burial Costs at the South Carolina Site (2018 dollars)

REFERENCE PWR COMPONENT	BASE DISPOSAL CHARGE	CASK HANDLING	CURIE SURCHARGE	LINER DOSE RATE	DOSE RATE SURCHARGE	DISPOSAL COST
VESSEL WALL	4,858,921	3,528,110	9,304,034	0	2,332,282	20,023,34
VESSEL HEAD & BOTTOM	3,095,560	3,713,800	12,240	0	0	6,821,60
UPPER CORE SUPPORT ASSM	292,242	371,380	6,120	0	93,517	763,25
UPPER SUPPORT COLUMN	270,186	371,380	61,200	0	86,460	789,22
UPPER CORE BARREL	128,682	185,690	489,686	0	61,767	865,82
UPPER CORE GRID PLATE	321,705	464,225	1,224,215	0	154,418	2,164,56
GUIDE TUBES	476,123	557,070	61,200	0	128,553	1,222,94
LOWER CORE BARREL[(a)]	2,058,912	2,971,040	7,834,976	0	988,278	13,853,20
THERMAL SHIELDS[(a)]	386,046	557,070	1,469,058	0	185,302	2,597,47
CORE SHROUD[(a)]	298,859	371,380	14,935,423	0	143,452	15,749,11
LOWER GRID PLATE[(a)]	321,705	464,225	2,448,430	0	154,418	3,388,77
LOWER SUPPORT COLUMN	81,607	92,845	244,843	0	39,171	458,46
LOWER CORE FORGING	886,651	1,021,295	1,530,000	0	425,593	3,863,53
MISC INTERNALS	718,880	742,760	1,224,000	0	345,062	3,030,70
BIO SHIELD CONCRETE	17,522,700	0	1,224,000	0	0	18,746,70
REACTOR CAVITY LINER	352,896	0	6,120	0	0	359,01
REACTOR COOLANT PUMPS	6,143,088	0	47,528	0	0	6,190,61
PRESSURIZER	2,788,110	0	3,103	0	0	2,791,21
R.Hx,EHx,SUMP PUMP,CAVITY PUMP	257,364	0	7,215	0	0	264,57
PRESSURIZER RELIEF TANK	772,092	0	2,472	0	0	774,56
SAFETY INJECTION ACCUM TANKS	2,749,716	0	49,841	0	0	2,799,55
STEAM GENERATORS	22,481,088	0	2,692,800	0	0	25,173,88
REACTOR COOLANT PIPING	2,448,216	0	182,376	0	0	2,630,59
REMAINING CONTAM. MATLS	43,279,386	0	136,959	0	0	43,416,34
CONTAMINATED MATRL OTHR BLD	332,949,767	0	112,761	0	0	333,062,52
FILTER CARTRIDGES	441,126	557,070	1,469,058	0	52,935	2,520,18
SPENT RESINS	1,617,480	1,856,900	4,896,860	0	776,390	9,147,63
COMBUSTIBLE WASTES – CLASS A	4,487,785	0	142,290	0	0	4,630,07
COMBUSTIBLE WASTES – CLASS B	2,426,220	5,570,700	321,300	0	194,098	8,512,31
EVAPORATOR BOTTOMS	7,602,156	8,727,430	8,448,660	0	1,038,422	25,816,66
POST-TMI-2 ADDITIONS	15,249,315	0	0	0	0	15,249,31
SUBTOTAL PWR COSTS	**477,764,584**	**32,124,370**	**60,588,769**	**0**	**7,200,120**	**577,677,84**
ATLANTIC COMPACT COMMISSION ADMINISTRATIVE SURCHARGE						3,883,49
TOTAL PWR COSTS (INSIDE COMPACT)						**540,772,39**

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

Table B-12 BWR Burial Costs at the South Carolina Site (2018 dollars)

REFERENCE BWR COMPONENT	BASE DISPOSAL CHARGE	CASK HANDLING	CURIE SURCHARGE	LINER DOSE RATE	DOSE RATE SURCHARGE	DISPOSAL COST
STEAM SEPARATOR	299,456	2,599,660	3,427,802	0	143,739	6,470,657
FUEL SUPPORT & PIECES	131,774	1,299,830	428,400	0	63,252	1,923,256
CONTROL RODS/INCORES	392,451	742,760	1,958,744	0	188,376	3,282,331
CONTROL RODS GUIDES	110,326	1,114,140	61,200	0	40,821	1,326,487
JET PUMPS	318,105	3,713,800	4,896,860	0	152,690	9,081,455
TOP FUEL GUIDES	545,322	6,684,840	17,628,696	0	261,755	25,120,613
CORE SUPPORT PLATE	366,499	2,878,195	397,800	0	135,605	3,778,098
CORE SHROUD[(a)]	1,067,923	12,998,300	34,278,020	0	512,603	48,856,846
REACTOR VESSEL WALL	232,425	2,042,590	1,321,920	0	85,997	3,682,932
SAC SHIELD Neutron-Activated Matl	4,898,601	0	104,040	0	0	5,002,641
REACT. WATER REC	2,119,571	0	26,898	0	0	2,146,469
SAC SHIELD Contaminated Matl	12,685,936	0	94,755	0	0	12,780,691
OTHER PRIMARY CONTAINMENT	88,985,743	0	1,080,822	0	0	90,066,565
CONTAINM. ATMOSPHERIC	1,090,645	0	14,672	0	0	1,105,317
HIGH PRESSURE CORE SPRAY	551,531	0	5,196	0	0	556,727
LOW PRESSURE CORE SPRAY	244,585	0	3,057	0	0	247,641
REACTOR BLDG CLOSED COOLING	857,390	0	9,781	0	0	867,171
REACTOR CORE ISO COOLING	295,383	0	3,974	0	0	299,357
RESIDUAL HEAT REMOVAL	1,629,433	0	18,951	0	0	1,648,384
POOL LINER & RACKS	10,928,571	0	116,457	0	0	11,045,029
CONTAMINATED CONCRETE	12,051,745	0	132,657	0	0	12,184,403
OTHER REACTOR BUILDING	32,242,187	0	433,735	0	0	32,675,922
TURBINE	40,426,469	0	429,761	0	0	40,856,230
NUCLEAR STEAM CONDENSATE	8,248,001	0	110,955	0	0	8,358,957
LOW PRESSURE FEEDWATER HEATERS	17,942,683	0	225,273	0	0	18,167,956
MAIN STEAM	1,613,245	0	21,702	0	0	1,634,947
MOISTURE SEPARATOR REHEATERS	16,246,063	0	218,549	0	0	16,464,612
REACTOR FEEDWATER PUMPS	4,408,023	0	59,298	0	0	4,467,321
HIGH PRESSURE FEEDWATER HEATERS	2,911,386	0	36,985	0	0	2,948,371
OTHER TG BLDG	110,359,621	0	1,484,602	0	0	111,844,223
RAD WASTE BLDG	54,645,849	0	735,118	0	0	55,380,967
REACTOR BLDG – CLASS A	4,699,997	0	150,705	0	0	4,850,702
REACTOR BLDG – CLASS B	11,762,405	5,942,080	338,895	0	940,992	18,984,373
TG BLDG – CLASS A	3,173,095	0	101,745	0	0	3,274,840
TG BLDG – CLASS B	7,719,078	3,899,490	228,735	0	617,526	12,464,830
RAD WASTE & CONTROL – CLASS A	2,738,882	0	87,822	0	0	2,826,704
RAD WASTE & CONTROL – CLASS B	6,983,928	3,528,110	197,370	0	558,714	11,268,122
CONCENTRATOR BOTTOMS – CLASS A	24,021,694	16,062,185	888,624	0	4,232,262	45,204,765
CONCENTRATOR BOTTOMS – CLASS B	7,220,394	4,827,940	12,731,836	0	1,272,125	26,052,295
OTHER	8,470,077	5,663,545	201,348	0	211,058	14,546,028
POST-TMI-2 ADDITIONS	1,246,255	0	0	0	0	1,246,255
SUBTOTAL BWR COSTS	**506,882,748**	**73,997,465**	**84,693,762**	**0**	**9,417,514**	**674,991,489**
ATLANTIC COMPACT COMMISSION ADMINISTRATIVE SURCHARGE						4,020,364
TOTAL BWR COSTS (INSIDE COMPACT)						**631,408,538**

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

Table B-13 PWR Burial Costs at the Washington Site (2020 dollars)

REFERENCE PWR COMPONENT	VOLUME CHARGE	SHIPMENT CHARGE	CONTAINER CHARGE	CONTAINER DOSE RATE CHARGE	DISPOSAL COST
VESSEL WALL	500,576	402,577	329,978	911,914	2,145,045
VESSEL HEAD & BOTTOM	526,922	423,766	347,345	2,492	1,300,525
UPPER CORE SUPPORT ASSM	52,692	42,377	34,735	70,846	200,650
UPPER SUPPORT COLUMN	52,692	42,377	34,735	70,846	200,650
UPPER CORE BARREL	26,346	21,188	17,367	53,033	117,935
UPPER CORE GRID PLATE	65,865	52,971	43,418	132,584	294,838
GUIDE TUBES	79,038	63,565	52,102	106,270	300,975
LOWER CORE BARREL[(a)]	421,538	339,012	277,876	848,534	1,886,961
THERMAL SHIELDS[(a)]	79,038	63,565	52,102	159,100	353,805
CORE SHROUD[(a)]	52,692	42,377	34,735	106,067	235,870
LOWER GRID PLATE[(a)]	65,865	52,971	43,418	132,584	294,838
LOWER SUPPORT COLUMN	13,173	10,594	8,684	26,517	58,968
LOWER CORE FORGING	144,904	116,536	95,520	291,684	648,643
MISC INTERNALS	105,384	84,753	69,469	212,134	471,740
BIO SHIELD CONCRETE	3,287,993	519,113	1,693,308	12,150	5,512,564
REACTOR CAVITY LINER	67,446	10,594	34,735	249	113,024
REACTOR COOLANT PUMPS	553,268	127,130	69,469	498	750,365
PRESSURIZER	474,230	84,753	69,469	498	628,950
R.Hx,EHx,SUMP PUMP,CAVITY PUMP	52,692	10,594	26,051	187	89,524
PRESSURIZER RELIEF TANK	158,077	21,188	17,367	125	196,757
SAFETY INJECTION ACCUM TANKS	526,922	84,753	69,469	498	681,643
STEAM GENERATORS	2,814,027	339,012	277,876	1,994	3,432,909
REACTOR COOLANT PIPING	434,711	74,159	60,785	436	570,091
REMAINING CONTAM. MATLS	6,930,078	1,070,008	3,568,972	25,608	11,594,666
CONTAMINATED MATRL OTHR BLD	62,850,071	8,432,935	32,207,584	231,097	103,721,686
FILTER CARTRIDGES	41,495	63,565	364,712	743,888	1,213,660
SPENT RESINS	263,461	211,883	173,673	530,334	1,179,350
COMBUSTIBLE WASTES – CLASS A	918,820	317,824	8,075,776	57,946	9,370,366
COMBUSTIBLE WASTES – CLASS B	414,951	317,824	3,647,125	911,914	5,291,814
EVAPORATOR BOTTOMS	1,238,267	995,849	816,261	911,914	3,962,291
POST-TMI-2 ADDITIONS	2,049,210	105,941	1,050,719	7,539	3,213,410
HEAVY OBJECT SURCHARGE					216,677
SITE AVAILABILITY CHARGES					755,595
OPERATING MARGIN					7,642,093
SUBTOTAL PWR COSTS	**85,262,445**	**14,545,754**	**53,664,833**	**6,561,479**	**168,648,877**
TAXES & FEES (% OF CHARGES)					7,251,902
TAXES & FEES ($/UNIT VOL.)					22,099,781
ANNUAL PERMIT FEES (3 YRS)					212,000
TOTAL PWR COSTS					**198,212,559**

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

Table B-14 BWR Burial Costs at the Washington Site (2020 dollars)

REFERENCE BWR COMPONENT	VOLUME CHARGE	SHIPMENT CHARGE	CONTAINER CHARGE	CONTAINER DOSE RATE CHARGE	DISPOSAL COST
STEAM SEPARATOR	46,520	148,318	243,142	911,914	1,349,893
FUEL SUPPORT & PIECES	23,260	74,159	121,571	371,234	590,224
CONTROL RODS/INCORES	69,780	84,753	69,469	911,914	1,135,916
CONTROL RODS GUIDES	18,608	63,565	104,204	318,200	504,577
JET PUMPS	65,128	211,883	347,345	911,914	1,536,270
TOP FUEL GUIDES	111,648	762,778	625,221	911,914	2,411,561
CORE SUPPORT PLATE	51,172	169,506	269,193	822,018	1,311,889
CORE SHROUD[(a)]	218,644	1,483,180	1,215,708	911,914	3,829,446
REACTOR VESSEL WALL	37,216	211,883	191,040	583,367	1,023,506
SAC SHIELD NEUTRON-ACTIVATED MATL	418,681	148,318	121,571	872	689,442
REACT. WATER REC	409,377	52,971	52,102	374	514,823
SAC SHIELD CONTAMINATED MATERIAL	1,442,123	402,577	329,978	2,368	2,177,046
OTHER PRIMARY CONTAINMENT	16,449,507	1,801,004	8,423,121	60,438	26,734,070
CONTAINM. ATMOSPHERIC	223,296	10,594	17,367	125	251,382
HIGH PRESSURE CORE SPRAY	79,084	21,188	17,367	125	117,764
LOW PRESSURE CORE SPRAY	46,520	10,594	8,684	62	65,860
REACTOR BLDG CLOSED COOLING	148,864	21,188	52,102	374	222,528
REACTOR CORE ISO COOLING	60,476	10,594	26,051	187	97,308
RESIDUAL HEAT REMOVAL	288,425	52,971	60,785	436	402,617
POOL LINER & RACKS	1,772,416	190,695	321,294	2,305	2,286,710
CONTAMINATED CONCRETE	2,018,972	296,636	937,832	6,729	3,260,169
OTHER REACTOR BUILDING	6,601,202	487,330	3,386,616	24,300	10,499,448
TURBINE	6,540,726	868,719	2,414,049	17,321	9,840,816
NUCLEAR STEAM CONDENSATE	1,688,680	137,724	382,080	2,742	2,211,225
LOW PRESSURE FEEDWATER HEATERS	3,428,531	444,954	382,080	2,742	4,258,306
MAIN STEAM	330,293	21,188	26,051	187	377,719
MOISTURE SEPARATOR REHEATERS	3,326,187	275,448	225,774	1,620	3,829,029
REACTOR FEEDWATER PUMPS	902,490	63,565	173,673	1,246	1,140,974
HIGH PRESSURE FEEDWATER HEATERS	562,893	84,753	69,469	498	717,614
OTHER TG BLDG	22,594,812	2,521,405	11,149,781	80,002	36,346,001
RAD WASTE BLDG	11,188,084	762,778	5,574,890	40,001	17,565,753
REACTOR BLDG – CLASS A	962,268	63,565	8,553,376	61,372	9,640,581
REACTOR BLDG – CLASS B	432,776	339,012	3,846,848	911,914	5,530,551
TG BLDG – CLASS A	649,653	42,377	5,774,614	41,434	6,508,078
TG BLDG – CLASS B	292,100	222,477	2,596,405	911,914	4,022,896
RAD WASTE & CONTROL – CLASS A	560,753	42,377	4,984,404	35,764	5,623,298
RAD WASTE & CONTROL – CLASS B	252,046	201,289	2,240,377	911,914	3,605,625
CONCENTRATOR BOTTOMS – CLASS A	2,288,789	1,832,786	1,502,268	766,403	6,390,246
CONCENTRATOR BOTTOMS – CLASS B	688,497	550,895	451,549	911,914	2,602,855
OTHER	809,450	646,243	529,701	3,801	1,989,194
POST-TMI-2 ADDITIONS	167,472	10,594	121,571	872	300,510
HEAVY OBJECT SURCHARGE					313,716
SITE AVAILABILITY CHARGES					755,595
OPERATING MARGIN					7,642,093
SUBTOTAL BWR COSTS	**88,267,422**	**15,848,833**	**67,940,721**	**11,456,742**	**192,225,123**
TAXES & FEES (% OF CHARGES)					8,265,680
TAXES & FEES ($/UNIT VOL.)					22,949,577
ANNUAL PERMIT FEES (3 YRS)					212,000
TOTAL BWR COSTS					**223,652,380**

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

Table B-15 PWR Burial Costs at the Washington Site (2018 dollars)

REFERENCE PWR COMPONENT	VOLUME CHARGE	SHIPMENT CHARGE	CONTAINER CHARGE	CONTAINER DOSE RATE CHARGE	DISPOSAL COST
VESSEL WALL	462,688	556,700	392,160	643,720	2,055,268
VESSEL HEAD & BOTTOM	487,040	586,000	412,800	1,600	1,487,440
UPPER CORE SUPPORT ASSM	48,704	58,600	41,280	45,240	193,824
UPPER SUPPORT COLUMN	48,704	58,600	41,280	45,240	193,824
UPPER CORE BARREL	24,352	29,300	20,640	33,880	108,172
UPPER CORE GRID PLATE	60,880	73,250	51,600	84,700	270,430
GUIDE TUBES	73,056	87,900	61,920	67,860	290,736
LOWER CORE BARREL[(a)]	389,632	468,800	330,240	542,080	1,730,752
THERMAL SHIELDS[(a)]	73,056	87,900	61,920	101,640	324,516
CORE SHROUD[(a)]	48,704	58,600	41,280	67,760	216,344
LOWER GRID PLATE[(a)]	60,880	73,250	51,600	84,700	270,430
LOWER SUPPORT COLUMN	12,176	14,650	10,320	16,940	54,086
LOWER CORE FORGING	133,936	161,150	113,520	186,340	594,946
MISC INTERNALS	97,408	117,200	82,560	135,520	432,688
BIO SHIELD CONCRETE	3,039,130	717,850	2,012,400	7,800	5,777,180
REACTOR CAVITY LINER	62,341	14,650	41,280	160	118,431
REACTOR COOLANT PUMPS	511,392	175,800	82,560	320	770,072
PRESSURIZER	438,336	117,200	82,560	320	638,416
R.Hx,EHx,SUMP PUMP,CAVITY PUMP	48,704	14,650	30,960	120	94,434
PRESSURIZER RELIEF TANK	146,112	29,300	20,640	80	196,132
SAFETY INJECTION ACCUM TANKS	487,040	117,200	82,560	320	687,120
STEAM GENERATORS	2,601,037	468,800	330,240	1,280	3,401,357
REACTOR COOLANT PIPING	401,808	102,550	72,240	280	576,878
REMAINING CONTAM. MATLS	6,405,550	1,479,650	4,241,520	16,440	12,143,160
CONTAMINATED MATRL OTHR BLD	58,093,035	11,661,400	38,276,880	148,360	108,179,675
FILTER CARTRIDGES	38,354	87,900	433,440	313,281	872,976
SPENT RESINS	243,520	293,000	206,400	0	742,920
COMBUSTIBLE WASTES – CLASS A	849,276	439,500	9,597,600	0	10,886,376
COMBUSTIBLE WASTES – CLASS B	383,544	439,500	4,334,400	0	5,157,444
EVAPORATOR BOTTOMS	1,144,544	1,377,100	970,080	0	3,491,724
POST-TMI-2 ADDITIONS	1,894,108	146,500	1,248,720	0	3,289,328
HEAVY OBJECT SURCHARGE					204,239
SITE AVAILABILITY CHARGES					435,756
SUBTOTAL PWR COSTS	**78,809,048**	**20,114,450**	**63,777,600**	**2,545,981**	**165,887,074**
TAXES & FEES (% OF CHARGES)					7,133,144
TAXES & FEES ($/UNIT VOL.)					22,099,781
ANNUAL PERMIT FEES (3 YRS)					127,200
TOTAL PWR COSTS					**195,247,200**

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

Table B-16 BWR Burial Costs at the Washington Site (2018 dollars)

REFERENCE BWR COMPONENT	VOLUME CHARGE	SHIPMENT CHARGE	CONTAINER CHARGE	CONTAINER DOSE RATE CHARGE	DISPOSAL COST
STEAM SEPARATOR	42,999	205,100	288,960	848,660	1,385,720
FUEL SUPPORT & PIECES	21,500	102,550	144,480	237,160	505,690
CONTROL RODS/INCORES	64,499	117,200	82,560	848,660	1,112,919
CONTROL RODS GUIDES	17,200	87,900	123,840	203,280	432,220
JET PUMPS	60,199	293,000	412,800	408,220	1,174,219
TOP FUEL GUIDES	103,198	1,054,800	743,040	0	1,901,038
CORE SUPPORT PLATE	47,299	234,400	319,920	0	601,619
CORE SHROUD[(a)]	202,096	2,051,000	1,444,800	0	3,697,896
REACTOR VESSEL WALL	34,399	293,000	227,040	0	554,439
SAC SHIELD NEUTRON-ACTIVATED MATL	386,992	205,100	144,480	0	736,572
REACT. WATER REC	378,392	73,250	61,920	0	513,562
SAC SHIELD CONTAMINATED MATERIAL	1,332,971	556,700	392,160	0	2,281,831
OTHER PRIMARY CONTAINMENT	15,204,467	2,490,500	10,010,400	0	27,705,367
CONTAINM. ATMOSPHERIC	206,395	14,650	20,640	0	241,685
HIGH PRESSURE CORE SPRAY	73,098	29,300	20,640	0	123,038
LOW PRESSURE CORE SPRAY	42,999	14,650	10,320	0	67,969
REACTOR BLDG CLOSED COOLING	137,597	29,300	61,920	0	228,817
REACTOR CORE ISO COOLING	55,899	14,650	30,960	0	101,509
RESIDUAL HEAT REMOVAL	266,594	73,250	72,240	0	412,084
POOL LINER & RACKS	1,638,264	263,700	381,840	0	2,283,804
CONTAMINATED CONCRETE	1,866,159	410,200	1,114,560	0	3,390,919
OTHER REACTOR BUILDING	6,101,566	673,900	4,024,800	0	10,800,266
TURBINE	6,045,667	1,201,300	2,868,960	0	10,115,927
NUCLEAR STEAM CONDENSATE	1,560,866	190,450	454,080	0	2,205,396
LOW PRESSURE FEEDWATER HEATERS	3,169,030	615,300	454,080	0	4,238,410
MAIN STEAM	305,293	29,300	30,960	0	365,553
MOISTURE SEPARATOR REHEATERS	3,074,433	380,900	268,320	0	3,723,653
REACTOR FEEDWATER PUMPS	834,182	87,900	206,400	0	1,128,482
HIGH PRESSURE FEEDWATER HEATERS	520,289	117,200	82,560	0	720,049
OTHER TG BLDG	20,884,642	3,486,700	13,250,880	0	37,622,222
RAD WASTE BLDG	10,341,273	1,054,800	6,625,440	0	18,021,513
REACTOR BLDG – CLASS A	889,435	87,900	10,165,200	0	11,142,535
REACTOR BLDG – CLASS B	400,020	468,800	4,571,760	0	5,440,580
TG BLDG – CLASS A	600,482	58,600	6,862,800	0	7,521,882
TG BLDG – CLASS B	269,991	307,650	3,085,680	0	3,663,321
RAD WASTE & CONTROL – CLASS A	518,311	58,600	5,923,680	0	6,500,591
RAD WASTE & CONTROL – CLASS B	232,969	278,350	2,662,560	0	3,173,879
CONCENTRATOR BOTTOMS – CLASS A	2,115,554	2,534,450	1,785,360	0	6,435,364
CONCENTRATOR BOTTOMS – CLASS B	636,386	761,800	536,640	0	1,934,826
OTHER	748,184	893,650	629,520	0	2,271,354
POST-TMI-2 ADDITIONS	154,797	14,650	144,480	0	313,927
HEAVY OBJECT SURCHARGE					295,707
SITE AVAILABILITY CHARGES					435,756
SUBTOTAL BWR COSTS	**81,586,583**	**21,916,400**	**80,743,680**	**2,545,981**	**187,524,107**
TAXES & FEES (% OF CHARGES)					8,063,537
TAXES & FEES ($/UNIT VOL.)					22,949,577
ANNUAL PERMIT FEES (3 YRS)					127,200
TOTAL BWR COSTS					**218,664,421**

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

Table B-17 PWR LLW Disposition Costs Using a Combination of Non-Compact Facility and the Texas Disposal Facility (2020 dollars)

REFERENCE PWR COMPONENT	BASE DISPOSAL CHARGE	IRRADIATED HARDWARE HANDLE SURCHARGE	CASK HANDLE SURCHARGE	WEIGHT SURCHARGE	CURIE CHARGE	DOSE RATE SURCHARGE	VENDOR CHARGES	DISPOSAL COST
VESSEL WALL	0	0	0	0	0	0	785,840	785,840
VESSEL HEAD & BOTTOM	0	0	0	0	0	0	1,751,200	1,751,200
UPPER CORE SUPPORT ASSM	0	0	0	0	0	0	82,720	82,720
UPPER SUPPORT COLUMN	0	0	0	0	0	0	82,720	82,720
UPPER CORE BARREL	200,000	150,000	0	0	400,000	80,000	0	830,000
UPPER CORE GRID PLATE	500,000	375,000	0	0	1,100,000	200,000	0	2,175,000
GUIDE TUBES	0	0	0	0	0	0	124,080	124,080
LOWER CORE BARREL[(a)]	3,200,000	2,400,000	0	0	7,040,000	1,280,000	0	13,920,000
THERMAL SHIELDS[(a)]	600,000	450,000	0	0	1,320,000	240,000	0	2,610,000
CORE SHROUD[(a)]	400,000	300,000	0	0	13,420,000	160,000	0	14,280,000
LOWER GRID PLATE[(a)]	500,000	375,000	0	0	2,200,000	200,000	0	3,275,000
LOWER SUPPORT COLUMN	100,000	75,000	0	0	220,000	40,000	0	435,000
LOWER CORE FORGING	1,100,000	825,000	0	0	1,000,000	440,000	0	3,365,000
MISC INTERNALS	800,000	600,000	0	0	800,000	320,000	0	2,520,000
BIO SHIELD CONCRETE	0	0	0	0	0	0	5,161,728	5,161,728
REACTOR CAVITY LINER	0	0	0	0	0	0	105,882	105,882
REACTOR COOLANT PUMPS	0	0	0	0	0	0	1,838,760	1,838,760
PRESSURIZER	0	0	0	0	0	0	1,576,080	1,576,080
R.Hx,EHx,SUMP PUMP,CAVITY PUMP	0	0	0	0	0	0	82,720	82,720
PRESSURIZER RELIEF TANK	0	0	0	0	0	0	248,160	248,160
SAFETY INJECTION ACCUM TANKS	0	0	0	0	0	0	827,200	827,200
STEAM GENERATORS	0	0	0	0	0	0	9,352,284	9,352,284
REACTOR COOLANT PIPING	0	0	0	0	0	0	682,440	682,440
REMAINING CONTAM. MATLS	0	0	0	0	0	0	10,879,334	10,879,334
CONTAMINATED MATRL OTHR BLD	0	0	0	0	0	0	98,666,555	98,666,555
FILTER CARTRIDGES	315,000	0	0	0	1,320,000	0	0	1,635,000
SPENT RESINS	2,000,000	0	0	0	4,400,000	800,000	0	7,200,000
COMBUSTIBLE WASTES – CLASS A	0	0	0	0	0	0	5,010,143	5,010,143
COMBUSTIBLE WASTES – CLASS B	3,150,000	0	0	0	210,000	0	0	3,360,000
EVAPORATOR BOTTOMS	0	0	0	0	0	0	2,088,546	2,088,546
POST-TMI-2 ADDITIONS	0	0	0	0	0	0	3,216,998	3,216,998
TOTAL PWR COSTS	**12,865,000**	**5,550,000**	**0**	**0**	**33,430,000**	**3,760,000**	**142,563,388**	**198,168,388**

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

Table B-18 BWR LLW Disposition Costs Using a Combination of Non-Compact Disposal Facility and the Texas Disposal Facility (2020 dollars)

REFERENCE BWR COMPONENT	BASE DISPOSAL CHARGE	IRRADIATED HARDWARE HANDLE SURCHARGE	CASK HANDLE SURCHARGE	WEIGHT SURCHARGE	CURIE CHARGE	DOSE RATE SURCHARGE	VENDOR CHARGES	DISPOSAL COST
STEAM SEPARATOR	353,146	1,050,000	0	0	3,081,200	141,258	0	4,625,604
FUEL SUPPORT & PIECES	176,573	525,000	0	0	280,074	70,629	0	1,052,276
CONTROL RODS/INCORES	529,719	600,000	0	0	1,776,800	211,888	0	3,118,407
CONTROL RODS GUIDES	0	0	0	0	0	0	29,212	29,212
JET PUMPS	494,404	1,500,000	0	0	4,405,152	197,762	0	6,597,318
TOP FUEL GUIDES	847,550	5,400,000	0	0	12,075,520	339,020	0	18,662,091
CORE SUPPORT PLATE	0	0	0	0	0	0	80,334	80,334
CORE SHROUD[a]	1,659,786	10,500,000	0	0	31,871,600	663,914	0	44,695,301
REACTOR VESSEL WALL	0	0	0	0	0	0	58,424	58,424
SAC SHIELD Neutron-Activated Matl	0	0	0	0	0	0	657,275	657,275
REACT. WATER REC	0	0	0	0	0	0	642,669	642,669
SAC SHIELD Contaminated Matl	0	0	0	0	0	0	2,263,948	2,263,948
OTHER PRIMARY CONTAINMENT	0	0	0	0	0	0	25,823,618	25,823,618
CONTAINM. ATMOSPHERIC	0	0	0	0	0	0	350,547	350,547
HIGH PRESSURE CORE SPRAY	0	0	0	0	0	0	124,152	124,152
LOW PRESSURE CORE SPRAY	0	0	0	0	0	0	73,031	73,031
REACTOR BLDG CLOSED COOLING	0	0	0	0	0	0	233,698	233,698
REACTOR CORE ISO COOLING	0	0	0	0	0	0	94,940	94,940
RESIDUAL HEAT REMOVAL	0	0	0	0	0	0	452,790	452,790
POOL LINER & RACKS	0	0	0	0	0	0	2,782,466	2,782,466
CONTAMINATED CONCRETE	0	0	0	0	0	0	3,169,528	3,169,528
OTHER REACTOR BUILDING	0	0	0	0	0	0	10,363,041	10,363,041
TURBINE	0	0	0	0	0	0	21,737,789	21,737,789
NUCLEAR STEAM CONDENSATE	0	0	0	0	0	0	2,651,011	2,651,011
LOW PRESSURE FEEDWATER HEATERS	0	0	0	0	0	0	5,382,355	5,382,355
MAIN STEAM	0	0	0	0	0	0	518,517	518,517
MOISTURE SEPARATOR REHEATERS	0	0	0	0	0	0	5,221,687	5,221,687
REACTOR FEEDWATER PUMPS	0	0	0	0	0	0	2,999,382	2,999,382
HIGH PRESSURE FEEDWATER HEATERS	0	0	0	0	0	0	883,670	883,670
OTHER TG BLDG	0	0	0	0	0	0	35,470,959	35,470,959
RAD WASTE BLDG	0	0	0	0	0	0	17,563,858	17,563,858
REACTOR BLDG – CLASS A	0	0	0	0	0	0	1,510,638	1,510,638
REACTOR BLDG – CLASS B	3,285,317	0	0	0	221,500	0	0	3,506,817
TG BLDG – CLASS A	0	0	0	0	0	0	1,019,872	1,019,872
TG BLDG – CLASS B	2,217,404	0	0	0	149,500	0	0	2,366,904
RAD WASTE & CONTROL – CLASS A	0	0	0	0	0	0	880,311	880,311
RAD WASTE & CONTROL – CLASS B	1,913,345	0	0	0	129,000	0	0	2,042,345
CONCENTRATOR BOTTOMS – CLASS A	0	0	0	0	0	0	516,031	516,031
CONCENTRATOR BOTTOMS – CLASS B	5,226,561	0	0	0	11,440,000	0	0	16,666,561
OTHER	0	0	0	0	0	0	1,270,732	1,270,732
POST-TMI-2 ADDITIONS	0	0	0	0	0	0	262,910	262,910
TOTAL BWR COSTS	**16,703,806**	**19,575,000**	**0**	**0**	**65,430,346**	**1,624,472**	**145,089,394**	**248,423,017**

[a] GTCC Material: Assumes a low-density, distributed packaging scheme and final disposal as LLW. High-density packaging, ISFSI storage, and geologic repository disposal could reduce disposal costs.

Table B-19 PWR LLW Disposition Costs Using a Combination of Non-Compact Facility and the South Carolina Disposal Facility (2020 dollars)

REFERENCE PWR COMPONENT	BASE DISPOSAL CHARGE	CASK HANDLING	CURIE SURCHARGE	LINER DOSE RATE	DOSE RATE SURCHARGE	VENDOR CHARGES	DISPOSAL COST
VESSEL WALL	0	0	0	0	0	785,840	785,840
VESSEL HEAD & BOTTOM	0	0	0	0	0	1,751,200	1,751,200
UPPER CORE SUPPORT ASSM	0	0	0	0	0	82,720	82,720
UPPER SUPPORT COLUMN	0	0	0	0	0	82,720	82,720
UPPER CORE BARREL	130,707	185,690	496,800	0	62,739	0	875,936
UPPER CORE GRID PLATE	326,768	464,225	1,242,000	0	156,848	0	2,189,841
GUIDE TUBES	0	0	0	0	0	124,080	124,080
LOWER CORE BARREL[(a)]	2,091,312	2,971,040	7,948,800	0	1,003,830	0	14,014,982
THERMAL SHIELDS[(a)]	392,121	557,070	1,490,400	0	188,218	0	2,627,809
CORE SHROUD[(a)]	303,574	371,380	15,152,400	0	145,716	0	15,973,070
LOWER GRID PLATE[(a)]	326,768	464,225	2,484,000	0	156,848	0	3,431,841
LOWER SUPPORT COLUMN	82,895	92,845	248,400	0	39,790	0	463,929
LOWER CORE FORGING	900,641	1,021,295	1,552,500	0	432,308	0	3,906,743
MISC INTERNALS	793,024	742,760	1,242,000	0	380,652	0	3,158,436
BIO SHIELD CONCRETE	0	0	0	0	0	5,161,728	5,161,728
REACTOR CAVITY LINER	0	0	0	0	0	105,882	105,882
REACTOR COOLANT PUMPS	0	0	0	0	0	1,838,760	1,838,760
PRESSURIZER	0	0	0	0	0	1,576,080	1,576,080
R.Hx,EHx,SUMP PUMP,CAVITY PUMP	0	0	0	0	0	82,720	82,720
PRESSURIZER RELIEF TANK	0	0	0	0	0	248,160	248,160
SAFETY INJECTION ACCUM TANKS	0	0	0	0	0	827,200	827,200
STEAM GENERATORS	0	0	0	0	0	9,352,284	9,352,284
REACTOR COOLANT PIPING	0	0	0	0	0	682,440	682,440
REMAINING CONTAM. MATLS	0	0	0	0	0	10,879,334	10,879,334
CONTAMINATED MATRL OTHR BLD	0	0	0	0	0	98,666,555	98,666,555
FILTER CARTRIDGES	448,092	557,070	1,490,400	0	53,771	0	2,549,333
SPENT RESINS	1,784,304	1,856,900	4,968,000	0	856,466	0	9,465,670
COMBUSTIBLE WASTES – CLASS A	0	0	0	0	0	5,010,143	5,010,143
COMBUSTIBLE WASTES – CLASS B	2,676,456	5,570,700	326,025	0	214,116	0	8,787,297
EVAPORATOR BOTTOMS	0	0	0	0	0	2,088,546	2,088,546
POST-TMI-2 ADDITIONS	0	0	0	0	0	3,216,998	3,216,998
SUBTOTAL PWR COSTS	**10,256,661**	**14,855,200**	**38,641,725**	**0**	**3,691,302**	**142,563,388**	**210,008,276**
ATLANTIC COMPACT COMMISSION ADMINISTRATIVE SURCHARGE							77,190
TOTAL PWR COSTS (INSIDE COMPACT)							**210,085,466**

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

Table B-20 BWR LLW Disposition Costs Using a Combination of Non-Compact Disposal Facility and the South Carolina Disposal Facility (2020 dollars)

REFERENCE BWR COMPONENT	BASE DISPOSAL CHARGE	CASK HANDLING	CURIE SURCHARGE	LINER DOSE RATE	DOSE RATE SURCHARGE	VENDOR CHARGES	DISPOSAL COST
STEAM SEPARATOR	304,168	2,599,660	3,477,600	0	146,001	0	6,527,429
FUEL SUPPORT & PIECES	133,853	1,299,830	434,700	0	64,250	0	1,932,633
CONTROL RODS/INCORES	432,927	742,760	1,987,200	0	207,805	0	3,370,693
CONTROL RODS GUIDES	0	0	0	0	0	29,212	29,212
JET PUMPS	323,111	3,713,800	4,968,000	0	155,093	0	9,160,004
TOP FUEL GUIDES	553,904	6,684,840	17,884,800	0	265,874	0	25,389,418
CORE SUPPORT PLATE	0	0	0	0	0	80,334	80,334
CORE SHROUD[(a)]	1,084,728	12,998,300	34,776,000	0	520,670	0	49,379,698
REACTOR VESSEL WALL	0	0	0	0	0	58,424	58,424
SAC SHIELD Neutron-Activated Matl	0	0	0	0	0	657,275	657,275
REACT. WATER REC	0	0	0	0	0	642,669	642,669
SAC SHIELD Contaminated Matl	0	0	0	0	0	2,263,948	2,263,948
OTHER PRIMARY CONTAINMENT	0	0	0	0	0	25,823,618	25,823,618
CONTAINM. ATMOSPHERIC	0	0	0	0	0	350,547	350,547
HIGH PRESSURE CORE SPRAY	0	0	0	0	0	124,152	124,152
LOW PRESSURE CORE SPRAY	0	0	0	0	0	73,031	73,031
REACTOR BLDG CLOSED COOLING	0	0	0	0	0	233,698	233,698
REACTOR CORE ISO COOLING	0	0	0	0	0	94,940	94,940
RESIDUAL HEAT REMOVAL	0	0	0	0	0	452,790	452,790
POOL LINER & RACKS	0	0	0	0	0	2,782,466	2,782,466
CONTAMINATED CONCRETE	0	0	0	0	0	3,169,528	3,169,528
OTHER REACTOR BUILDING	0	0	0	0	0	10,363,041	10,363,041
TURBINE	0	0	0	0	0	21,737,789	21,737,789
NUCLEAR STEAM CONDENSATE	0	0	0	0	0	2,651,011	2,651,011
LOW PRESSURE FEEDWATER HEATERS	0	0	0	0	0	5,382,355	5,382,355
MAIN STEAM	0	0	0	0	0	518,517	518,517
MOISTURE SEPARATOR REHEATERS	0	0	0	0	0	5,221,687	5,221,687
REACTOR FEEDWATER PUMPS	0	0	0	0	0	2,999,382	2,999,382
HIGH PRESSURE FEEDWATER HEATERS	0	0	0	0	0	883,670	883,670
OTHER TG BLDG	0	0	0	0	0	35,470,959	35,470,959
RAD WASTE BLDG	0	0	0	0	0	17,563,858	17,563,858
REACTOR BLDG – CLASS A	0	0	0	0	0	1,510,638	1,510,638
REACTOR BLDG – CLASS B	11,948,150	5,942,080	343,879	0	955,852	0	19,189,961
TG BLDG – CLASS A	0	0	0	0	0	1,019,872	1,019,872
TG BLDG – CLASS B	7,840,974	3,899,490	232,099	0	627,278	0	12,599,840
RAD WASTE & CONTROL – CLASS A	0	0	0	0	0	880,311	880,311
RAD WASTE & CONTROL – CLASS B	7,094,214	3,528,110	200,273	0	567,537	0	11,390,134
CONCENTRATOR BOTTOMS – CLASS A	0	0	0	0	0	516,031	516,031
CONCENTRATOR BOTTOMS – CLASS B	7,334,414	4,827,940	12,916,800	0	1,292,213	0	26,371,367
OTHER	0	0	0	0	0	1,270,732	1,270,732
POST-TMI-2 ADDITIONS	0	0	0	0	0	262,910	262,910
SUBTOTAL BWR COSTS	**37,050,444**	**46,236,810**	**77,221,350**	**0**	**4,802,573**	**145,089,394**	**310,400,570**
ATLANTIC COMPACT COMMISSION ADMINISTRATIVE SURCHARGE							100,223
TOTAL BWR COSTS (INSIDE COMPACT)							**310,500,793**

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

Table B-21 PWR LLW Disposition Costs Using a Combination of Non-Compact Disposal Facility and the Washington Disposal Facility (2020 dollars)

REFERENCE PWR COMPONENT	VOLUME CHARGE	SHIPMENT CHARGE	CONTAINER CHARGE	CONTAINER DOSE RATE CHARGE	WASTE VENDOR CHARGE	DISPOSAL COST
VESSEL WALL	0	0	0	0	785,840	785,840
VESSEL HEAD & BOTTOM	0	0	0	0	1,751,200	1,751,200
UPPER CORE SUPPORT ASSM	0	0	0	0	82,720	82,720
UPPER SUPPORT COLUMN	0	0	0	0	82,720	82,720
UPPER CORE BARREL	26,346	21,188	17,367	53,033	0	117,935
UPPER CORE GRID PLATE	65,865	52,971	43,418	132,584	0	294,838
GUIDE TUBES	0	0	0	0	124,080	124,080
LOWER CORE BARREL[(a)]	421,538	339,012	277,876	848,534	0	1,886,961
THERMAL SHIELDS[(a)]	79,038	63,565	52,102	159,100	0	353,805
CORE SHROUD[(a)]	52,692	42,377	34,735	106,067	0	235,870
LOWER GRID PLATE[(a)]	65,865	52,971	43,418	132,584	0	294,838
LOWER SUPPORT COLUMN	13,173	10,594	8,684	26,517	0	58,968
LOWER CORE FORGING	144,904	116,536	95,520	291,684	0	648,643
MISC INTERNALS	105,384	84,753	69,469	212,134	0	471,740
BIO SHIELD CONCRETE	0	0	0	0	5,161,728	5,161,728
REACTOR CAVITY LINER	0	0	0	0	105,882	105,882
REACTOR COOLANT PUMPS	0	0	0	0	1,838,760	1,838,760
PRESSURIZER	0	0	0	0	1,576,080	1,576,080
R.Hx,EHx,SUMP PUMP,CAVITY PUMP	0	0	0	0	82,720	82,720
PRESSURIZER RELIEF TANK	0	0	0	0	248,160	248,160
SAFETY INJECTION ACCUM TANKS	0	0	0	0	827,200	827,200
STEAM GENERATORS	0	0	0	0	9,352,284	9,352,284
REACTOR COOLANT PIPING	0	0	0	0	682,440	682,440
REMAINING CONTAM. MATLS	0	0	0	0	10,879,334	10,879,334
CONTAMINATED MATRL OTHR BLD	0	0	0	0	98,666,555	98,666,555
FILTER CARTRIDGES	41,495	63,565	364,712	743,888	0	1,213,660
SPENT RESINS	263,461	211,883	173,673	530,334	0	1,179,350
COMBUSTIBLE WASTES – CLASS A	0	0	0	0	5,010,143	5,010,143
COMBUSTIBLE WASTES – CLASS B	414,951	317,824	3,647,125	911,914	0	5,291,814
EVAPORATOR BOTTOMS	0	0	0	0	2,088,546	2,088,546
POST-TMI-2 ADDITIONS	0	0	0	0	3,216,998	3,216,998
HEAVY OBJECT SURCHARGE						0
SITE AVAILABILITY CHARGES						755,595
OPERATING MARGIN						2,867,524
SUBTOTAL PWR COSTS	**1,694,713**	**1,377,238**	**4,828,098**	**4,148,371**	**142,563,388**	**158,234,928**
TAXES & FEES (% OF CHARGES)						673,876
TAXES & FEES ($/UNIT VOL.)						372,126
ANNUAL PERMIT FEES (3 YRS)						212,000
TOTAL PWR COSTS						**159,492,930**

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

Table B-22 BWR LLW Disposition Costs Using a Combination of Non-Compact Disposal Facility and the Washington Disposal Facility (2020 dollars)

REFERENCE BWR COMPONENT	VOLUME CHARGE	SHIPMENT CHARGE	CONTAINER CHARGE	CONTAINER DOSE RATE CHARGE	VENDOR CHARGE	DISPOSAL COST
STEAM SEPARATOR	46,520	148,318	243,142	911,914	0	1,349,893
FUEL SUPPORT & PIECES	23,260	74,159	121,571	371,234	0	590,224
CONTROL RODS/INCORES	69,780	84,753	69,469	911,914	0	1,135,916
CONTROL RODS GUIDES	0	0	0	0	29,212	29,212
JET PUMPS	65,128	211,883	347,345	911,914	0	1,536,270
TOP FUEL GUIDES	111,648	762,778	625,221	911,914	0	2,411,561
CORE SUPPORT PLATE	0	0	0	0	80,334	80,334
CORE SHROUD[(a)]	218,644	1,483,180	1,215,708	911,914	0	3,829,446
REACTOR VESSEL WALL	0	0	0	0	58,424	58,424
SAC SHIELD Neutron-Activated Matl	0	0	0	0	657,275	657,275
REACT. WATER REC	0	0	0	0	642,669	642,669
SAC SHIELD Contaminated Matl	0	0	0	0	2,263,948	2,263,948
OTHER PRIMARY CONTAINMENT	0	0	0	0	25,823,618	25,823,618
CONTAINM. ATMOSPHERIC	0	0	0	0	350,547	350,547
HIGH PRESSURE CORE SPRAY	0	0	0	0	124,152	124,152
LOW PRESSURE CORE SPRAY	0	0	0	0	73,031	73,031
REACTOR BLDG CLOSED COOLING	0	0	0	0	233,698	233,698
REACTOR CORE ISO COOLING	0	0	0	0	94,940	94,940
RESIDUAL HEAT REMOVAL	0	0	0	0	452,790	452,790
POOL LINER & RACKS	0	0	0	0	2,782,466	2,782,466
CONTAMINATED CONCRETE	0	0	0	0	3,169,528	3,169,528
OTHER REACTOR BUILDING	0	0	0	0	10,363,041	10,363,041
TURBINE	0	0	0	0	21,737,789	21,737,789
NUCLEAR STEAM CONDENSATE	0	0	0	0	2,651,011	2,651,011
LOW PRESSURE FEEDWATER HEATERS	0	0	0	0	5,382,355	5,382,355
MAIN STEAM	0	0	0	0	518,517	518,517
MOISTURE SEPARATOR REHEATERS	0	0	0	0	5,221,687	5,221,687
REACTOR FEEDWATER PUMPS	0	0	0	0	2,999,382	2,999,382
HIGH PRESSURE FEEDWATER HEATERS	0	0	0	0	883,670	883,670
OTHER TG BLDG	0	0	0	0	35,470,959	35,470,959
RAD WASTE BLDG	0	0	0	0	17,563,858	17,563,858
REACTOR BLDG – CLASS A	0	0	0	0	1,510,638	1,510,638
REACTOR BLDG – CLASS B	432,776	339,012	3,846,848	911,914	0	5,530,551
TG BLDG – CLASS A	0	0	0	0	1,019,872	1,019,872
TG BLDG – CLASS B	292,100	222,477	2,596,405	911,914	0	4,022,896
RAD WASTE & CONTROL – CLASS A	0	0	0	0	880,311	880,311
RAD WASTE & CONTROL – CLASS B	252,046	201,289	2,240,377	911,914	0	3,605,625
CONCENTRATOR BOTTOMS – CLASS A	0	0	0	0	516,031	516,031
CONCENTRATOR BOTTOMS – CLASS B	688,497	550,895	451,549	911,914	0	2,602,855
OTHER	0	0	0	0	1,270,732	1,270,732
POST-TMI-2 ADDITIONS	0	0	0	0	262,910	262,910
HEAVY OBJECT SURCHARGE						0
SITE AVAILABILITY CHARGES						755,595
OPERATING MARGIN						6,334,426
SUBTOTAL BWR COSTS	**2,200,401**	**4,078,744**	**11,757,635**	**8,578,457**	**145,089,394**	**178,794,651**
TAXES & FEES (% OF CHARGES)						1,449,326
TAXES & FEES ($/UNIT VOL.)						572,105
ANNUAL PERMIT FEES (3 YRS)						212,000
TOTAL BWR COSTS						**181,028,083**

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

Table B-23 PWR LLW Disposition Costs Using a Combination of Non-Compact Facility and the Texas Disposal Facility (2018 dollars)

REFERENCE PWR COMPONENT	BASE DISPOSAL CHARGE	IRRADIATED HARDWARE HANDLE SURCHARGE	CASK HANDLE SURCHARGE	WEIGHT SURCHARGE	CURIE CHARGE	DOSE RATE SURCHARGE	VENDOR CHARGES	DISPOSAL COST
VESSEL WALL	0	0	0	0	0	0	785,840	785,840
VESSEL HEAD & BOTTOM	0	0	0	0	0	0	1,751,200	1,751,200
UPPER CORE SUPPORT ASSM	0	0	0	0	0	0	82,720	82,720
UPPER SUPPORT COLUMN	0	0	0	0	0	0	82,720	82,720
UPPER CORE BARREL	200,000	150,000	5,000	0	440,000	60,000	0	855,000
UPPER CORE GRID PLATE	500,000	375,000	12,500	0	1,100,000	150,000	0	2,137,500
GUIDE TUBES	0	0	0	0	0	0	124,080	124,080
LOWER CORE BARREL[(a)]	3,200,000	2,400,000	80,000	0	7,040,000	960,000	0	13,680,000
THERMAL SHIELDS[(a)]	600,000	450,000	15,000	0	1,320,000	180,000	0	2,565,000
CORE SHROUD[(a)]	400,000	300,000	10,000	0	13,420,000	120,000	0	14,250,000
LOWER GRID PLATE[(a)]	500,000	375,000	12,500	0	2,200,000	150,000	0	3,237,500
LOWER SUPPORT COLUMN	100,000	75,000	2,500	0	220,000	30,000	0	427,500
LOWER CORE FORGING	1,100,000	825,000	27,500	0	1,375,000	330,000	0	3,657,500
MISC INTERNALS	800,000	600,000	20,000	80,000	1,100,000	240,000	0	2,840,000
BIO SHIELD CONCRETE	0	0	0	0	0	0	5,161,728	5,161,728
REACTOR CAVITY LINER	0	0	0	0	0	0	105,882	105,882
REACTOR COOLANT PUMPS	0	0	0	0	0	0	1,838,760	1,838,760
PRESSURIZER	0	0	0	0	0	0	1,576,080	1,576,080
R.Hx,EHx,SUMP PUMP,CAVITY PUMP	0	0	0	0	0	0	82,720	82,720
PRESSURIZER RELIEF TANK	0	0	0	0	0	0	248,160	248,160
SAFETY INJECTION ACCUM TANKS	0	0	0	0	0	0	827,200	827,200
STEAM GENERATORS	0	0	0	0	0	0	9,352,284	9,352,284
REACTOR COOLANT PIPING	0	0	0	0	0	0	682,440	682,440
REMAINING CONTAM. MATLS	0	0	0	0	0	0	10,879,334	10,879,334
CONTAMINATED MATRL OTHR BLD	0	0	0	0	0	0	98,666,555	98,666,555
FILTER CARTRIDGES	315,000	0	15,000	0	1,320,000	31,500	0	1,681,500
SPENT RESINS	2,000,000	0	50,000	0	4,400,000	600,000	0	7,050,000
COMBUSTIBLE WASTES – CLASS A	0	0	0	0	0	0	5,010,143	5,010,143
COMBUSTIBLE WASTES – CLASS B	3,150,000	0	150,000	0	288,750	315,000	0	3,903,750
EVAPORATOR BOTTOMS	0	0	0	0	0	0	2,088,546	2,088,546
POST-TMI-2 ADDITIONS	0	0	0	0	0	0	3,216,998	3,216,998
TOTAL PWR COSTS	**12,865,000**	**5,550,000**	**400,000**	**80,000**	**34,223,750**	**3,166,500**	**142,563,388**	**198,848,638**

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

Table B-24 BWR LLW Disposition Costs Using a Combination of Non-Compact Disposal Facility and the Texas Disposal Facility (2018 dollars)

REFERENCE BWR COMPONENT	BASE DISPOSAL CHARGE	IRRADIATED HARDWARE HANDLE SURCHARGE	CASK HANDLE SURCHARGE	WEIGHT SURCHARGE	CURIE CHARGE	DOSE RATE SURCHARGE	VENDOR CHARGES	DISPOSAL COST
STEAM SEPARATOR	353,146	1,050,000	70,000	0	3,083,000	141,258	0	4,697,404
FUEL SUPPORT & PIECES	176,573	525,000	35,000	0	385,185	52,972	0	1,174,730
CONTROL RODS/INCORES	529,719	600,000	20,000	0	1,802,000	211,888	0	3,163,607
CONTROL RODS GUIDES	0	0	0	0	0	0	29,212	29,212
JET PUMPS	494,404	1,500,000	100,000	0	4,412,880	197,762	0	6,705,046
TOP FUEL GUIDES	847,550	5,400,000	180,000	0	15,928,800	339,020	0	22,695,371
CORE SUPPORT PLATE	0	0	0	0	0	0	80,334	80,334
CORE SHROUD[(a)]	1,659,786	10,500,000	350,000	0	33,479,000	663,914	0	46,652,701
REACTOR VESSEL WALL	0	0	0	0	0	0	58,424	58,424
SAC SHIELD Neutron-Activated Matl	0	0	0	0	0	0	657,275	657,275
REACT. WATER REC	0	0	0	0	0	0	642,669	642,669
SAC SHIELD Contaminated Matl	0	0	0	0	0	0	2,263,948	2,263,948
OTHER PRIMARY CONTAINMENT	0	0	0	0	0	0	25,823,618	25,823,618
CONTAINM. ATMOSPHERIC	0	0	0	0	0	0	350,547	350,547
HIGH PRESSURE CORE SPRAY	0	0	0	0	0	0	124,152	124,152
LOW PRESSURE CORE SPRAY	0	0	0	0	0	0	73,031	73,031
REACTOR BLDG CLOSED COOLING	0	0	0	0	0	0	233,698	233,698
REACTOR CORE ISO COOLING	0	0	0	0	0	0	94,940	94,940
RESIDUAL HEAT REMOVAL	0	0	0	0	0	0	452,790	452,790
POOL LINER & RACKS	0	0	0	0	0	0	2,782,466	2,782,466
CONTAMINATED CONCRETE	0	0	0	0	0	0	3,169,528	3,169,528
OTHER REACTOR BUILDING	0	0	0	0	0	0	10,363,041	10,363,041
TURBINE	0	0	0	0	0	0	21,737,789	21,737,789
NUCLEAR STEAM CONDENSATE	0	0	0	0	0	0	2,651,011	2,651,011
LOW PRESSURE FEEDWATER HEATERS	0	0	0	0	0	0	5,382,355	5,382,355
MAIN STEAM	0	0	0	0	0	0	518,517	518,517
MOISTURE SEPARATOR REHEATERS	0	0	0	0	0	0	5,221,687	5,221,687
REACTOR FEEDWATER PUMPS	0	0	0	0	0	0	2,999,382	2,999,382
HIGH PRESSURE FEEDWATER HEATERS	0	0	0	0	0	0	883,670	883,670
OTHER TG BLDG	0	0	0	0	0	0	35,470,959	35,470,959
RAD WASTE BLDG	0	0	0	0	0	0	17,563,858	17,563,858
REACTOR BLDG – CLASS A	0	0	0	0	0	0	1,510,638	1,510,638
REACTOR BLDG – CLASS B	3,285,317	0	160,000	0	304,563	328,532	0	4,078,411
TG BLDG – CLASS A	0	0	0	0	0	0	1,019,872	1,019,872
TG BLDG – CLASS B	2,217,404	0	105,000	0	205,563	221,740	0	2,749,707
RAD WASTE & CONTROL – CLASS A	0	0	0	0	0	0	880,311	880,311
RAD WASTE & CONTROL – CLASS B	1,913,345	0	95,000	0	177,375	191,335	0	2,377,055
CONCENTRATOR BOTTOMS – CLASS A	0	0	0	0	0	0	516,031	516,031
CONCENTRATOR BOTTOMS – CLASS B	5,226,561	0	130,000	520,000	11,440,000	640,480	0	17,957,041
OTHER	0	0	0	0	0	0	1,270,732	1,270,732
POST-TMI-2 ADDITIONS	0	0	0	0	0	0	262,910	262,910
TOTAL BWR COSTS	**16,703,806**	**19,575,000**	**1,245,000**	**520,000**	**71,218,365**	**2,988,901**	**145,089,394**	**257,340,466**

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

Table B-25 PWR LLW Disposition Costs Using a Combination of Non-Compact Facility and the South Carolina Disposal Facility (2018 dollars)

REFERENCE PWR COMPONENT	BASE DISPOSAL CHARGE	CASK HANDLING	CURIE SURCHARGE	LINER DOSE RATE	DOSE RATE SURCHARGE	VENDOR CHARGES	DISPOSAL COST
VESSEL WALL	0	0	0	0	0	785,840	785,840
VESSEL HEAD & BOTTOM	0	0	0	0	0	1,751,200	1,751,200
UPPER CORE SUPPORT ASSM	0	0	0	0	0	82,720	82,720
UPPER SUPPORT COLUMN	0	0	0	0	0	82,720	82,720
UPPER CORE BARREL	128,682	185,690	489,686	0	61,767	0	865,825
UPPER CORE GRID PLATE	321,705	464,225	1,224,215	0	154,418	0	2,164,563
GUIDE TUBES	0	0	0	0	0	124,080	124,080
LOWER CORE BARREL[(a)]	2,058,912	2,971,040	7,834,976	0	988,278	0	13,853,206
THERMAL SHIELDS[(a)]	386,046	557,070	1,469,058	0	185,302	0	2,597,476
CORE SHROUD[(a)]	298,859	371,380	14,935,423	0	143,452	0	15,749,114
LOWER GRID PLATE[(a)]	321,705	464,225	2,448,430	0	154,418	0	3,388,778
LOWER SUPPORT COLUMN	81,607	92,845	244,843	0	39,171	0	458,467
LOWER CORE FORGING	886,651	1,021,295	1,530,000	0	425,593	0	3,863,539
MISC INTERNALS	718,880	742,760	1,224,000	0	345,062	0	3,030,702
BIO SHIELD CONCRETE	0	0	0	0	0	5,161,728	5,161,728
REACTOR CAVITY LINER	0	0	0	0	0	105,882	105,882
REACTOR COOLANT PUMPS	0	0	0	0	0	1,838,760	1,838,760
PRESSURIZER	0	0	0	0	0	1,576,080	1,576,080
R.Hx,EHx,SUMP PUMP,CAVITY PUMP	0	0	0	0	0	82,720	82,720
PRESSURIZER RELIEF TANK	0	0	0	0	0	248,160	248,160
SAFETY INJECTION ACCUM TANKS	0	0	0	0	0	827,200	827,200
STEAM GENERATORS	0	0	0	0	0	9,352,284	9,352,284
REACTOR COOLANT PIPING	0	0	0	0	0	682,440	682,440
REMAINING CONTAM. MATLS	0	0	0	0	0	10,879,334	10,879,334
CONTAMINATED MATRL OTHR BLD	0	0	0	0	0	98,666,555	98,666,555
FILTER CARTRIDGES	441,126	557,070	1,469,058	0	52,935	0	2,520,189
SPENT RESINS	1,617,480	1,856,900	4,896,860	0	776,390	0	9,147,630
COMBUSTIBLE WASTES – CLASS A	0	0	0	0	0	5,010,143	5,010,143
COMBUSTIBLE WASTES – CLASS B	2,426,220	5,570,700	321,300	0	194,098	0	8,512,318
EVAPORATOR BOTTOMS	0	0	0	0	0	2,088,546	2,088,546
POST-TMI-2 ADDITIONS	0	0	0	0	0	3,216,998	3,216,998
SUBTOTAL PWR COSTS	**9,687,873**	**14,855,200**	**38,087,849**	**0**	**3,520,886**	**142,563,388**	**208,715,196**
ATLANTIC COMPACT COMMISSION ADMINISTRATIVE SURCHARGE							77,190
TOTAL PWR COSTS (INSIDE COMPACT)							**208,792,386**

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

Table B-26 BWR LLW Disposition Costs Using a Combination of Non-Compact Disposal Facility and the South Carolina Disposal Facility (2018 dollars)

REFERENCE BWR COMPONENT	BASE DISPOSAL CHARGE	CASK HANDLING	CURIE SURCHARGE	LINER DOSE RATE	DOSE RATE SURCHARGE	VENDOR CHARGES	DISPOSAL COST
STEAM SEPARATOR	299,456	2,599,660	3,427,802	0	143,739	0	6,470,657
FUEL SUPPORT & PIECES	131,774	1,299,830	428,400	0	63,252	0	1,923,256
CONTROL RODS/INCORES	392,451	742,760	1,958,744	0	188,376	0	3,282,331
CONTROL RODS GUIDES	0	0	0	0	0	29,212	29,212
JET PUMPS	318,105	3,713,800	4,896,860	0	152,690	0	9,081,455
TOP FUEL GUIDES	545,322	6,684,840	17,628,696	0	261,755	0	25,120,613
CORE SUPPORT PLATE	0	0	0	0	0	80,334	80,334
CORE SHROUD[(a)]	1,067,923	12,998,300	34,278,020	0	512,603	0	48,856,846
REACTOR VESSEL WALL	0	0	0	0	0	58,424	58,424
SAC SHIELD Neutron-Activated Matl	0	0	0	0	0	657,275	657,275
REACT. WATER REC	0	0	0	0	0	642,669	642,669
SAC SHIELD Contaminated Matl	0	0	0	0	0	2,263,948	2,263,948
OTHER PRIMARY CONTAINMENT	0	0	0	0	0	25,823,618	25,823,618
CONTAINM. ATMOSPHERIC	0	0	0	0	0	350,547	350,547
HIGH PRESSURE CORE SPRAY	0	0	0	0	0	124,152	124,152
LOW PRESSURE CORE SPRAY	0	0	0	0	0	73,031	73,031
REACTOR BLDG CLOSED COOLING	0	0	0	0	0	233,698	233,698
REACTOR CORE ISO COOLING	0	0	0	0	0	94,940	94,940
RESIDUAL HEAT REMOVAL	0	0	0	0	0	452,790	452,790
POOL LINER & RACKS	0	0	0	0	0	2,782,466	2,782,466
CONTAMINATED CONCRETE	0	0	0	0	0	3,169,528	3,169,528
OTHER REACTOR BUILDING	0	0	0	0	0	10,363,041	10,363,041
TURBINE	0	0	0	0	0	21,737,789	21,737,789
NUCLEAR STEAM CONDENSATE	0	0	0	0	0	2,651,011	2,651,011
LOW PRESSURE FEEDWATER HEATERS	0	0	0	0	0	5,382,355	5,382,355
MAIN STEAM	0	0	0	0	0	518,517	518,517
MOISTURE SEPARATOR REHEATERS	0	0	0	0	0	5,221,687	5,221,687
REACTOR FEEDWATER PUMPS	0	0	0	0	0	2,999,382	2,999,382
HIGH PRESSURE FEEDWATER HEATERS	0	0	0	0	0	883,670	883,670
OTHER TG BLDG	0	0	0	0	0	35,470,959	35,470,959
RAD WASTE BLDG	0	0	0	0	0	17,563,858	17,563,858
REACTOR BLDG – CLASS A	0	0	0	0	0	1,510,638	1,510,638
REACTOR BLDG – CLASS B	11,762,405	5,942,080	338,895	0	940,992	0	18,984,373
TG BLDG – CLASS A	0	0	0	0	0	1,019,872	1,019,872
TG BLDG – CLASS B	7,719,078	3,899,490	228,735	0	617,526	0	12,464,830
RAD WASTE & CONTROL – CLASS A	0	0	0	0	0	880,311	880,311
RAD WASTE & CONTROL – CLASS B	6,983,928	3,528,110	197,370	0	558,714	0	11,268,122
CONCENTRATOR BOTTOMS – CLASS A	0	0	0	0	0	516,031	516,031
CONCENTRATOR BOTTOMS – CLASS B	7,220,394	4,827,940	12,731,836	0	1,272,125	0	26,052,295
OTHER	0	0	0	0	0	1,270,732	1,270,732
POST-TMI-2 ADDITIONS	0	0	0	0	0	262,910	262,910
SUBTOTAL BWR COSTS	**36,440,837**	**46,236,810**	**76,115,358**	**0**	**4,711,773**	**145,089,394**	**308,594,171**
ATLANTIC COMPACT COMMISSION ADMINISTRATIVE SURCHARGE							100,223
TOTAL BWR COSTS (INSIDE COMPACT)							**308,694,394**

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

Table B-27 PWR LLW Disposition Costs Using a Combination of Non-Compact Disposal Facility and the Washington Disposal Facility (2018 dollars)

REFERENCE PWR COMPONENT	VOLUME CHARGE	SHIPMENT CHARGE	CONTAINER CHARGE	CONTAINER DOSE RATE CHARGE	WASTE VENDOR CHARGE	DISPOSAL COST
VESSEL WALL	0	0	0	0	785,840	785,840
VESSEL HEAD & BOTTOM	0	0	0	0	1,751,200	1,751,200
UPPER CORE SUPPORT ASSM	0	0	0	0	82,720	82,720
UPPER SUPPORT COLUMN	0	0	0	0	82,720	82,720
UPPER CORE BARREL	24,352	29,300	20,640	33,880	0	108,172
UPPER CORE GRID PLATE	60,880	73,250	51,600	84,700	0	270,430
GUIDE TUBES	0	0	0	0	124,080	124,080
LOWER CORE BARREL[(a)]	389,632	468,800	330,240	542,080	0	1,730,752
THERMAL SHIELDS[(a)]	73,056	87,900	61,920	101,640	0	324,516
CORE SHROUD[(a)]	48,704	58,600	41,280	67,760	0	216,344
LOWER GRID PLATE[(a)]	60,880	73,250	51,600	84,700	0	270,430
LOWER SUPPORT COLUMN	12,176	14,650	10,320	16,940	0	54,086
LOWER CORE FORGING	133,936	161,150	113,520	186,340	0	594,946
MISC INTERNALS	97,408	117,200	82,560	135,520	0	432,688
BIO SHIELD CONCRETE	0	0	0	0	5,161,728	5,161,728
REACTOR CAVITY LINER	0	0	0	0	105,882	105,882
REACTOR COOLANT PUMPS	0	0	0	0	1,838,760	1,838,760
PRESSURIZER	0	0	0	0	1,576,080	1,576,080
R.Hx,EHx,SUMP PUMP,CAVITY PUMP	0	0	0	0	82,720	82,720
PRESSURIZER RELIEF TANK	0	0	0	0	248,160	248,160
SAFETY INJECTION ACCUM TANKS	0	0	0	0	827,200	827,200
STEAM GENERATORS	0	0	0	0	9,352,284	9,352,284
REACTOR COOLANT PIPING	0	0	0	0	682,440	682,440
REMAINING CONTAM. MATLS	0	0	0	0	10,879,334	10,879,334
CONTAMINATED MATRL OTHR BLD	0	0	0	0	98,666,555	98,666,555
FILTER CARTRIDGES	38,354	87,900	433,440	475,020	0	1,034,714
SPENT RESINS	243,520	293,000	206,400	338,800	0	1,081,720
COMBUSTIBLE WASTES – CLASS A	0	0	0	0	5,010,143	5,010,143
COMBUSTIBLE WASTES – CLASS B	383,544	439,500	4,334,400	1,117,759	0	6,275,203
EVAPORATOR BOTTOMS	0	0	0	0	2,088,546	2,088,546
POST-TMI-2 ADDITIONS	0	0	0	0	3,216,998	3,216,998
HEAVY OBJECT SURCHARGE						0
SITE AVAILABILITY CHARGES						435,756
SUBTOTAL PWR COSTS	**1,566,442**	**1,904,500**	**5,737,920**	**3,185,139**	**142,563,388**	**155,393,145**
TAXES & FEES (% OF CHARGES)						551,680
TAXES & FEES ($/UNIT VOL.)						372,126
ANNUAL PERMIT FEES (3 YRS)						127,200
TOTAL PWR COSTS						**156,444,151**

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

Table B-28 BWR LLW Disposition Costs Using a Combination of Non-Compact Disposal Facility and the Washington Disposal Facility (2018 dollars)

REFERENCE BWR COMPONENT	VOLUME CHARGE	SHIPMENT CHARGE	CONTAINER CHARGE	CONTAINER DOSE RATE CHARGE	VENDOR CHARGE	DISPOSAL COST
STEAM SEPARATOR	42,999	205,100	288,960	1,117,759	0	1,654,818
FUEL SUPPORT & PIECES	21,500	102,550	144,480	237,160	0	505,690
CONTROL RODS/INCORES	64,499	117,200	82,560	1,117,759	0	1,382,017
CONTROL RODS GUIDES	0	0	0	0	29,212	29,212
JET PUMPS	60,199	293,000	412,800	880,599	0	1,646,598
TOP FUEL GUIDES	103,198	1,054,800	743,040	0	0	1,901,038
CORE SUPPORT PLATE	0	0	0	0	80,334	80,334
CORE SHROUD[(a)]	202,096	2,051,000	1,444,800	0	0	3,697,896
REACTOR VESSEL WALL	0	0	0	0	58,424	58,424
SAC SHIELD Neutron-Activated Matl	0	0	0	0	657,275	657,275
REACT. WATER REC	0	0	0	0	642,669	642,669
SAC SHIELD Contaminated Matl	0	0	0	0	2,263,948	2,263,948
OTHER PRIMARY CONTAINMENT	0	0	0	0	25,823,618	25,823,618
CONTAINM. ATMOSPHERIC	0	0	0	0	350,547	350,547
HIGH PRESSURE CORE SPRAY	0	0	0	0	124,152	124,152
LOW PRESSURE CORE SPRAY	0	0	0	0	73,031	73,031
REACTOR BLDG CLOSED COOLING	0	0	0	0	233,698	233,698
REACTOR CORE ISO COOLING	0	0	0	0	94,940	94,940
RESIDUAL HEAT REMOVAL	0	0	0	0	452,790	452,790
POOL LINER & RACKS	0	0	0	0	2,782,466	2,782,466
CONTAMINATED CONCRETE	0	0	0	0	3,169,528	3,169,528
OTHER REACTOR BUILDING	0	0	0	0	10,363,041	10,363,041
TURBINE	0	0	0	0	21,737,789	21,737,789
NUCLEAR STEAM CONDENSATE	0	0	0	0	2,651,011	2,651,011
LOW PRESSURE FEEDWATER HEATERS	0	0	0	0	5,382,355	5,382,355
MAIN STEAM	0	0	0	0	518,517	518,517
MOISTURE SEPARATOR REHEATERS	0	0	0	0	5,221,687	5,221,687
REACTOR FEEDWATER PUMPS	0	0	0	0	2,999,382	2,999,382
HIGH PRESSURE FEEDWATER HEATERS	0	0	0	0	883,670	883,670
OTHER TG BLDG	0	0	0	0	35,470,959	35,470,959
RAD WASTE BLDG	0	0	0	0	17,563,858	17,563,858
REACTOR BLDG – CLASS A	0	0	0	0	1,510,638	1,510,638
REACTOR BLDG – CLASS B	400,020	468,800	4,571,760	0	0	5,440,580
TG BLDG – CLASS A	0	0	0	0	1,019,872	1,019,872
TG BLDG – CLASS B	269,991	307,650	3,085,680	0	0	3,663,321
RAD WASTE & CONTROL – CLASS A	0	0	0	0	880,311	880,311
RAD WASTE & CONTROL – CLASS B	232,969	278,350	2,662,560	0	0	3,173,879
CONCENTRATOR BOTTOMS – CLASS A	0	0	0	0	516,031	516,031
CONCENTRATOR BOTTOMS – CLASS B	636,386	761,800	536,640	0	0	1,934,826
OTHER	0	0	0	0	1,270,732	1,270,732
POST-TMI-2 ADDITIONS	0	0	0	0	262,910	262,910
HEAVY OBJECT SURCHARGE						0
SITE AVAILABILITY CHARGES						435,756
SUBTOTAL BWR COSTS	**2,033,855**	**5,640,250**	**13,973,280**	**3,353,276**	**145,089,394**	**170,525,812**
TAXES & FEES (% OF CHARGES)						1,093,766
TAXES & FEES ($/UNIT VOL.)						572,105
ANNUAL PERMIT FEES (3 YRS)						127,200
TOTAL BWR COSTS						**172,318,883**

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

APPENDIX C
BUREAU OF LABOR STATISTICS ON THE INTERNET

For use in the adjustment formula in Chapter 3, the labor indexes for the first quarter of 2020 and the producer price indexes for March 2020 were obtained from the Bureau of Labor Statistics data on the Internet.

These dates were chosen to agree, to the extent possible, with the effective dates of the waste burial rate schedules. Instructions for accessing and obtaining the specific indexes used in this report follow below.

Bureau of Labor Statistics Internet Data Page

To obtain reports of producer price indexes and labor indexes, proceed as follows:

1. Enter the URL: **http://www.bls.gov/data/**

2. Click on the item labeled *Series Report*.

3. In the box labeled *Enter series id(s) below*, type in the following six series identifications (IDs), one ID per line:

Series ID	Producer Price Indexes
wpu0543	(Industrial electric power–used in calculation of P_x, per Section 3.3)
wpu0573	(Light fuel oils–used in calculation of F_x per Section 3.3)

Labor Indexes (Used in the calculation of L_x, per Section 3.1)

CIU2010000000210I	(Total compensation, private industry, Northeast region)
CIU2010000000220I	(Total compensation, private industry, South region)
CIU2010000000230I	(Total compensation, private industry, Midwest region)
CIU2010000000240I	(Total compensation, private industry, West region)

4. Click the button labeled *Next*.

5. In the box labeled *Select view of the data*, use *Table Format* and *Original Data value*.

6. In the box labeled *Select the time frame for your data*, specify the years you want and time period.

7. Click on the button labeled *Retrieve Data* and the six tables of data you requested will be displayed.

APPENDIX D
REPRESENTATIVE EXAMPLES OF DECOMMISSIONING COSTS FOR 2008 THROUGH 2020

In Section 3.5 of this revision and the five previous revisions of NUREG-1307, decommissioning costs for four typical situations were developed. Results of these calculations are summarized below.

Example 1 (No Compact-Affiliated Disposal Facilities)

Reactor Type: Boiling Water Reactor (BWR)
Thermal Power Rating: 3400 MWt
Location of Plant: Midwest Compact
LLW Burial Location: Before 2008–South Carolina (Non-Atlantic Compact); 2008 to 2012–Unknown (Generic LLW Disposal Site); Beginning 2016–No LLW Compact Disposal Facilities

	2008	2010	2012	2016	2018	2020
L_x	2.23	2.29	2.39	2.57	2.70	2.86
E_x	2.853	2.181	2.795	1.632	2.340	2.029
B_x	11.198	12.540	14.160	13.132	13.422	12.837
Decommissioning Cost (Millions)	$578	$612	$679	$644	$677	$668

Example 2 (Compact-Affiliated Disposal Facility Only)

Reactor Type: Pressurized-Water Reactor (PWR)
Thermal Power Rating: 3400 MWt
Location of Plant: Texas Compact
LLW Burial Location: Texas (Texas Compact); 2018 is the first use of the Texas compact as an example calculation for Compact-Affiliated Disposal Facility Only

	2008	2010	2012	2016	2018	2020
L_x	NA	NA	NA	NA	2.58	2.71
E_x	NA	NA	NA	NA	2.320	2.030
B_x	NA	NA	NA	NA	8.508	8.040
Decommissioning Cost (Millions)	NA	NA	NA	NA	$404	$398

Example 3 (Combination of Compact-Affiliated and Non-Compact Disposal Facilities)

Reactor Type: PWR
Thermal Power Rating: 3400 MWt
Location of Plant: Atlantic Compact
LLW Burial Location: South Carolina (Atlantic Compact) and Non-Compact Disposal Site

	2008	2010	2012	2016	2018	2020
L_x	2.33	2.41	2.52	2.75	2.89	3.06
E_x	2.746	2.139	2.704	1.645	2.320	2.030
B_x	9.872	12.280	13.885	10.971	11.607	11.679
Decommissioning Cost (Millions)	$425	$477	$530	$464	$497	$506

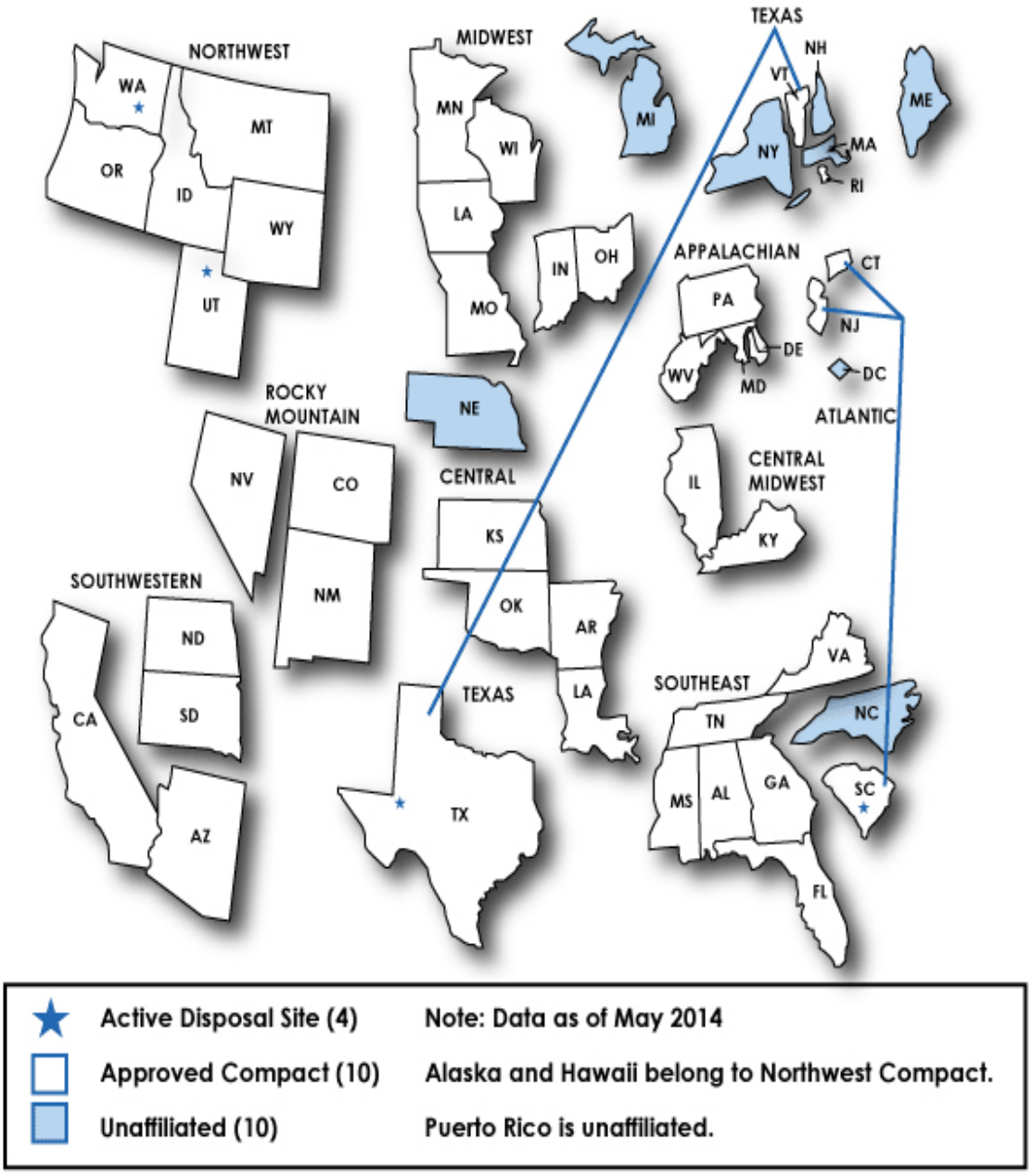
Example 4 (Compact-Affiliated Disposal Facility Only)

Reactor Type: BWR
Thermal Power Rating: 3400 MWt
Location of Plant: Northwest Compact
LLW Burial Location: Washington

	2008	2010	2012	2016	2018	2020
L_x	2.23	2.29	2.38	2.60	2.77	2.94
E_x	2.853	2.181	2.795	1.632	2.340	2.029
B_x	23.185	7.423	6.704	7.290	9.118	9.326
Decommissioning Cost (Millions)	$934	$460	$457	$473	$555	$571

APPENDIX E
LOW-LEVEL WASTE COMPACTS

The figure and table below identify the current composition of all low-level radioactive waste (LLW) compacts (source: NRC, http://www.nrc.gov/waste/llw-disposal/licensing/compacts.html).



Compact	Affiliated States			
Northwest	Alaska	Idaho	Oregon	Washington[a]
	Hawaii	Montana	Utah	Wyoming
Southwestern	Arizona	California[b]	North Dakota	South Dakota
Rocky Mountain	Colorado	New Mexico	Nevada	
Midwest	Indiana	Minnesota	Ohio[b]	Wisconsin
	Iowa	Missouri		
Central	Arkansas	Kansas	Louisiana	Oklahoma
Texas	Texas[a]	Vermont		
Central Midwest	Illinois[b]	Kentucky		
Appalachian	Delaware	Maryland	Pennsylvania[b]	West Virginia
Atlantic	Connecticut	New Jersey	South Carolina[a]	
Southeast	Alabama	Georgia	Tennessee	Virginia
	Florida	Mississippi		
Unaffiliated States	District of Columbia	Michigan	New York	Rhode Island
	Massachusetts	Nebraska	Puerto Rico	North Carolina
	Maine	New Hampshire		

(a) Current Host State for operating LLW disposal sites (3 States)
(b) Selected Host State for future LLW disposal sites (4 States)

APPENDIX F
COMMENT RESOLUTION MATRIX

Please see file in Agencywide Document Accession Management System Accession Number ML20267A491.

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NUREG-1307, Revision 18, "Report on Waste Burial Charges: Changes in Decommissioning Waste Disposal Costs at Low-Level Waste Burial Facilities", explains the formula acceptable to the NRC for determining the minimum decommissioning fund requirements for nuclear power reactors, as required by the NRC's regulations. Specifically, this report provides adjustment factors, and updates to these values, for the labor, energy, and waste burial components of the minimum formula

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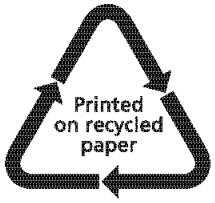

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