

**Waterford Steam Electric Station, Unit 3
Decommissioning Cost Analysis**

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**TABLE 3.2
SAFSTOR ALTERNATIVE
TOTAL ANNUAL EXPENDITURES
(thousands, 2019 dollars)**

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2043	170	0	0	0	495	665
2044	7,154	121	66	1	14,708	22,050
2045	67,001	4,191	1,714	133	33,914	106,954
2046	49,936	21,332	982	1,097	31,656	105,003
2047	30,252	20,062	343	14	11,572	62,243
2048	30,334	20,117	344	14	11,604	62,414
2049	30,252	20,062	343	14	11,572	62,243
2050	18,114	9,479	251	10	6,574	34,429
2051	7,821	870	171	7	2,265	11,135
2052	7,842	871	172	7	2,271	11,164
2053	7,821	870	171	7	2,265	11,135
2054	7,821	870	171	7	2,265	11,135
2055	7,821	870	171	7	2,265	11,135
2056	7,842	871	172	7	2,271	11,164
2057	7,821	870	171	7	2,265	11,135
2058	7,821	870	171	7	2,265	11,135
2059	7,821	870	171	7	2,265	11,135
2060	7,842	871	172	7	2,271	11,164
2061	7,821	870	171	7	2,265	11,135
2062	7,821	870	171	7	2,265	11,135
2063	7,821	870	171	7	2,265	11,135
2064	7,842	871	172	7	2,271	11,164
2065	7,821	870	171	7	2,265	11,135
2066	7,821	870	171	7	2,265	11,135
2067	7,821	870	171	7	2,265	11,135
2068	7,842	871	172	7	2,271	11,164
2069	7,821	870	171	7	2,265	11,135
2070	7,764	698	171	7	2,265	10,905
2071	7,821	870	171	7	2,265	11,135
2072	7,842	871	172	7	2,271	11,164
2073	7,821	870	171	7	2,265	11,135

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**TABLE 3.2 (continued)
SAFSTOR ALTERNATIVE
TOTAL ANNUAL EXPENDITURES**
(thousands, 2019 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2074	7,821	870	171	7	2,265	11,135
2075	7,764	698	171	7	2,265	10,905
2076	7,842	871	172	7	2,271	11,164
2077	7,821	870	171	7	2,265	11,135
2078	7,821	870	171	7	2,265	11,135
2079	7,821	870	171	7	2,265	11,135
2080	7,842	871	172	7	2,271	11,164
2081	3,252	345	171	6	1,447	5,222
2082	3,252	345	171	6	1,447	5,222
2083	3,252	345	171	6	1,447	5,222
2084	3,261	346	172	6	1,451	5,236
2085	3,252	345	171	6	1,447	5,222
2086	3,252	345	171	6	1,447	5,222
2087	3,252	345	171	6	1,447	5,222
2088	3,261	346	172	6	1,451	5,236
2089	3,252	345	171	6	1,447	5,222
2090	3,252	345	171	6	1,447	5,222
2091	3,252	345	171	6	1,447	5,222
2092	3,261	346	172	6	1,451	5,236
2093	3,252	345	171	6	1,447	5,222
2094	3,252	345	171	6	1,447	5,222
2095	3,252	345	171	6	1,447	5,222
2096	3,261	346	172	6	1,451	5,236
2097	3,252	345	171	6	1,447	5,222
2098	3,252	345	171	6	1,447	5,222
2099	21,202	2,110	801	17	3,351	27,481
2100	50,436	5,364	1,714	34	6,459	64,007
2101	61,073	29,730	1,637	37,942	23,460	153,842
2102	60,150	21,417	1,452	31,146	19,178	133,342
2103	58,646	11,109	1,286	20,722	13,394	105,157
2104	41,770	4,247	541	4,507	5,949	57,014

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TABLE 3.2 (continued)
SAFSTOR ALTERNATIVE
TOTAL ANNUAL EXPENDITURES
(thousands, 2019 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2105	21,300	11,682	171	0	2,262	35,415
2106	15,815	8,673	127	0	1,679	26,295
Total	856,865	221,694	20,008	95,977	291,895	1,486,438

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TABLE 3.2a
SAFSTOR ALTERNATIVE
LICENSE TERMINATION EXPENDITURES
(thousands, 2019 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2043	170	0	0	0	495	665
2044	7,131	53	66	1	14,612	21,864
2045	66,303	2,098	1,714	133	31,430	101,679
2046	42,193	5,837	982	1,097	29,348	79,456
2047	18,902	488	343	14	9,416	29,163
2048	18,953	489	344	14	9,442	29,243
2049	18,902	488	343	14	9,416	29,163
2050	10,269	415	251	10	5,430	16,376
2051	2,826	353	171	7	1,993	5,350
2052	2,834	354	172	7	1,998	5,365
2053	2,826	353	171	7	1,993	5,350
2054	2,826	353	171	7	1,993	5,350
2055	2,826	353	171	7	1,993	5,350
2056	2,834	354	172	7	1,998	5,365
2057	2,826	353	171	7	1,993	5,350
2058	2,826	353	171	7	1,993	5,350
2059	2,826	353	171	7	1,993	5,350
2060	2,834	354	172	7	1,998	5,365
2061	2,826	353	171	7	1,993	5,350
2062	2,826	353	171	7	1,993	5,350
2063	2,826	353	171	7	1,993	5,350
2064	2,834	354	172	7	1,998	5,365
2065	2,826	353	171	7	1,993	5,350
2066	2,826	353	171	7	1,993	5,350
2067	2,826	353	171	7	1,993	5,350
2068	2,834	354	172	7	1,998	5,365
2069	2,826	353	171	7	1,993	5,350
2070	2,826	353	171	7	1,993	5,350
2071	2,826	353	171	7	1,993	5,350
2072	2,834	354	172	7	1,998	5,365
2073	2,826	353	171	7	1,993	5,350

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TABLE 3.2a (continued)
SAFSTOR ALTERNATIVE
LICENSE TERMINATION EXPENDITURES
(thousands, 2019 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2074	2,826	353	171	7	1,993	5,350
2075	2,826	353	171	7	1,993	5,350
2076	2,834	354	172	7	1,998	5,365
2077	2,826	353	171	7	1,993	5,350
2078	2,826	353	171	7	1,993	5,350
2079	2,826	353	171	7	1,993	5,350
2080	2,834	354	172	7	1,998	5,365
2081	3,252	345	171	6	1,447	5,222
2082	3,252	345	171	6	1,447	5,222
2083	3,252	345	171	6	1,447	5,222
2084	3,261	346	172	6	1,451	5,236
2085	3,252	345	171	6	1,447	5,222
2086	3,252	345	171	6	1,447	5,222
2087	3,252	345	171	6	1,447	5,222
2088	3,261	346	172	6	1,451	5,236
2089	3,252	345	171	6	1,447	5,222
2090	3,252	345	171	6	1,447	5,222
2091	3,252	345	171	6	1,447	5,222
2092	3,261	346	172	6	1,451	5,236
2093	3,252	345	171	6	1,447	5,222
2094	3,252	345	171	6	1,447	5,222
2095	3,252	345	171	6	1,447	5,222
2096	3,261	346	172	6	1,451	5,236
2097	3,252	345	171	6	1,447	5,222
2098	3,252	345	171	6	1,447	5,222
2099	20,867	2,110	801	17	3,351	27,146
2100	49,088	5,364	1,714	34	6,459	62,659
2101	60,217	29,682	1,637	37,942	23,460	152,939
2102	58,792	21,345	1,452	31,146	19,178	131,913
2103	56,681	11,020	1,286	20,722	13,394	103,103
2104	40,534	3,780	535	4,507	5,862	55,217

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TABLE 3.2a (continued)
SAFSTOR ALTERNATIVE
LICENSE TERMINATION EXPENDITURES
(thousands, 2019 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2105	151	0	0	0	0	151
2106	112	0	0	0	0	112
Total	612,680	99,987	19,703	95,977	267,175	1,095,521

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**TABLE 3.2b
SAFSTOR ALTERNATIVE
SPENT FUEL MANAGEMENT EXPENDITURES**
(thousands, 2019 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2043	0	0	0	0	0	0
2044	23	68	0	0	95	186
2045	698	2,093	0	0	2,484	5,275
2046	7,743	15,495	0	0	2,309	25,547
2047	11,350	19,574	0	0	2,156	33,080
2048	11,381	19,628	0	0	2,162	33,171
2049	11,350	19,574	0	0	2,156	33,080
2050	7,845	9,063	0	0	1,145	18,053
2051	4,995	518	0	0	273	5,785
2052	5,008	518	0	0	273	5,799
2053	4,995	518	0	0	273	5,785
2054	4,995	518	0	0	273	5,785
2055	4,995	518	0	0	273	5,785
2056	5,008	518	0	0	273	5,799
2057	4,995	518	0	0	273	5,785
2058	4,995	518	0	0	273	5,785
2059	4,995	518	0	0	273	5,785
2060	5,008	518	0	0	273	5,799
2061	4,995	518	0	0	273	5,785
2062	4,995	518	0	0	273	5,785
2063	4,995	518	0	0	273	5,785
2064	5,008	518	0	0	273	5,799
2065	4,995	518	0	0	273	5,785
2066	4,995	518	0	0	273	5,785
2067	4,995	518	0	0	273	5,785
2068	5,008	518	0	0	273	5,799
2069	4,995	518	0	0	273	5,785
2070	4,938	345	0	0	273	5,555
2071	4,995	518	0	0	273	5,785
2072	5,008	518	0	0	273	5,799
2073	4,995	518	0	0	273	5,785

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TABLE 3.2b (continued)
SAFSTOR ALTERNATIVE
SPENT FUEL MANAGEMENT EXPENDITURES
(thousands, 2019 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2074	4,995	518	0	0	273	5,785
2075	4,938	345	0	0	273	5,555
2076	5,008	518	0	0	273	5,799
2077	4,995	518	0	0	273	5,785
2078	4,995	518	0	0	273	5,785
2079	4,995	518	0	0	273	5,785
2080	5,008	518	0	0	273	5,799
2081-06	0	0	0	0	0	0
Total	200,235	100,677	0	0	20,691	321,603

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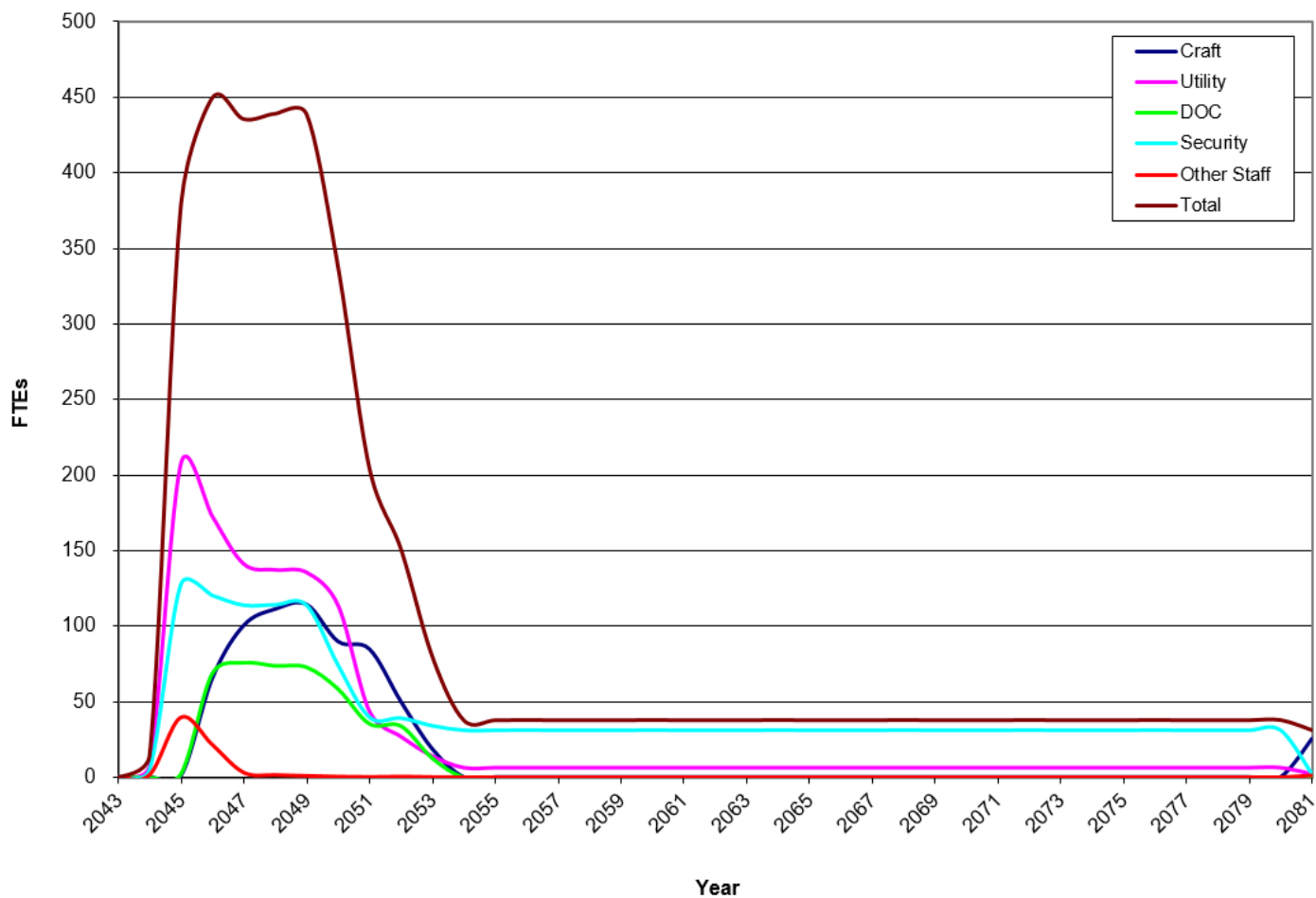
TABLE 3.2c
SAFSTOR ALTERNATIVE
SITE RESTORATION EXPENDITURES
(thousands, 2019 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2043-98	0	0	0	0	0	0
2099	335	0	0	0	0	335
2100	1,348	0	0	0	0	1,348
2101	856	47	0	0	0	903
2102	1,358	72	0	0	0	1,430
2103	1,965	89	0	0	0	2,054
2104	1,236	467	7	0	87	1,797
2105	21,149	11,682	171	0	2,262	35,264
2106	15,702	8,673	127	0	1,679	26,183
Total	43,950	21,031	305	0	4,028	69,314

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Decommissioning Cost Analysis**

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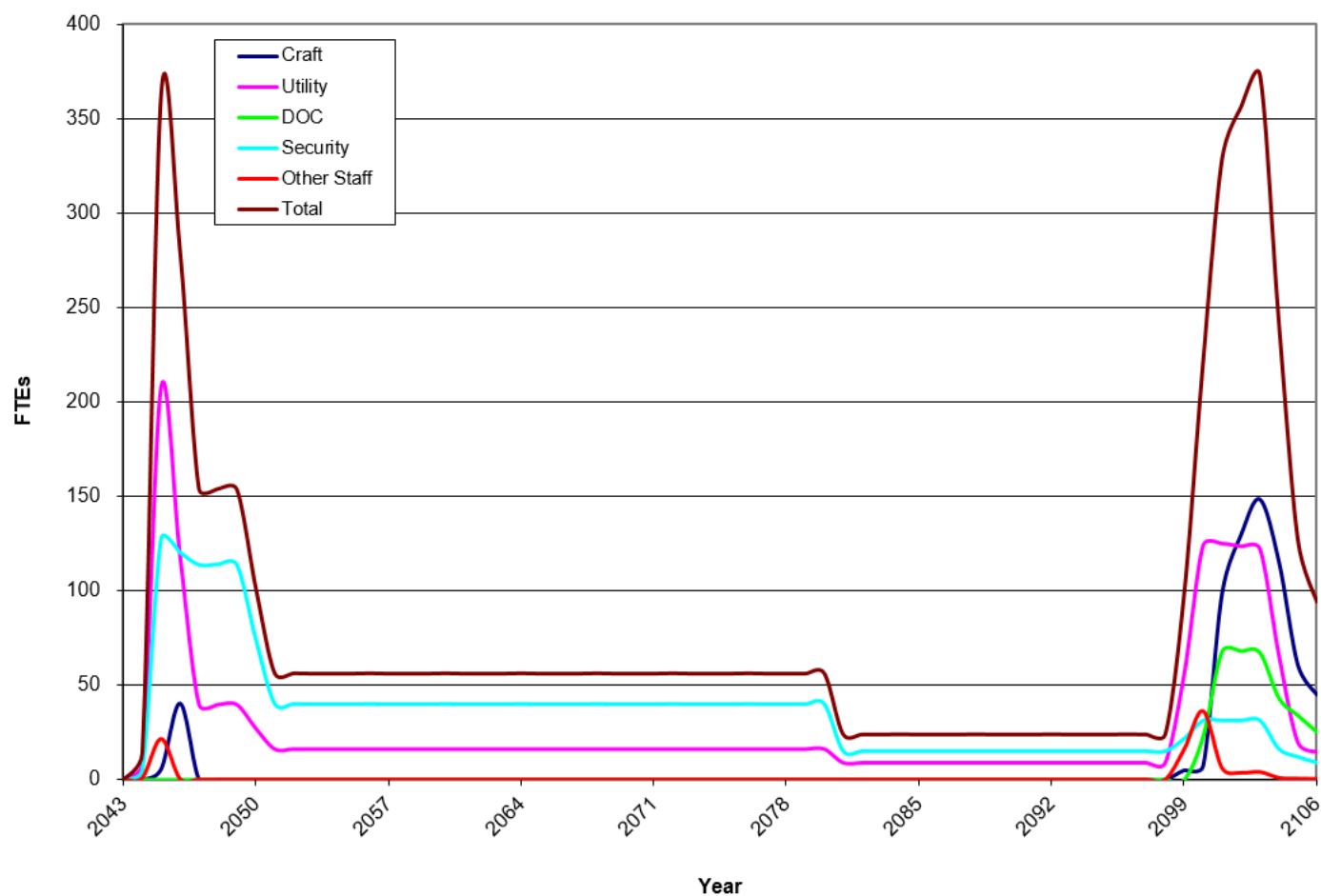
**FIGURE 3.1
DECOMMISSIONING PERSONNEL LEVELS
DECON**



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**FIGURE 3.2
DECOMMISSIONING PERSONNEL LEVELS
SAFSTOR**



4. SCHEDULE ESTIMATE

The schedules for the decommissioning scenarios considered in this analysis follow the sequences presented in the AIF/NESP-036 study, with minor changes to reflect recent experience and site-specific constraints. In addition, the scheduling has been revised to reflect the spent fuel management described in Section 3.4.1.

A schedule or sequence of activities for the DECON alternative is presented in Figure 4.1. The scheduling sequence is based on the fuel being removed from the spent fuel pool within five and one half years. The key activities listed in the schedule do not reflect a one-to-one correspondence with those activities in the cost table, but reflect dividing some activities for clarity and combining others for convenience. The schedule was prepared using the "Microsoft Project Professional" computer software.^[36]

4.1 SCHEDULE ESTIMATE ASSUMPTIONS

The schedule reflects the results of a precedence network developed for the site decommissioning activities, i.e., a PERT (Program Evaluation and Review Technique) Software Package. The work activity durations used in the precedence network reflect the actual man-hour estimates from the cost table, adjusted by stretching certain activities over their slack range and shifting the start and end dates of others. The following assumptions were made in the development of the decommissioning schedule:

- The fuel handling building is isolated until such time that all spent fuel has been discharged from the spent fuel pool to the DOE or to the ISFSI. Decontamination and dismantling of the storage pool is initiated once the transfer of spent fuel is complete (DECON option).
- All work (except reactor vessel and reactor vessel internals removal and the spent fuel loading campaigns) is performed during an 8-hour workday, 5 days per week, with no overtime.
- Reactor and internals removal activities are performed by using separate crews for different activities working on different shifts, with a corresponding backshift charge for the second shift.
- Multiple crews work parallel activities to the maximum extent possible, consistent with optimum efficiency, adequate access for cutting, removal and laydown space, and with the stringent safety measures necessary during demolition of heavy components and structures.

4.2 PROJECT SCHEDULE

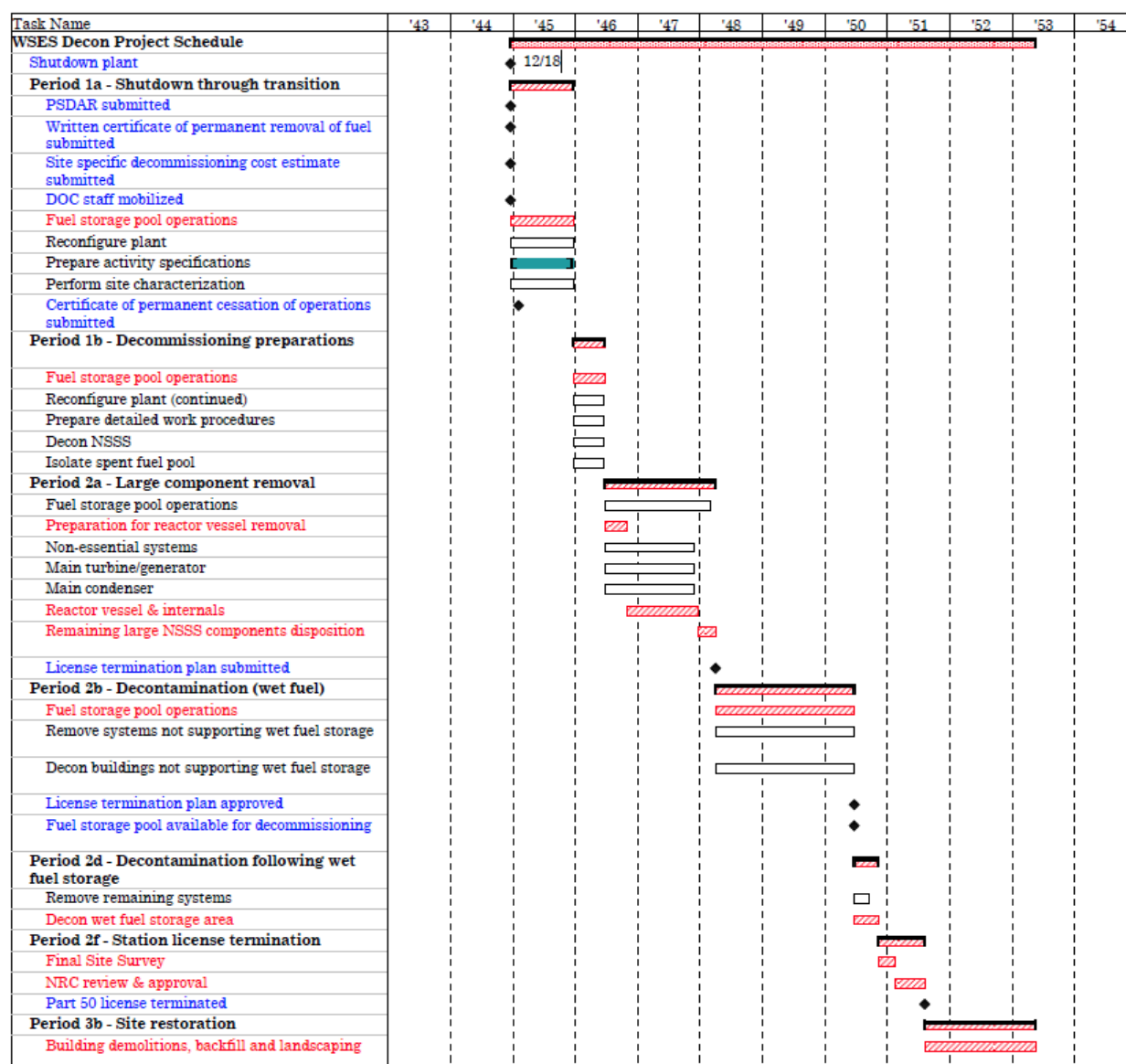
The period-dependent costs presented in the detailed cost tables are based upon the durations developed in the schedules for decommissioning. Durations are established between several milestones in each project period; these durations are used to establish a critical path for the entire project. In turn, the critical path duration for each period is used as the basis for determining the period-dependent costs. A second critical path is shown for the spent fuel storage period, which determines the release of the fuel handling building for final decontamination.

Project timelines are provided in Figures 4.2 and 4.3, with milestone dates based on the 2044 shutdown date. The fuel pool is emptied approximately five and one half years after shutdown, while ISFSI operations continue until the DOE can complete the transfer of assemblies. Deferred decommissioning in the SAFSTOR scenario is assumed to commence so that the operating license is terminated within a 60-year period from the cessation of plant operations.

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**FIGURE 4.1
ACTIVITY SCHEDULE**



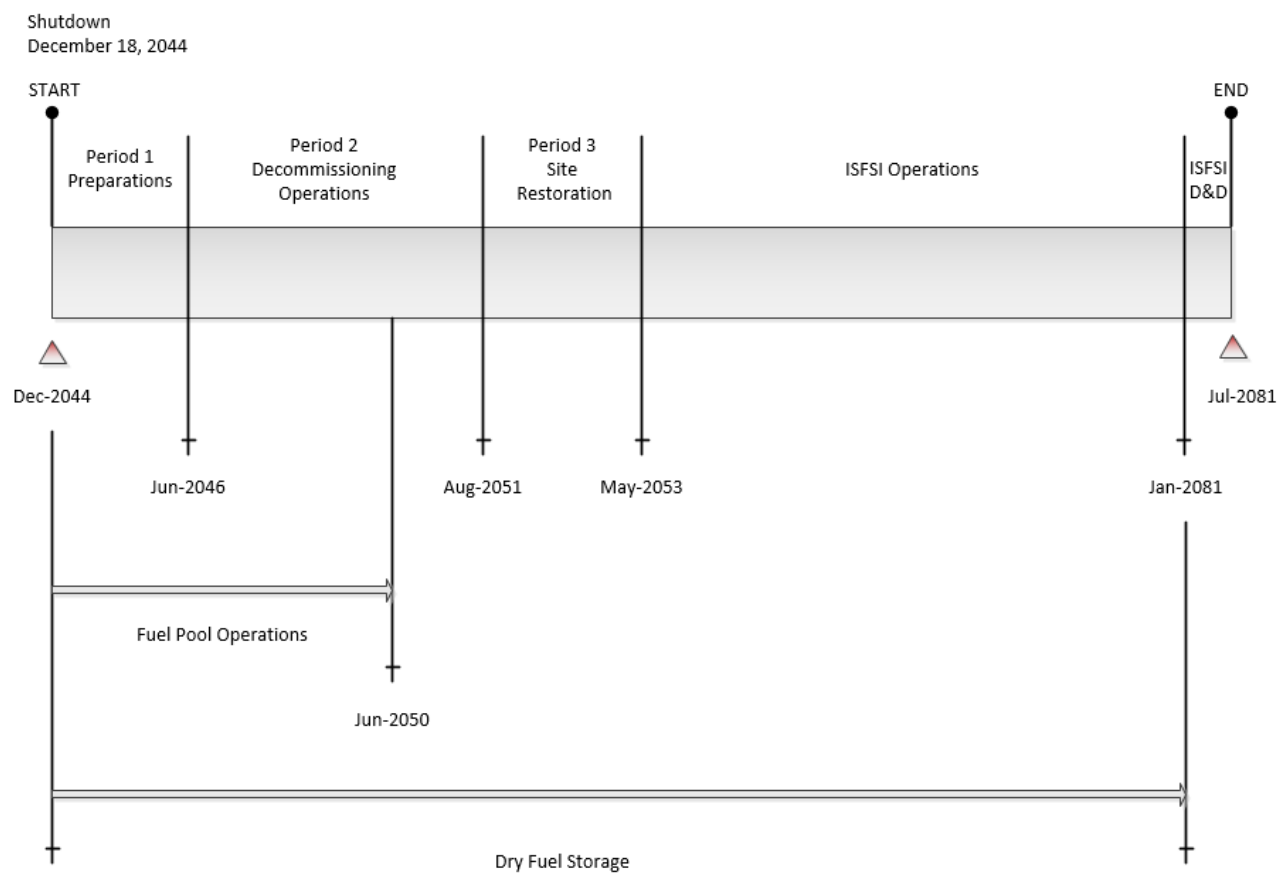
LEGEND

1. Red scheduling bars indicate critical path activities
2. Red scheduling bars with black border are associated with major decommissioning periods, e.g., Period 1a, indicating overall duration of that period
3. Diamond symbols indicate major milestones

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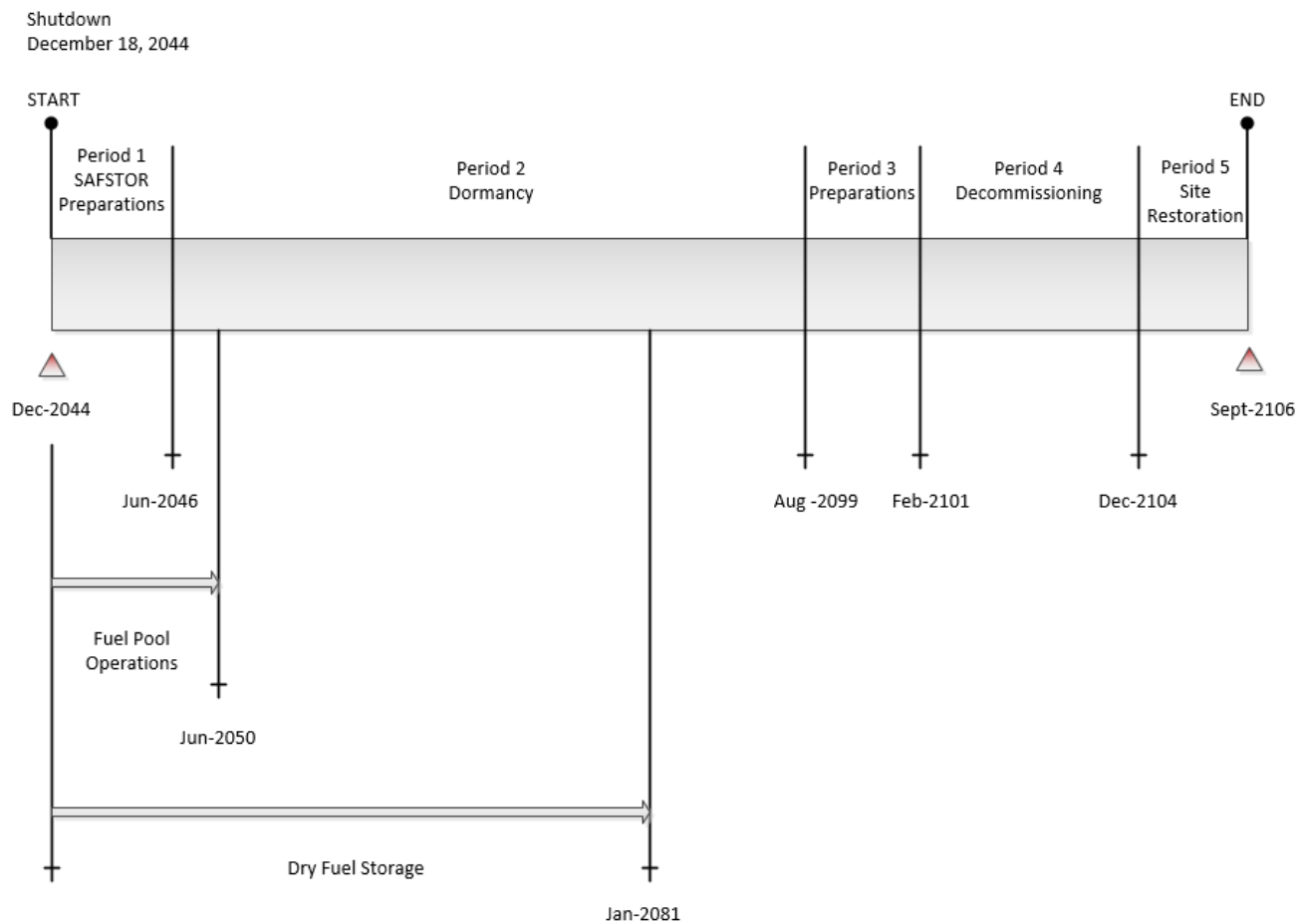
**FIGURE 4.2
DECOMMISSIONING TIMELINE
DECON
(not to scale)**



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**FIGURE 4.3
DECOMMISSIONING TIMELINE
SAFSTOR
(not to scale)**



5. RADIOACTIVE WASTES

The objectives of the decommissioning process are the removal of all radioactive material from the site that would restrict its future use and the termination of the NRC license. This currently requires the remediation of all radioactive material at the site in excess of applicable legal limits. Under the Atomic Energy Act,^[37] the NRC is responsible for protecting the public from sources of ionizing radiation. Title 10 of the Code of Federal Regulations delineates the production, utilization, and disposal of radioactive materials and processes. In particular, Part 71 defines radioactive material as it pertains to transportation and Part 61 specifies its disposition.

Most of the materials being transported for controlled burial are categorized as Low Specific Activity (LSA) or Surface Contaminated Object (SCO) materials containing Type A quantities, as defined in 49 CFR Parts 173-178. Shipping containers are required to be Industrial Packages (IP-1, IP-2 or IP-3, as defined in 10 CFR §173.411). For this study, commercially available steel containers are presumed to be used for the disposal of piping, small components, and concrete. Larger components can serve as their own containers, with proper closure of all openings, access ways, and penetrations.

The destinations for the various waste streams from decommissioning are identified in Figures 5.1 and 5.2. The volumes are shown on a line-item basis in Appendices C and D and summarized in Tables 5.1 and 5.2. The volumes are calculated based on the exterior dimensions for containerized material and on the displaced volume of components serving as their own waste containers.

The reactor vessel and internals are categorized as large quantity shipments and, accordingly, will be shipped in reusable, shielded truck casks with disposable liners. In calculating disposal costs, the burial fees are applied against the liner volume, as well as the special handling requirements of the payload. Packaging efficiencies are lower for the highly activated materials (greater than Type A quantity waste), where high concentrations of gamma-emitting radionuclides limit the capacity of the shipping canisters.

No process system containing/handling radioactive substances at shutdown is presumed to meet material release criteria by decay alone (i.e., systems radioactive at shutdown will still be radioactive over the time period during which the decommissioning is accomplished, due to the presence of long-lived radionuclides). While the dose rates decrease with time, radionuclides such as ¹³⁷Cs will still control the disposition requirements.

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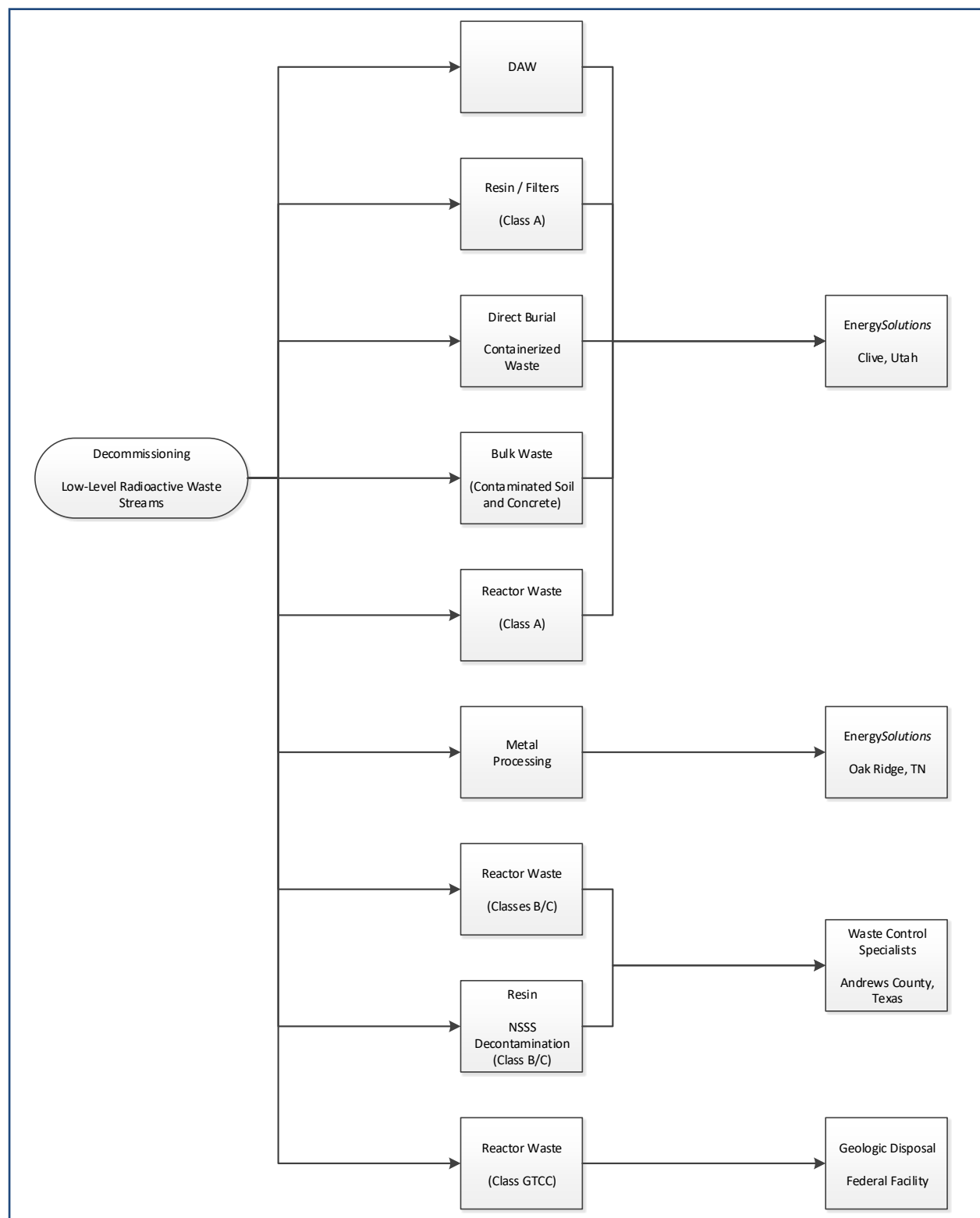
The waste material produced in the decontamination and dismantling of the nuclear plant is primarily generated during Period 2 of DECON and Period 4 of SAFSTOR. Material that is considered potentially contaminated when removed from the radiological controlled area is sent to processing facilities in Tennessee for conditioning and disposal. Heavily contaminated components and activated materials are routed for controlled disposal. The disposal volumes reported in the tables reflect the savings resulting from reprocessing and recycling.

For purposes of constructing the estimates, the current cost for disposal at EnergySolutions facility in Clive, Utah was used for a majority of the radioactive waste produced from the decommissioning activities. Separate rates were used for containerized waste and large components. Demolition debris including miscellaneous steel, scaffolding, and concrete was disposed of at a bulk rate. The decommissioning waste stream also included resins and dry active waste.

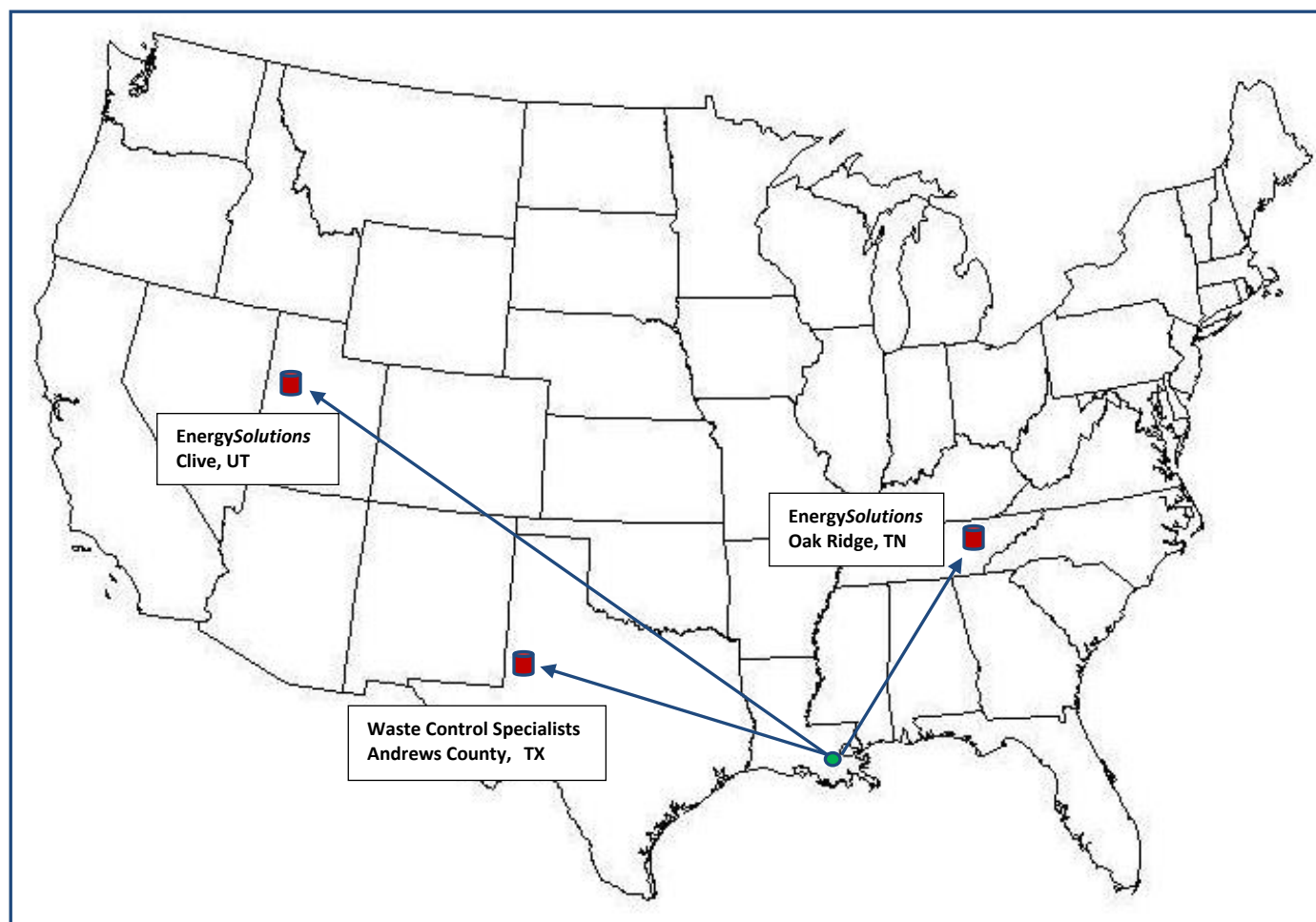
Since EnergySolutions is not currently able to receive the more highly radioactive components generated in the decontamination and dismantling of the reactor, disposal costs for the Class B and C material were based upon Entergy's current agreement with WCS for the Andrews County disposal facility.

The estimate includes the disposition of low-level radioactive waste currently stored in the spent fuel pool and expected to be present at the cessation of plant operations. The inventory comprises 34 containers with segmented in-core instruments (ICIs), Tri-Nuke filters, four four-fingered CEAs that cannot be reinserted into the spent fuel assemblies and other assorted components such as old excore detectors. It is assumed that this material will be packaged into a shipping liner (compatible with a Transnuclear TN-RAM or equivalent shielded cask) and designated for disposal at the WCS site.

**FIGURE 5.1
RADIOACTIVE WASTE DISPOSITION**



**FIGURE 5.2
DECOMMISSIONING WASTE DESTINATIONS
RADIOLOGICAL**



**TABLE 5.1
 DECON ALTERNATIVE
 DECOMMISSIONING WASTE SUMMARY**

Waste	Cost Basis	Class ^[1]	Waste Volume (cubic feet)	Mass (pounds)
Low-Level Radioactive Waste (near-surface disposal)	<i>EnergySolutions</i>	A	214,882	15,607,862
	WCS	B	1,808	214,385
	WCS	C	112	11,273
Greater than Class C (geologic repository)	Spent Fuel Equivalent	GTCC	2,474	487,788
Processed/Conditioned (off-site recycling center)	Recycling Vendors	A	423,311	16,330,690
Total ^[2]			642,587	32,651,998

^[1] Waste is classified according to the requirements as delineated in Title 10 CFR, Part 61.55

^[2] Columns may not add due to rounding

**TABLE 5.2
 SAFSTOR ALTERNATIVE
 DECOMMISSIONING WASTE SUMMARY**

Waste	Cost Basis	Class ^[1]	Waste Volume (cubic feet)	Mass (pounds)
Low-Level Radioactive Waste (near-surface disposal)	<i>EnergySolutions</i>	A	187,686	13,738,539
	WCS	B	807	87,477
	WCS	C	112	11,273
Greater than Class C (geologic repository)	Spent Fuel Equivalent	GTCC	2,474	487,788
Processed/Conditioned (off-site recycling center)	Recycling Vendors	A	445,524	17,249,300
Total ^[2]			636,603	31,574,377

^[1] Waste is classified according to the requirements as delineated in Title 10 CFR, Part 61.55

^[2] Columns may not add due to rounding

6. RESULTS

The analysis to estimate the costs to decommission Waterford 3 relied upon the site-specific, technical information developed for a previous analysis prepared in 2015. While not an engineering study, the estimates provide the owner with sufficient information to assess its financial obligations, as they pertain to the eventual decommissioning of the nuclear station.

The estimates described in this report are based on numerous fundamental assumptions, including regulatory requirements, project contingencies, low-level radioactive waste disposal practices, high-level radioactive waste management options, and site restoration requirements.

The cost projected to promptly decommission the station, dismantle the structures, and manage the spent fuel is estimated to be \$1,277.5 million. The majority of this cost (approximately 67%) is associated with the physical decontamination and dismantling of the nuclear plant so that the operating license can be terminated. Another 27.5% is associated with the management, interim storage, and eventual transfer of the spent fuel. The remaining 5.5% is for the demolition of the designated structures and limited restoration of the site.

The cost projected for deferred decommissioning (SAFSTOR) is estimated to be \$1,486.4 million. The majority of this cost (approximately 73.7%) is associated with placing the plant in storage, ongoing caretaking of the plant during dormancy, and the eventual physical decontamination and dismantling of the nuclear plant so that the operating license can be terminated. Another 21.6% is associated with the management, interim storage, and eventual transfer of the spent fuel. The remaining 4.7% is for the demolition of the designated structures and limited restoration of the site.

The primary cost contributors, identified in Tables 6.1 and 6.2, are either labor-related or associated with the management and disposition of the radioactive waste. Program management is the largest single contributor to the overall cost. The magnitude of the expense is a function of both the size of the organization required to manage the decommissioning, as well as the duration of the program. It is assumed, for purposes of this analysis, that Entergy Operations will oversee the decommissioning program and manage the decommissioning labor force (with the exception of the ISFSI decommissioning discussed in Section 3.4.1). The size and composition of the management organization varies with the decommissioning phase and associated site activities. However, once the operating license is amended or terminated, the staff is substantially reduced for the conventional demolition and

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restoration of the site, and the long-term care of the spent fuel (for the DECON alternative).

As described in this report, the spent fuel pool will remain operational for a minimum of five and one-half years following the cessation of operations. The pool will be isolated and an independent spent fuel island created. This will allow decommissioning operations to proceed in and around the pool area. Over the five and one-half year period, the spent fuel will be packaged into canisters assumed to be loaded into a DOE-provided transport cask or relocated to the ISFSI.

The cost for waste disposal includes only those costs associated with the controlled disposition of the low-level radioactive waste generated from decontamination and dismantling activities, including plant equipment and components, structural material, filters, resins and dry-active waste. As described in Section 5, disposition of the majority of the low-level radioactive material requiring controlled disposal is at the EnergySolutions' facility. Highly activated components, requiring additional isolation from the environment (GTCC), are packaged for geologic disposal. The cost of geologic disposal is based upon a cost equivalent for spent fuel.

A significant portion of the metallic waste is designated for additional processing and treatment at an off-site facility. Processing reduces the volume of material requiring controlled disposal through such techniques and processes as survey and sorting, decontamination, and volume reduction. The material that cannot be unconditionally released is packaged for controlled disposal at one of the currently operating facilities. The cost identified in the summary tables for processing is all-inclusive, incorporating the ultimate disposition of the material.

Removal costs reflect the labor-intensive nature of the decommissioning process, as well as the management controls required to ensure a safe and successful program. Decontamination and packaging costs also have a large labor component that is based upon prevailing wages. Non-radiological demolition is a natural extension of the decommissioning process. The methods employed in decontamination and dismantling are generally destructive and indiscriminate in inflicting collateral damage. With a work force mobilized to support decommissioning operations, non-radiological demolition can be an integrated activity and a logical expansion of the work being performed in the process of terminating the operating license.

The reported cost for transport includes the tariffs and surcharges associated with moving large components and/or overweight shielded casks overland, as well as the general expense, e.g., labor and fuel, of transporting material to the destinations identified in this report. For purposes of this analysis, material is primarily moved overland by truck.

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Decontamination is used to reduce the plant's radiation fields and minimize worker exposure. Slightly contaminated material or material located within a contaminated area is sent to an off-site processing center, i.e., this analysis does not assume that contaminated plant components and equipment can be decontaminated for uncontrolled release in-situ. Centralized processing centers have proven to be a more economical means of handling the large volumes of material produced in the dismantling of a nuclear plant.

License termination survey costs are associated with the labor intensive and complex activity of verifying that contamination has been removed from the site to the levels specified by the regulating agency. This process involves a systematic survey of all remaining plant surface areas and surrounding environs, sampling, isotopic analysis, and documentation of the findings. The status of any plant components and materials not removed in the decommissioning process will also require confirmation and will add to the expense of surveying the facilities alone.

The remaining costs include allocations for heavy equipment and temporary services, as well as for other expenses such as regulatory fees and the premiums for nuclear insurance. While site operating costs are greatly reduced following the final cessation of plant operations, certain administrative functions do need to be maintained either at a basic functional or regulatory level.

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**TABLE 6.1
DECON ALTERNATIVE
DECOMMISSIONING COST ELEMENTS**
(thousands of 2019 dollars)

Cost Element	Cost	Percentage
Decontamination	15,975	1.3
Removal	135,534	10.6
Packaging	31,584	2.5
Transportation	19,476	1.5
Waste Disposal	75,739	5.9
Off-site Waste Processing	47,260	3.7
Program Management ^[1]	414,653	32.5
Site Security	192,678	15.1
Spent Fuel Pool Isolation	14,174	1.1
Dry Fuel Storage (Capital and Transfer) ^[2]	160,484	12.6
Insurance and Regulatory Fees	45,936	3.6
Energy	10,111	0.8
Characterization and Licensing Surveys	28,244	2.2
Property Taxes	4,277	0.3
Site O&M (Non-Labor Overhead)	19,357	1.5
Corporate A&G	44,771	3.5
Miscellaneous Equipment / Site Services	11,234	0.9
Severance	6,000	0.5
Total ^[3]	1,277,489	100

Cost Category	Cost	Percentage
License Termination	856,219	67.0
Spent Fuel Management	351,173	27.5
Site Restoration	70,097	5.5
Total ^[3]	1,277,489	100.0

^[1] Includes engineering costs

^[2] Includes costs for operating the spent fuel pools and ISFSI, emergency planning and the cost to transfer the fuel to the DOE and/or ISFSI

^[3] Columns may not add due to rounding

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TABLE 6.2
SAFSTOR ALTERNATIVE
DECOMMISSIONING COST ELEMENTS
(thousands of 2019 dollars)

Cost Element	Cost	Percentage
Decontamination	18,427	1.2
Removal	135,109	9.1
Packaging	20,223	1.4
Transportation	16,980	1.1
Waste Disposal	60,196	4.1
Off-site Waste Processing	49,912	3.4
Program Management ^[1]	497,187	33.5
Site Security	264,412	17.8
Spent Fuel Pool Isolation	14,174	1.0
Dry Fuel Storage (Capital and Transfer) ^[2]	151,728	10.2
Insurance and Regulatory Fees	74,487	5.0
Energy	20,070	1.4
Characterization and Licensing Surveys	27,016	1.8
Property Taxes	7,268	0.5
Site O&M (Non-Labor Overhead)	25,246	1.7
Corporate A&G	64,535	4.3
Miscellaneous Equipment / Site Services	33,468	2.3
Severance	6,000	0.4
Total ^[3]	1,486,438	100

Cost Category	Cost	Percentage
License Termination	1,095,521	73.7
Spent Fuel Management	321,603	21.6
Site Restoration	69,314	4.7
Total ^[3]	1,486,438	100.0

^[1] Includes engineering costs

^[2] Includes costs for operating the spent fuel pools and ISFSI, emergency planning and the cost to transfer the fuel to the DOE and/or ISFSI

^[3] Columns may not add due to rounding

7. REFERENCES

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APPENDIX A

UNIT COST FACTOR DEVELOPMENT

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APPENDIX A
UNIT COST FACTOR DEVELOPMENT

Example: Unit Factor for Removal of Contaminated Heat Exchanger < 3,000 lbs.

1. SCOPE

Heat exchangers weighing < 3,000 lbs. will be removed in one piece using a crane or small hoist. They will be disconnected from the inlet and outlet piping. The heat exchanger will be sent to the waste processing area.

2. CALCULATIONS

Act ID	Activity Description	Activity Duration (minutes)	Critical Duration (minutes)*
a	Remove insulation	60	(b)
b	Mount pipe cutters	60	60
c	Install contamination controls	20	(b)
d	Disconnect inlet and outlet lines	60	60
e	Cap openings	20	(d)
f	Rig for removal	30	30
g	Unbolt from mounts	30	30
h	Remove contamination controls	15	15
i	Remove, wrap, send to waste processing area	<u>60</u>	<u>60</u>
Totals (Activity/Critical)		355	255

Duration adjustment(s):

+ Respiratory protection adjustment (50% of critical duration) 128

+ Radiation/ALARA adjustment (37.1% of critical duration) 95

Adjusted work duration 478

+ Protective clothing adjustment (30% of adjusted duration) 143

Productive work duration 621

+ Work break adjustment (8.33 % of productive duration) 52

Total work duration (minutes) 673

***** Total duration = 11.217 hr *****

* alpha designators indicate activities that can be performed in parallel

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3. LABOR REQUIRED

Crew	Number	Duration (hours)	Rate (\$/hr)	Cost
Laborers	3.00	11.217	\$30.40	\$1,022.99
Craftsmen	2.00	11.217	\$51.37	\$1,152.43
Foreman	1.00	11.217	\$54.94	\$616.26
General Foreman	0.25	11.217	\$57.49	\$161.22
Fire Watch	0.05	11.217	\$30.40	\$17.05
Health Physics Technician	1.00	11.217	\$49.51	<u>\$555.35</u>
Total Labor Cost				\$3,525.30

4. EQUIPMENT & CONSUMABLES COSTS

Equipment Costs	none
Consumables/Materials Costs	
-Universal Sorbent 50 @ \$0.67 sq. ft. ^{1}	\$33.50
-Tarpaulins (oil resistant/fire retardant) 50 @ \$0.52/sq. ft. ^{2}	\$26.00
-Gas torch consumables 1 @ \$21.25/hr. x 1 hr. ^{3}	<u>\$21.25</u>
Subtotal cost of equipment and materials	\$80.75
Overhead & profit on equipment and materials @ 19.45 %	<u>\$15.71</u>
Total costs, equipment & material	\$96.46

TOTAL COST:

Removal of contaminated heat exchanger <3000 pounds:	\$3,621.76
Total labor cost:	\$3,525.30
Total equipment/material costs:	\$96.46
Total craft labor man-hours required per unit:	81.88

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5. NOTES AND REFERENCES

- Work difficulty factors were developed in conjunction with the Atomic Industrial Forum's (now NEI) program to standardize nuclear decommissioning cost estimates and are delineated in Volume 1, Chapter 5 of the "Guidelines for Producing Commercial Nuclear Power Plant Decommissioning Cost Estimates," AIF/NESP-036, May 1986.
- References for equipment & consumables costs:
 1. www.mcmaster.com online catalog, McMaster Carr Spill Control (7193T88)
 2. R.S. Means (2019) Division 01 56, Section 13.60-0600, page 22
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- Material and consumable costs were adjusted using the regional indices for New Orleans, Louisiana.

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APPENDIX B

UNIT COST FACTOR LISTING (DECON: Power Block Structures Only)

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APPENDIX B

**UNIT COST FACTOR LISTING
(Power Block Structures Only)**

Unit Cost Factor	Cost/Unit(\$)
Removal of clean instrument and sampling tubing, \$/linear foot	0.37
Removal of clean pipe 0.25 to 2 inches diameter, \$/linear foot	3.80
Removal of clean pipe >2 to 4 inches diameter, \$/linear foot	5.62
Removal of clean pipe >4 to 8 inches diameter, \$/linear foot	11.55
Removal of clean pipe >8 to 14 inches diameter, \$/linear foot	21.66
Removal of clean pipe >14 to 20 inches diameter, \$/linear foot	28.34
Removal of clean pipe >20 to 36 inches diameter, \$/linear foot	41.65
Removal of clean pipe >36 inches diameter, \$/linear foot	49.41
Removal of clean valve >2 to 4 inches	75.90
Removal of clean valve >4 to 8 inches	115.48
Removal of clean valve >8 to 14 inches	216.58
Removal of clean valve >14 to 20 inches	283.40
Removal of clean valve >20 to 36 inches	416.54
Removal of clean valve >36 inches	494.12
Removal of clean pipe hanger for small bore piping	27.67
Removal of clean pipe hanger for large bore piping	90.98
Removal of clean pump, <300 pound	198.53
Removal of clean pump, 300-1000 pound	559.56
Removal of clean pump, 1000-10,000 pound	2,168.05
Removal of clean pump, >10,000 pound	4,205.90
Removal of clean pump motor, 300-1000 pound	231.30
Removal of clean pump motor, 1000-10,000 pound	897.06
Removal of clean pump motor, >10,000 pound	2,018.38
Removal of clean heat exchanger <3000 pound	1,172.65
Removal of clean heat exchanger >3000 pound	2,969.82
Removal of clean feedwater heater/deaerator	8,312.16
Removal of clean moisture separator/reheater	17,008.79
Removal of clean tank, <300 gallons	254.95
Removal of clean tank, 300-3000 gallon	796.77
Removal of clean tank, >3000 gallons, \$/square foot surface area	6.92

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Unit Cost Factor	Cost/Unit(\$)
Removal of clean electrical equipment, <300 pound	105.27
Removal of clean electrical equipment, 300-1000 pound	376.57
Removal of clean electrical equipment, 1000-10,000 pound	753.15
Removal of clean electrical equipment, >10,000 pound	1,816.25
Removal of clean electrical transformer < 30 tons	1,261.36
Removal of clean electrical transformer > 30 tons	3,632.49
Removal of clean standby diesel generator, <100 kW	1,288.37
Removal of clean standby diesel generator, 100 kW to 1 MW	2,875.73
Removal of clean standby diesel generator, >1 MW	5,953.33
Removal of clean electrical cable tray, \$/linear foot	10.07
Removal of clean electrical conduit, \$/linear foot	4.41
Removal of clean mechanical equipment, <300 pound	105.27
Removal of clean mechanical equipment, 300-1000 pound	376.57
Removal of clean mechanical equipment, 1000-10,000 pound	753.15
Removal of clean mechanical equipment, >10,000 pound	1,816.25
Removal of clean HVAC equipment, <300 pound	127.30
Removal of clean HVAC equipment, 300-1000 pound	452.49
Removal of clean HVAC equipment, 1000-10,000 pound	901.80
Removal of clean HVAC equipment, >10,000 pound	1,816.25
Removal of clean HVAC ductwork, \$/pound	0.39
Removal of contaminated instrument and sampling tubing, \$/linear foot	1.24
Removal of contaminated pipe 0.25 to 2 inches diameter, \$/linear foot	19.72
Removal of contaminated pipe >2 to 4 inches diameter, \$/linear foot	31.98
Removal of contaminated pipe >4 to 8 inches diameter, \$/linear foot	52.02
Removal of contaminated pipe >8 to 14 inches diameter, \$/linear foot	98.12
Removal of contaminated pipe >14 to 20 inches diameter, \$/linear foot	116.81
Removal of contaminated pipe >20 to 36 inches diameter, \$/linear foot	159.25
Removal of contaminated pipe >36 inches diameter, \$/linear foot	187.00
Removal of contaminated valve >2 to 4 inches	380.98
Removal of contaminated valve >4 to 8 inches	456.08

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Unit Cost Factor	Cost/Unit(\$)
Removal of contaminated valve >8 to 14 inches	910.18
Removal of contaminated valve >14 to 20 inches	1,150.23
Removal of contaminated valve >20 to 36 inches	1,521.42
Removal of contaminated valve >36 inches	1,798.98
Removal of contaminated pipe hanger for small bore piping	124.85
Removal of contaminated pipe hanger for large bore piping	403.68
Removal of contaminated pump, <300 pound	820.26
Removal of contaminated pump, 300-1000 pound	1,907.90
Removal of contaminated pump, 1000-10,000 pound	5,936.82
Removal of contaminated pump, >10,000 pound	14,455.83
Removal of contaminated pump motor, 300-1000 pound	843.90
Removal of contaminated pump motor, 1000-10,000 pound	2,450.16
Removal of contaminated pump motor, >10,000 pound	5,501.22
Removal of contaminated heat exchanger <3000 pound	3,621.76
Removal of contaminated heat exchanger >3000 pound	10,606.06
Removal of contaminated tank, <300 gallons	1,371.66
Removal of contaminated tank, >300 gallons, \$/square foot	26.18
Removal of contaminated electrical equipment, <300 pound	617.69
Removal of contaminated electrical equipment, 300-1000 pound	1,531.76
Removal of contaminated electrical equipment, 1000-10,000 pound	2,952.29
Removal of contaminated electrical equipment, >10,000 pound	5,863.78
Removal of contaminated electrical cable tray, \$/linear foot	29.93
Removal of contaminated electrical conduit, \$/linear foot	15.84
Removal of contaminated mechanical equipment, <300 pound	686.41
Removal of contaminated mechanical equipment, 300-1000 pound	1,688.79
Removal of contaminated mechanical equipment, 1000-10,000 pound	3,249.54
Removal of contaminated mechanical equipment, >10,000 pound	5,863.78
Removal of contaminated HVAC equipment, <300 pound	686.41
Removal of contaminated HVAC equipment, 300-1000 pound	1,688.79
Removal of contaminated HVAC equipment, 1000-10,000 pound	3,249.54

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**UNIT COST FACTOR LISTING
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Unit Cost Factor	Cost/Unit(\$)
Removal of contaminated HVAC equipment, >10,000 pound	5,863.78
Removal of contaminated HVAC ductwork, \$/pound	1.91
Removal/plasma arc cut of contaminated thin metal components, \$/linear in.	3.29
Additional decontamination of surface by washing, \$/square foot	6.65
Additional decontamination of surfaces by hydrolasing, \$/square foot	31.60
Decontamination rig hook up and flush, \$/ 250 foot length	5,729.69
Chemical flush of components/systems, \$/gallon	22.66
Removal of clean standard reinforced concrete, \$/cubic yard	71.94
Removal of grade slab concrete, \$/cubic yard	81.77
Removal of clean concrete floors, \$/cubic yard	354.20
Removal of sections of clean concrete floors, \$/cubic yard	1,040.00
Removal of clean heavily rein concrete w/#9 rebar, \$/cubic yard	103.66
Removal of contaminated heavily rein concrete w/#9 rebar, \$/cubic yard	1,931.52
Removal of clean heavily rein concrete w/#18 rebar, \$/cubic yard	140.45
Removal of contaminated heavily rein concrete w/#18 rebar, \$/cubic yard	2,551.38
Removal heavily rein concrete w/#18 rebar & steel embedments, \$/cubic yard	416.74
Removal of below-grade suspended floors, \$/cubic yard	196.80
Removal of clean monolithic concrete structures, \$/cubic yard	817.58
Removal of contaminated monolithic concrete structures, \$/cubic yard	1,912.25
Removal of clean foundation concrete, \$/cubic yard	646.15
Removal of contaminated foundation concrete, \$/cubic yard	1,782.36
Explosive demolition of bulk concrete, \$/cubic yard	46.40
Removal of clean hollow masonry block wall, \$/cubic yard	25.03
Removal of contaminated hollow masonry block wall, \$/cubic yard	65.18
Removal of clean solid masonry block wall, \$/cubic yard	25.03
Removal of contaminated solid masonry block wall, \$/cubic yard	65.18
Backfill of below-grade voids, \$/cubic yard	32.26
Removal of subterranean tunnels/voids, \$/linear foot	98.46
Placement of concrete for below-grade voids, \$/cubic yard	149.83
Excavation of clean material, \$/cubic yard	2.97

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**UNIT COST FACTOR LISTING
(Power Block Structures Only)**

Unit Cost Factor	Cost/Unit(\$)
Excavation of contaminated material, \$/cubic yard	39.80
Removal of clean concrete rubble (tipping fee included), \$/cubic yard	25.69
Removal of contaminated concrete rubble, \$/cubic yard	24.86
Removal of building by volume, \$/cubic foot	0.28
Removal of clean building metal siding, \$/square foot	1.15
Removal of contaminated building metal siding, \$/square foot	3.99
Removal of standard asphalt roofing, \$/square foot	1.72
Removal of transite panels, \$/square foot	1.83
Scarifying contaminated concrete surfaces (drill & spall), \$/square foot	11.75
Scabbling contaminated concrete floors, \$/square foot	6.74
Scabbling contaminated concrete walls, \$/square foot	17.40
Scabbling contaminated ceilings, \$/square foot	59.36
Scabbling structural steel, \$/square foot	5.65
Removal of clean overhead crane/monorail < 10 ton capacity	545.34
Removal of contaminated overhead crane/monorail < 10 ton capacity	1,586.33
Removal of clean overhead crane/monorail >10-50 ton capacity	1,308.81
Removal of contaminated overhead crane/monorail >10-50 ton capacity	3,806.56
Removal of polar crane > 50 ton capacity	5,526.95
Removal of gantry crane > 50 ton capacity	20,281.44
Removal of structural steel, \$/pound	0.17
Removal of clean steel floor grating, \$/square foot	4.33
Removal of contaminated steel floor grating, \$/square foot	12.61
Removal of clean free standing steel liner, \$/square foot	10.37
Removal of contaminated free standing steel liner, \$/square foot	30.47
Removal of clean concrete-anchored steel liner, \$/square foot	5.19
Removal of contaminated concrete-anchored steel liner, \$/square foot	35.54
Placement of scaffolding in clean areas, \$/square foot	16.79
Placement of scaffolding in contaminated areas, \$/square foot	25.12
Landscaping with topsoil, \$/acre	24,915.55
Cost of CPC B-88 LSA box & preparation for use	2,222.82

***Waterford Steam Electric Station, Unit 3
Decommissioning Cost Analysis***

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APPENDIX B

**UNIT COST FACTOR LISTING
(Power Block Structures Only)**

Unit Cost Factor	Cost/Unit(\$)
Cost of CPC B-25 LSA box & preparation for use	1,799.73
Cost of CPC B-12V 12 gauge LSA box & preparation for use	1,719.12
Cost of CPC B-144 LSA box & preparation for use	11,352.87
Cost of LSA drum & preparation for use	232.12
Cost of cask liner for CNSI 8 120A cask (resins)	13,280.65
Cost of cask liner for CNSI 8 120A cask (filters)	9,442.60
Decontamination of surfaces with vacuuming, \$/square foot	0.73

*Waterford Steam Electric Station, Unit 3
Decommissioning Cost Analysis*

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APPENDIX C
DETAILED COST ANALYSIS
DECON

Table C
Waterford Steam Electric Station, Unit 3
DECON Decommissioning Cost Estimate
(thousands of 2019 dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes				Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
															Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet			
PERIOD 0a - Pre-Shutdown Early Planning																					
Period 0a Additional Costs																					
0a.2.1	Pre-Shutdown Contractor	-	-	-	-	-	-	8,858	-	8,858	8,858	-	-	-	-	-	-	-	-	-	-
0a.2.2	IT Support and Projects	-	-	-	-	-	-	701	-	701	701	-	-	-	-	-	-	-	-	-	-
0a.2	Subtotal Period 0a Additional Costs	-	-	-	-	-	-	9,559	-	9,559	9,559	-	-	-	-	-	-	-	-	-	-
Period 0a Collateral Costs																					
0a.3.1	NDO	-	-	-	-	-	-	3,288	493	3,781	3,781	-	-	-	-	-	-	-	-	-	-
0a.3	Subtotal Period 0a Collateral Costs	-	-	-	-	-	-	3,288	493	3,781	3,781	-	-	-	-	-	-	-	-	-	-
Period 0a Period-Dependent Costs																					
0a.4.4	NRC Fees	-	-	-	-	-	-	498	50	548	548	-	-	-	-	-	-	-	-	-	-
0a.4.5	Utility Staff Cost	-	-	-	-	-	-	4,151	623	4,774	4,774	-	-	-	-	-	-	-	-	-	-
0a.4	Subtotal Period 0a Period-Dependent Costs	-	-	-	-	-	-	4,649	672	5,322	5,322	-	-	-	-	-	-	-	-	-	-
0a.0	TOTAL PERIOD 0a COST	-	-	-	-	-	-	17,496	1,166	18,661	18,661	-	-	-	-	-	-	-	-	-	-
PERIOD 1a - Shutdown through Transition																					
Period 1a Direct Decommissioning Activities																					
1a.1.1	Prepare preliminary decommissioning cost	-	-	-	-	-	-	195	29	224	224	-	-	-	-	-	-	-	-	-	1,300
1a.1.2	Notification of Cessation of Operations									a											
1a.1.3	Remove fuel & source material									n/a											
1a.1.4	Notification of Permanent Defueling									a											
1a.1.5	Deactivate plant systems & process waste									a											
1a.1.6	Prepare and submit PSDAR	-	-	-	-	-	-	300	45	344	344	-	-	-	-	-	-	-	-	-	2,000
1a.1.7	Review plant dwgs & specs.	-	-	-	-	-	-	689	103	792	792	-	-	-	-	-	-	-	-	-	4,600
1a.1.8	Perform detailed rad survey									a											
1a.1.9	Estimate by-product inventory	-	-	-	-	-	-	150	22	172	172	-	-	-	-	-	-	-	-	-	1,000
1a.1.10	End product description	-	-	-	-	-	-	150	22	172	172	-	-	-	-	-	-	-	-	-	1,000
1a.1.11	Detailed by-product inventory	-	-	-	-	-	-	195	29	224	224	-	-	-	-	-	-	-	-	-	1,300
1a.1.12	Define major work sequence	-	-	-	-	-	-	1,123	168	1,292	1,292	-	-	-	-	-	-	-	-	-	7,500
1a.1.13	Perform SER and EA	-	-	-	-	-	-	464	70	534	534	-	-	-	-	-	-	-	-	-	3,100
1a.1.14	Prepare/submit Defueled Technical Specifications	-	-	-	-	-	-	1,123	168	1,292	1,292	-	-	-	-	-	-	-	-	-	7,500
1a.1.15	Perform Site-Specific Cost Study	-	-	-	-	-	-	749	112	861	861	-	-	-	-	-	-	-	-	-	5,000
1a.1.16	Prepare/submit Irradiated Fuel Management Plan	-	-	-	-	-	-	150	22	172	172	-	-	-	-	-	-	-	-	-	1,000
Activity Specifications																					
1a.1.17.1	Plant & temporary facilities	-	-	-	-	-	-	737	111	847	763	-	85	-	-	-	-	-	-	-	4,920
1a.1.17.2	Plant systems	-	-	-	-	-	-	624	94	718	646	-	72	-	-	-	-	-	-	-	4,167
1a.1.17.3	NSSS Decontamination Flush	-	-	-	-	-	-	75	11	86	86	-	-	-	-	-	-	-	-	-	500
1a.1.17.4	Reactor internals	-	-	-	-	-	-	1,063	160	1,223	1,223	-	-	-	-	-	-	-	-	-	7,100
1a.1.17.5	Reactor vessel	-	-	-	-	-	-	974	146	1,120	1,120	-	-	-	-	-	-	-	-	-	6,500
1a.1.17.6	Biological shield	-	-	-	-	-	-	75	11	86	86	-	-	-	-	-	-	-	-	-	500
1a.1.17.7	Steam generators	-	-	-	-	-	-	467	70	537	537	-	-	-	-	-	-	-	-	-	3,120
1a.1.17.8	Reinforced concrete	-	-	-	-	-	-	240	36	276	138	-	138	-	-	-	-	-	-	-	1,600
1a.1.17.9	Main Turbine	-	-	-	-	-	-	60	9	69	-	-	69	-	-	-	-	-	-	-	400
1a.1.17.10	Main Condensers	-	-	-	-	-	-	60	9	69	-	-	69	-	-	-	-	-	-	-	400
1a.1.17.11	Plant structures & buildings	-	-	-	-	-	-	467	70	537	269	-	269	-	-	-	-	-	-	-	3,120
1a.1.17.12	Waste management	-	-	-	-	-	-	689	103	792	792	-	-	-	-	-	-	-	-	-	4,600
1a.1.17.13	Facility & site closeout	-	-	-	-	-	-	135	20	155	78	-	78	-	-	-	-	-	-	-	900
1a.1.17	Total	-	-	-	-	-	-	5,665	850	6,515	5,737	-	778	-	-	-	-	-	-	-	37,827
Planning & Site Preparations																					
1a.1.18	Prepare dismantling sequence	-	-	-	-	-	-	359	54	413	413	-	-	-	-	-	-	-	-	-	2,400
1a.1.19	Plant prep. & temp. svces	-	-	-	-	-	-	3,400	510	3,910	3,910	-	-	-	-	-	-	-	-	-	-
1a.1.20	Design water clean-up system	-	-	-	-	-	-	210	31	241	241	-	-	-	-	-	-	-	-	-	1,400
1a.1.21	Rigging/Cont. Cntrl Envlps/tooling/etc.	-	-	-	-	-	-	2,400	360	2,760	2,760	-	-	-	-	-	-	-	-	-	-
1a.1.22	Procure casks/liners & containers	-	-	-	-	-	-	184	28	212	212	-	-	-	-	-	-	-	-	-	1,230
1a.1	Subtotal Period 1a Activity Costs	-	-	-	-	-	-	17,506	2,626	20,131	19,353	-	778	-	-	-	-	-	-	-	78,157
Period 1a Additional Costs																					
1a.2.1	IT Support and Projects	-	-	-	-	-	-	547	-	547	547	-	-	-	-	-	-	-	-	-	-
1a.2.2	Fees Paid by Headquarters	-	-	-	-	-	-	98	-	98	98	-	-	-	-	-	-	-	-	-	-
1a.2.3	Communication Plan	-	-	-	-	-	-	342	-	342	342	-	-	-	-	-	-	-	-	-	-
1a.2.4	Post-Shutdown Contractor	-	-	-	-	-	-	815	-	815	815	-	-	-	-	-	-	-	-	-	-

Waterford Steam Electric Station, Unit 3
Decommissioning Cost Analysis

Table C
Waterford Steam Electric Station, Unit 3
DECON Decommissioning Cost Estimate
(thousands of 2019 dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes				Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
															Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet			
Period 1a Additional Costs (continued)																					
1a.2.5	Water Usage	-	-	-	-	-	-	320	48	368	368	-	-	-	-	-	-	-	-	-	-
1a.2	Subtotal Period 1a Additional Costs	-	-	-	-	-	-	2,122	48	2,170	2,170	-	-	-	-	-	-	-	-	-	-
Period 1a Collateral Costs																					
1a.3.1	Spent Fuel Capital and Transfer	-	-	-	-	-	-	2,060	309	2,369	-	2,369	-	-	-	-	-	-	-	-	-
1a.3.2	NDO	-	-	-	-	-	-	3,288	493	3,781	3,781	-	-	-	-	-	-	-	-	-	-
1a.3.3	Legal (License Termination)	-	-	-	-	-	-	831	125	956	956	-	-	-	-	-	-	-	-	-	-
1a.3.4	Annual Fee	-	-	-	-	-	-	83	12	95	95	-	-	-	-	-	-	-	-	-	-
1a.3.5	Corporate A&G	-	-	-	-	-	-	10,249	1,537	11,786	11,786	-	-	-	-	-	-	-	-	-	-
1a.3	Subtotal Period 1a Collateral Costs	-	-	-	-	-	-	16,511	2,477	18,987	16,618	2,369	-	-	-	-	-	-	-	-	-
Period 1a Period-Dependent Costs																					
1a.4.1	Insurance	-	-	-	-	-	-	3,349	335	3,684	3,684	-	-	-	-	-	-	-	-	-	-
1a.4.2	Property taxes	-	-	-	-	-	-	106	11	117	117	-	-	-	-	-	-	-	-	-	-
1a.4.3	Health physics supplies	-	517	-	-	-	-	-	129	646	646	-	-	-	-	-	-	-	-	-	-
1a.4.4	Heavy equipment rental	-	546	-	-	-	-	-	82	628	628	-	-	-	-	-	-	-	-	-	-
1a.4.5	Disposal of DAW generated	-	-	12	5	-	31	-	10	57	57	-	-	-	616	-	-	-	12,311	20	-
1a.4.6	Plant energy budget	-	-	-	-	-	-	1,491	224	1,714	1,714	-	-	-	-	-	-	-	-	-	-
1a.4.7	NRC Fees	-	-	-	-	-	-	1,700	170	1,870	1,870	-	-	-	-	-	-	-	-	-	-
1a.4.8	Emergency Planning Fees	-	-	-	-	-	-	1,279	128	1,407	-	1,407	-	-	-	-	-	-	-	-	-
1a.4.9	Indirect Overhead	-	-	-	-	-	-	2,844	427	3,271	3,271	-	-	-	-	-	-	-	-	-	-
1a.4.10	Spent Fuel Pool O&M	-	-	-	-	-	-	828	124	952	-	952	-	-	-	-	-	-	-	-	-
1a.4.11	ISFSI Operating Costs	-	-	-	-	-	-	109	16	125	-	125	-	-	-	-	-	-	-	-	-
1a.4.12	Security Staff Cost	-	-	-	-	-	-	14,820	2,223	17,043	17,043	-	-	-	-	-	-	-	-	-	266,058
1a.4.13	Utility Staff Cost	-	-	-	-	-	-	35,482	5,322	40,804	40,804	-	-	-	-	-	-	-	-	-	432,640
1a.4	Subtotal Period 1a Period-Dependent Costs	-	1,063	12	5	-	31	62,008	9,200	72,318	69,834	2,484	-	-	616	-	-	-	12,311	20	698,698
1a.0	TOTAL PERIOD 1a COST	-	1,063	12	5	-	31	98,146	14,351	113,607	107,976	4,853	778	-	616	-	-	-	12,311	20	776,855
PERIOD 1b - Decommissioning Preparations																					
Period 1b Direct Decommissioning Activities																					
Detailed Work Procedures																					
1b.1.1.1	Plant systems	-	-	-	-	-	-	709	106	815	734	-	82	-	-	-	-	-	-	-	4,733
1b.1.1.2	NSSS Decontamination Flush	-	-	-	-	-	-	150	22	172	172	-	-	-	-	-	-	-	-	-	1,000
1b.1.1.3	Reactor internals	-	-	-	-	-	-	374	56	431	431	-	-	-	-	-	-	-	-	-	2,500
1b.1.1.4	Remaining buildings	-	-	-	-	-	-	202	30	233	58	-	174	-	-	-	-	-	-	-	1,350
1b.1.1.5	CRD cooling assembly	-	-	-	-	-	-	150	22	172	172	-	-	-	-	-	-	-	-	-	1,000
1b.1.1.6	CRD housings & ICI tubes	-	-	-	-	-	-	150	22	172	172	-	-	-	-	-	-	-	-	-	1,000
1b.1.1.7	Incore instrumentation	-	-	-	-	-	-	150	22	172	172	-	-	-	-	-	-	-	-	-	1,000
1b.1.1.8	Reactor vessel	-	-	-	-	-	-	544	82	625	625	-	-	-	-	-	-	-	-	-	3,630
1b.1.1.9	Facility closeout	-	-	-	-	-	-	180	27	207	103	-	103	-	-	-	-	-	-	-	1,200
1b.1.1.10	Missile shields	-	-	-	-	-	-	67	10	78	78	-	-	-	-	-	-	-	-	-	450
1b.1.1.11	Biological shield	-	-	-	-	-	-	180	27	207	207	-	-	-	-	-	-	-	-	-	1,200
1b.1.1.12	Steam generators	-	-	-	-	-	-	689	103	792	792	-	-	-	-	-	-	-	-	-	4,600
1b.1.1.13	Reinforced concrete	-	-	-	-	-	-	150	22	172	86	-	86	-	-	-	-	-	-	-	1,000
1b.1.1.14	Main Turbine	-	-	-	-	-	-	234	35	269	-	-	269	-	-	-	-	-	-	-	1,560
1b.1.1.15	Main Condensers	-	-	-	-	-	-	234	35	269	-	-	269	-	-	-	-	-	-	-	1,560
1b.1.1.16	Auxiliary building	-	-	-	-	-	-	409	61	470	423	-	47	-	-	-	-	-	-	-	2,730
1b.1.1.17	Reactor building	-	-	-	-	-	-	409	61	470	423	-	47	-	-	-	-	-	-	-	2,730
1b.1.1	Total	-	-	-	-	-	-	4,979	747	5,726	4,649	-	1,077	-	-	-	-	-	-	-	33,243
1b.1.2	Decon primary loop	800	-	-	-	-	-	-	400	1,200	1,200	-	-	-	-	-	-	-	-	1,067	-
1b.1	Subtotal Period 1b Activity Costs	800	-	-	-	-	-	4,979	1,147	6,925	5,849	-	1,077	-	-	-	-	-	-	1,067	33,243
Period 1b Additional Costs																					
1b.2.1	Spent fuel pool isolation	-	-	-	-	-	-	12,325	1,849	14,174	14,174	-	-	-	-	-	-	-	-	-	-
1b.2.2	Site Characterization	-	-	-	-	-	-	4,640	1,392	6,031	6,031	-	-	-	-	-	-	-	-	24,400	9,232
1b.2.3	IT Support and Projects	-	-	-	-	-	-	242	-	242	242	-	-	-	-	-	-	-	-	-	-
1b.2.4	Fees Paid by Headquarters	-	-	-	-	-	-	49	-	49	49	-	-	-	-	-	-	-	-	-	-
1b.2.5	Communication Plan	-	-	-	-	-	-	17	-	17	17	-	-	-	-	-	-	-	-	-	-
1b.2.6	Post-Shutdown Contractor	-	-	-	-	-	-	202	-	202	202	-	-	-	-	-	-	-	-	-	-
1b.2.7	Water Usage	-	-	-	-	-	-	193	29	222	222	-	-	-	-	-	-	-	-	-	-
1b.2	Subtotal Period 1b Additional Costs	-	-	-	-	-	-	17,669	3,270	20,939	20,939	-	-	-	-	-	-	-	-	24,400	9,232

Waterford Steam Electric Station, Unit 3
Decommissioning Cost Analysis

Table C
Waterford Steam Electric Station, Unit 3
DECON Decommissioning Cost Estimate
(thousands of 2019 dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes				Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
															Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet			
Period 1b Collateral Costs																					
1b.3.1	Decon equipment	1,026	-	-	-	-	-	-	154	1,180	1,180	-	-	-	-	-	-	-	-	-	-
1b.3.2	DOC staff relocation expenses	-	-	-	-	-	-	1,825	274	2,098	2,098	-	-	-	-	-	-	-	-	-	-
1b.3.3	Process decommissioning water waste	55	-	38	79	-	116	-	72	361	361	-	-	-	341	-	-	-	20,455	66	-
1b.3.4	Process decommissioning chemical flush waste	2	-	87	308	-	5,671	-	1,474	7,543	7,543	-	-	-	-	816	-	-	86,927	153	-
1b.3.5	Small tool allowance	-	2	-	-	-	-	-	0	3	3	-	-	-	-	-	-	-	-	-	-
1b.3.6	Pipe cutting equipment	-	1,200	-	-	-	-	-	180	1,380	1,380	-	-	-	-	-	-	-	-	-	-
1b.3.7	Decon rig	2,150	-	-	-	-	-	-	323	2,473	2,473	-	-	-	-	-	-	-	-	-	-
1b.3.8	Spent Fuel Capital and Transfer	-	-	-	-	-	-	6,287	943	7,230	-	7,230	-	-	-	-	-	-	-	-	-
1b.3.9	NDO	-	-	-	-	-	-	1,657	249	1,906	1,906	-	-	-	-	-	-	-	-	-	-
1b.3.10	Legal (License Termination)	-	-	-	-	-	-	436	65	501	501	-	-	-	-	-	-	-	-	-	-
1b.3.11	Annual Fee	-	-	-	-	-	-	43	7	50	50	-	-	-	-	-	-	-	-	-	-
1b.3.12	Corporate A&G	-	-	-	-	-	-	3,300	495	3,795	3,795	-	-	-	-	-	-	-	-	-	-
1b.3	Subtotal Period 1b Collateral Costs	3,234	1,202	124	388	-	5,788	13,548	4,235	28,518	21,289	7,230	-	-	341	816	-	-	107,382	219	-
Period 1b Period-Dependent Costs																					
1b.4.1	Decon supplies	38	-	-	-	-	-	-	9	47	47	-	-	-	-	-	-	-	-	-	-
1b.4.2	Insurance	-	-	-	-	-	-	1,688	169	1,857	1,857	-	-	-	-	-	-	-	-	-	-
1b.4.3	Property taxes	-	-	-	-	-	-	54	5	59	59	-	-	-	-	-	-	-	-	-	-
1b.4.4	Health physics supplies	-	292	-	-	-	-	-	73	365	365	-	-	-	-	-	-	-	-	-	-
1b.4.5	Heavy equipment rental	-	275	-	-	-	-	-	41	317	317	-	-	-	-	-	-	-	-	-	-
1b.4.6	Disposal of DAW generated	-	-	7	3	-	18	-	6	34	34	-	-	-	363	-	-	-	7,258	12	-
1b.4.7	Plant energy budget	-	-	-	-	-	-	1,503	225	1,728	1,728	-	-	-	-	-	-	-	-	-	-
1b.4.8	NRC Fees	-	-	-	-	-	-	579	58	637	637	-	-	-	-	-	-	-	-	-	-
1b.4.9	Emergency Planning Fees	-	-	-	-	-	-	645	64	709	-	709	-	-	-	-	-	-	-	-	-
1b.4.10	Indirect Overhead	-	-	-	-	-	-	1,371	206	1,576	1,576	-	-	-	-	-	-	-	-	-	-
1b.4.11	Spent Fuel Pool O&M	-	-	-	-	-	-	417	63	480	-	480	-	-	-	-	-	-	-	-	-
1b.4.12	ISFSI Operating Costs	-	-	-	-	-	-	55	8	63	-	63	-	-	-	-	-	-	-	-	-
1b.4.13	Security Staff Cost	-	-	-	-	-	-	7,471	1,121	8,591	8,591	-	-	-	-	-	-	-	-	-	134,122
1b.4.14	DOC Staff Cost	-	-	-	-	-	-	6,643	996	7,640	7,640	-	-	-	-	-	-	-	-	-	63,961
1b.4.15	Utility Staff Cost	-	-	-	-	-	-	17,932	2,690	20,622	20,622	-	-	-	-	-	-	-	-	-	219,147
1b.4	Subtotal Period 1b Period-Dependent Costs	38	567	7	3	-	18	38,358	5,735	44,726	43,474	1,252	-	-	363	-	-	-	7,258	12	417,230
1b.0	TOTAL PERIOD 1b COST	4,071	1,770	132	390	-	5,806	74,554	14,387	101,109	91,550	8,482	1,077	-	704	816	-	-	114,639	25,698	459,705
PERIOD 1 TOTALS		4,071	2,833	144	395	-	5,837	172,700	28,737	214,716	199,526	13,335	1,855	-	1,319	816	-	-	126,950	25,718	1,236,560
PERIOD 2a - Large Component Removal																					
Period 2a Direct Decommissioning Activities																					
Nuclear Steam Supply System Removal																					
2a.1.1.1	Reactor Coolant Piping	93	74	25	63	-	279	-	147	680	680	-	-	-	1,302	-	-	-	90,849	3,432	-
2a.1.1.2	Pressurizer Quench Tank	10	8	4	9	-	42	-	19	92	92	-	-	-	198	-	-	-	13,797	368	-
2a.1.1.3	Reactor Coolant Pumps & Motors	107	85	137	217	-	2,502	-	746	3,795	3,795	-	-	-	10,576	-	-	-	775,440	4,609	100
2a.1.1.4	Pressurizer	38	51	607	184	-	685	-	291	1,856	1,856	-	-	-	2,895	-	-	-	275,055	2,403	1,875
2a.1.1.5	Steam Generators	231	5,664	2,460	2,589	2,983	3,890	-	3,586	21,404	21,404	-	-	39,095	16,442	-	-	-	3,273,629	16,074	3,500
2a.1.1.6	Retired Steam Generator Units	-	-	1,951	2,560	2,983	3,799	-	1,977	13,271	13,271	-	-	39,095	16,059	-	-	-	3,153,777	5,400	2,250
2a.1.1.7	CRDMs/ICIs/Service Structure Removal	177	358	436	175	-	906	-	474	2,527	2,527	-	-	-	6,933	-	-	-	295,175	11,032	-
2a.1.1.8	Reactor Vessel Internals	101	7,115	12,978	1,199	-	10,225	415	14,106	46,138	46,138	-	-	-	1,502	937	112	-	266,890	33,690	1,506
2a.1.1.9	Reactor Vessel	105	8,578	2,994	1,497	-	3,531	415	9,437	26,557	26,557	-	-	-	13,775	-	-	-	993,120	33,690	1,506
2a.1.1	Totals	863	21,933	21,591	8,494	5,967	25,859	830	30,783	116,321	116,321	-	-	78,189	69,681	937	112	-	9,137,732	110,698	10,737
Removal of Major Equipment																					
2a.1.2	Main Turbine/Generator	-	444	383	128	725	494	-	401	2,574	2,574	-	-	4,815	2,682	-	-	-	459,278	9,676	-
2a.1.3	Main Condensers	-	1,168	234	153	918	662	-	641	3,776	3,776	-	-	8,124	3,393	-	-	-	581,121	25,748	-
Cascading Costs from Clean Building Demolition																					
2a.1.4.1	Reactor Building	-	453	-	-	-	-	-	68	521	521	-	-	-	-	-	-	-	-	5,495	-
2a.1.4.2	Condensate Polishing Building	-	12	-	-	-	-	-	2	14	14	-	-	-	-	-	-	-	-	115	-
2a.1.4.3	Low Level Radioactive Waste Building	-	2	-	-	-	-	-	0	2	2	-	-	-	-	-	-	-	-	18	-
2a.1.4.4	Reactor Auxiliary Building	-	233	-	-	-	-	-	35	268	268	-	-	-	-	-	-	-	-	1,499	-
2a.1.4.5	Solidification Facility	-	2	-	-	-	-	-	0	2	2	-	-	-	-	-	-	-	-	19	-
2a.1.4.6	Turbine Building	-	194	-	-	-	-	-	29	223	223	-	-	-	-	-	-	-	-	2,980	-
2a.1.4.7	Fuel Handling Building	-	72	-	-	-	-	-	11	82	82	-	-	-	-	-	-	-	-	570	-
2a.1.4	Totals	-	968	-	-	-	-	-	145	1,113	1,113	-	-	-	-	-	-	-	-	10,696	-

**Waterford Steam Electric Station, Unit 3
Decommissioning Cost Analysis**

Table C
Waterford Steam Electric Station, Unit 3
DECON Decommissioning Cost Estimate
(thousands of 2019 dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes				Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
															Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet			
Disposal of Plant Systems																					
2a.1.5.1	Air Evacuation	-	95	-	-	-	-	-	14	109	-	-	109	-	-	-	-	-	-	2,336	-
2a.1.5.2	Auxiliary Boiler	-	63	-	-	-	-	-	9	72	-	-	72	-	-	-	-	-	-	1,489	-
2a.1.5.3	Auxiliary Boiler - RCA	-	25	0	1	20	-	-	9	56	56	-	-	197	-	-	-	-	7,991	470	-
2a.1.5.4	Auxiliary Steam	-	15	-	-	-	-	-	2	17	-	-	17	-	-	-	-	-	-	367	-
2a.1.5.5	Auxiliary Steam - RCA	-	10	0	1	9	-	-	4	23	23	-	-	84	-	-	-	-	3,403	189	-
2a.1.5.6	Blowdown	-	556	10	34	513	-	-	222	1,335	1,335	-	-	5,036	-	-	-	-	204,498	11,472	-
2a.1.5.7	Boze	-	25	-	-	-	-	-	4	29	-	-	29	-	-	-	-	-	-	622	-
2a.1.5.8	Carbon Dioxide/Hydrogen/Nitrogen	-	14	-	-	-	-	-	2	16	-	-	16	-	-	-	-	-	-	323	-
2a.1.5.9	Carbon Dioxide/Hydrogen/Nitrogen - RCA	-	11	0	0	5	-	-	4	21	21	-	-	52	-	-	-	-	2,101	236	-
2a.1.5.10	Chemical Feed	-	14	-	-	-	-	-	2	17	-	-	17	-	-	-	-	-	-	339	-
2a.1.5.11	Chemical Feed - RCA	-	7	0	0	4	-	-	2	14	14	-	-	44	-	-	-	-	1,784	118	-
2a.1.5.12	Circulating Water	-	150	-	-	-	-	-	23	173	-	-	173	-	-	-	-	-	-	3,785	-
2a.1.5.13	Condensate	-	1,107	60	197	2,983	-	-	760	5,106	5,106	-	-	29,264	-	-	-	-	1,188,407	24,175	-
2a.1.5.14	Condensate Makeup	-	637	12	41	618	-	-	259	1,568	1,568	-	-	6,067	-	-	-	-	246,371	13,197	-
2a.1.5.15	Condensate Polisher	-	814	21	67	1,020	-	-	369	2,291	2,291	-	-	10,011	-	-	-	-	406,540	17,507	-
2a.1.5.16	Extraction Steam	-	518	25	83	1,253	-	-	332	2,211	2,211	-	-	12,293	-	-	-	-	499,207	11,406	-
2a.1.5.17	Feedwater	-	2,384	93	307	4,638	-	-	1,347	8,768	8,768	-	-	45,499	-	-	-	-	1,847,740	51,074	-
2a.1.5.18	Gland Seal	-	10	-	-	-	-	-	2	12	-	-	12	-	-	-	-	-	-	265	-
2a.1.5.19	HVAC (Other Bldg)	-	66	-	-	-	-	-	10	76	-	-	76	-	-	-	-	-	-	1,754	-
2a.1.5.20	HVAC (Service Bldg)	-	27	-	-	-	-	-	4	31	-	-	31	-	-	-	-	-	-	744	-
2a.1.5.21	HVAC (Turbine Bldg)	-	133	-	-	-	-	-	20	153	-	-	153	-	-	-	-	-	-	3,618	-
2a.1.5.22	Main Steam	-	677	22	71	1,070	-	-	342	2,181	2,181	-	-	10,497	-	-	-	-	426,279	14,480	-
2a.1.5.23	Movable Incore Nuclear Instrumentation	-	7	1	1	2	7	-	4	20	20	-	-	16	34	-	-	-	2,794	149	-
2a.1.5.24	Primary Makeup	-	61	-	-	-	-	-	9	70	-	-	70	-	-	-	-	-	-	1,405	-
2a.1.5.25	Reheat Steam	-	336	29	95	1,443	-	-	318	2,222	2,222	-	-	14,159	-	-	-	-	575,011	7,543	-
2a.1.5.26	Seal Oil	-	7	-	-	-	-	-	1	8	-	-	8	-	-	-	-	-	-	166	-
2a.1.5.27	Traveling Screen Wash	-	46	-	-	-	-	-	7	53	-	-	53	-	-	-	-	-	-	1,105	-
2a.1.5.28	Turbine Building Cooling	-	145	-	-	-	-	-	22	167	-	-	167	-	-	-	-	-	-	3,629	-
2a.1.5.29	Turbine Lube Oil	-	25	-	-	-	-	-	4	28	-	-	28	-	-	-	-	-	-	604	-
2a.1.5	Totals	-	7,984	274	899	13,579	7	-	4,107	26,849	25,818	-	1,031	133,216	34	-	-	-	5,412,125	174,568	-
2a.1.6	Scaffolding in support of decommissioning	-	928	16	7	85	13	-	251	1,301	1,301	-	-	751	66	-	-	-	38,008	25,260	-
2a.1	Subtotal Period 2a Activity Costs	863	33,425	22,498	9,680	21,274	27,034	830	36,328	151,933	150,903	-	1,031	225,095	75,856	937	112	-	15,628,260	356,645	10,737
Period 2a Additional Costs																					
2a.2.1	IT Support and Projects	-	-	-	-	-	-	254	-	254	254	-	-	-	-	-	-	-	-	-	-
2a.2.2	Fees Paid by Headquarters	-	-	-	-	-	-	147	-	147	147	-	-	-	-	-	-	-	-	-	-
2a.2.3	Communication Plan	-	-	-	-	-	-	74	-	74	74	-	-	-	-	-	-	-	-	-	-
2a.2.4	Post-Shutdown Contractor	-	-	-	-	-	-	316	-	316	316	-	-	-	-	-	-	-	-	-	-
2a.2.5	Water Usage	-	-	-	-	-	-	484	73	557	557	-	-	-	-	-	-	-	-	-	-
2a.2	Subtotal Period 2a Additional Costs	-	-	-	-	-	-	1,275	73	1,348	1,348	-	-	-	-	-	-	-	-	-	-
Period 2a Collateral Costs																					
2a.3.1	Process decommissioning water waste	104	-	72	153	-	224	-	138	691	691	-	-	-	655	-	-	-	39,300	128	-
2a.3.3	Small tool allowance	-	316	-	-	-	-	-	47	363	327	-	36	-	-	-	-	-	-	-	-
2a.3.4	Spent Fuel Capital and Transfer	-	-	-	-	-	-	43,662	6,549	50,212	-	50,212	-	-	-	-	-	-	-	-	-
2a.3.5	NDO	-	-	-	-	-	-	2,923	438	3,361	3,361	-	-	-	-	-	-	-	-	-	-
2a.3.6	Legal (License Termination)	-	-	-	-	-	-	1,537	230	1,767	1,767	-	-	-	-	-	-	-	-	-	-
2a.3.7	Annual Fee	-	-	-	-	-	-	153	23	176	176	-	-	-	-	-	-	-	-	-	-
2a.3.8	Corporate A&G	-	-	-	-	-	-	7,842	1,176	9,018	9,018	-	-	-	-	-	-	-	-	-	-
2a.3	Subtotal Period 2a Collateral Costs	104	316	72	153	-	224	56,116	8,603	65,588	15,340	50,212	36	-	655	-	-	-	39,300	128	-
Period 2a Period-Dependent Costs																					
2a.4.1	Decon supplies	133	-	-	-	-	-	-	33	167	167	-	-	-	-	-	-	-	-	-	-
2a.4.2	Insurance	-	-	-	-	-	-	1,499	150	1,649	1,649	-	-	-	-	-	-	-	-	-	-
2a.4.3	Property taxes	-	-	-	-	-	-	189	19	208	208	-	-	-	-	-	-	-	-	-	-
2a.4.4	Health physics supplies	-	2,627	-	-	-	-	-	657	3,284	3,284	-	-	-	-	-	-	-	-	-	-
2a.4.5	Heavy equipment rental	-	3,794	-	-	-	-	-	569	4,363	4,363	-	-	-	-	-	-	-	-	-	-
2a.4.6	Disposal of DAW generated	-	-	137	51	-	345	-	108	640	640	-	-	-	6,872	-	-	-	137,440	224	-
2a.4.7	Plant energy budget	-	-	-	-	-	-	2,518	378	2,896	2,896	-	-	-	-	-	-	-	-	-	-
2a.4.8	NRC Fees	-	-	-	-	-	-	2,024	202	2,226	2,226	-	-	-	-	-	-	-	-	-	-
2a.4.9	Emergency Planning Fees	-	-	-	-	-	-	1,350	135	1,485	-	1,485	-	-	-	-	-	-	-	-	-
2a.4.10	Indirect Overhead	-	-	-	-	-	-	3,862	579	4,442	4,442	-	-	-	-	-	-	-	-	-	-
2a.4.11	Spent Fuel Pool O&M	-	-	-	-	-	-	1,471	221	1,692	-	1,692	-	-	-	-	-	-	-	-	-
2a.4.12	ISFSI Operating Costs	-	-	-	-	-	-	194	29	223	-	223	-	-	-	-	-	-	-	-	-

Table C
Waterford Steam Electric Station, Unit 3
DECON Decommissioning Cost Estimate
(thousands of 2019 dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes				Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
															Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet			
Period 2a Period-Dependent Costs (continued)																					
2a.4.13	Remedial Actions Surveys	-	-	-	-	-	-	1,830	274	2,104	2,104	-	-	-	-	-	-	-	-	-	-
2a.4.14	Security Staff Cost	-	-	-	-	-	-	23,484	3,523	27,007	27,007	-	-	-	-	-	-	-	-	-	421,330
2a.4.15	DOC Staff Cost	-	-	-	-	-	-	28,700	4,305	33,005	33,005	-	-	-	-	-	-	-	-	-	281,079
2a.4.16	Utility Staff Cost	-	-	-	-	-	-	44,180	6,627	50,807	50,807	-	-	-	-	-	-	-	-	-	523,325
2a.4	Subtotal Period 2a Period-Dependent Costs	133	6,422	137	51	-	345	111,302	17,809	136,199	132,799	3,400	-	-	6,872	-	-	-	137,440	224	1,225,735
2a.0	TOTAL PERIOD 2a COST	1,101	40,163	22,708	9,884	21,274	27,603	169,524	62,813	355,068	300,389	53,612	1,067	225,095	83,383	937	112	-	15,805,000	356,997	1,236,472
PERIOD 2b - Site Decontamination																					
Period 2b Direct Decommissioning Activities																					
Disposal of Plant Systems																					
2b.1.1.1.1	Boric Acid Makeup	-	29	-	-	-	-	-	4	33	-	-	33	-	-	-	-	-	-	680	-
2b.1.1.1.2	Boron Management	-	647	86	115	362	655	-	406	2,272	2,272	-	-	3,555	3,341	-	-	-	357,770	13,833	-
2b.1.1.1.3	Chemical and Volume Control	195	291	33	37	44	243	-	246	1,088	1,088	-	-	435	1,227	-	-	-	96,681	9,456	-
2b.1.1.1.4	Chilled Water	-	46	-	-	-	-	-	7	53	-	-	53	-	-	-	-	-	-	1,158	-
2b.1.1.1.5	Chilled Water - RCA	-	280	5	15	224	-	-	106	629	629	-	-	2,196	-	-	-	-	89,167	5,148	-
2b.1.1.1.6	Component Cooling Water	-	2,058	79	259	3,921	-	-	1,149	7,467	7,467	-	-	38,467	-	-	-	-	1,562,178	43,730	-
2b.1.1.1.7	Containment Building	-	43	3	3	11	17	-	17	93	93	-	-	104	83	-	-	-	9,692	831	-
2b.1.1.1.8	Containment Spray	-	136	20	30	101	169	-	98	555	555	-	-	992	865	-	-	-	95,457	2,982	-
2b.1.1.1.9	Demineralized Water	-	105	-	-	-	-	-	16	121	-	-	121	-	-	-	-	-	-	2,439	-
2b.1.1.1.10	Demineralized Water - RCA	-	183	3	9	141	-	-	69	405	405	-	-	1,384	-	-	-	-	56,204	3,326	-
2b.1.1.1.11	Electrical Clean - RCA	-	4,969	114	366	5,539	-	-	2,140	13,129	13,129	-	-	54,342	-	-	-	-	2,206,853	90,221	-
2b.1.1.1.12	Electrical Clean Non-RCA	-	2,354	-	-	-	-	-	353	2,707	-	-	2,707	-	-	-	-	-	-	55,575	-
2b.1.1.1.13	Electrical Contaminated	-	770	15	43	564	41	-	295	1,728	1,728	-	-	5,538	209	-	-	-	238,144	15,145	-
2b.1.1.1.14	Electro-Hydraulic Fluid	-	4	-	-	-	-	-	1	5	-	-	5	-	-	-	-	-	-	100	-
2b.1.1.1.15	Electro-Hydraulic Fluid - RCA	-	7	0	0	4	-	-	2	13	13	-	-	38	-	-	-	-	1,543	114	-
2b.1.1.1.16	Emergency Breathing Air	-	6	-	-	-	-	-	1	6	-	-	6	-	-	-	-	-	-	144	-
2b.1.1.1.17	Emergency Diesel Generator	-	69	-	-	-	-	-	10	79	-	-	79	-	-	-	-	-	-	1,586	-
2b.1.1.1.18	Emergency Diesel Generator - RCA	-	168	3	8	123	-	-	62	364	364	-	-	1,206	-	-	-	-	48,972	3,018	-
2b.1.1.1.19	Fire Protection	-	222	-	-	-	-	-	33	255	-	-	255	-	-	-	-	-	-	5,250	-
2b.1.1.1.20	Fire Protection - RCA	-	569	12	40	605	-	-	240	1,467	1,467	-	-	5,930	-	-	-	-	240,841	10,660	-
2b.1.1.1.21	Gaseous Waste Management	-	78	8	11	65	50	-	44	257	257	-	-	639	253	-	-	-	42,238	1,753	-
2b.1.1.1.22	HVAC (Containment Bldg)	-	939	83	169	1,735	389	-	626	3,941	3,941	-	-	17,025	1,971	-	-	-	818,040	18,919	-
2b.1.1.1.23	HVAC (Control Bldg)	-	39	-	-	-	-	-	6	45	-	-	45	-	-	-	-	-	-	975	-
2b.1.1.1.24	HVAC (Reactor Auxiliary Bldg)	-	988	56	133	1,483	252	-	558	3,469	3,469	-	-	14,547	1,286	-	-	-	672,757	19,859	-
2b.1.1.1.25	Instrument Air	-	26	-	-	-	-	-	4	29	-	-	29	-	-	-	-	-	-	627	-
2b.1.1.1.26	Instrument Air - RCA	-	93	1	3	47	-	-	31	174	174	-	-	459	-	-	-	-	18,658	1,761	-
2b.1.1.1.27	Leak Rate Testing	-	9	-	-	-	-	-	1	11	-	-	11	-	-	-	-	-	-	233	-
2b.1.1.1.28	Liquid Waste Management	77	152	15	16	17	106	-	109	492	492	-	-	163	533	-	-	-	41,069	4,488	-
2b.1.1.1.29	Post Accident Sampling	-	35	1	3	38	7	-	17	102	102	-	-	374	35	-	-	-	17,389	752	-
2b.1.1.1.30	Potable Water	-	7	-	-	-	-	-	1	8	-	-	8	-	-	-	-	-	-	173	-
2b.1.1.1.31	Potable Water - RCA	-	51	1	2	34	-	-	18	107	107	-	-	335	-	-	-	-	13,594	914	-
2b.1.1.1.32	Primary Sampling	-	113	52	54	81	347	-	140	787	787	-	-	792	1,747	-	-	-	145,311	2,804	-
2b.1.1.1.33	Reactor Coolant	1	8	0	1	3	3	-	4	21	21	-	-	31	17	-	-	-	2,349	181	-
2b.1.1.1.34	Refrigeration	-	7	-	-	-	-	-	1	8	-	-	8	-	-	-	-	-	-	156	-
2b.1.1.1.35	Refrigeration - RCA	-	12	0	0	7	-	-	4	23	23	-	-	67	-	-	-	-	2,709	200	-
2b.1.1.1.36	Resin Waste Management	39	54	6	7	12	42	-	47	205	205	-	-	113	212	-	-	-	18,250	1,829	-
2b.1.1.1.37	Safety Injection	-	860	240	317	1,018	1,795	-	888	5,118	5,118	-	-	9,985	9,110	-	-	-	990,236	18,841	-
2b.1.1.1.38	Sanitary System	-	20	-	-	-	-	-	3	23	-	-	23	-	-	-	-	-	-	502	-
2b.1.1.1.39	Secondary Sampling	-	27	-	-	-	-	-	4	31	-	-	31	-	-	-	-	-	-	649	-
2b.1.1.1.40	Secondary Sampling - RCA	-	17	0	1	10	-	-	6	34	34	-	-	100	-	-	-	-	4,049	299	-
2b.1.1.1.41	Service Air	-	20	-	-	-	-	-	3	23	-	-	23	-	-	-	-	-	-	498	-
2b.1.1.1.42	Service Air - RCA	-	64	1	3	39	-	-	22	129	129	-	-	385	-	-	-	-	15,647	1,301	-
2b.1.1.1.43	Site Security	-	4	-	-	-	-	-	1	4	-	-	4	-	-	-	-	-	-	88	-
2b.1.1.1.44	Solid Waste Management	23	21	3	4	13	24	-	25	113	113	-	-	127	120	-	-	-	12,812	888	-
2b.1.1.1.45	Sump Pump - Contaminated	-	146	14	16	48	93	-	71	388	388	-	-	469	470	-	-	-	49,428	3,012	-
2b.1.1.1.46	Sump Pump - RCA	-	100	2	7	102	-	-	41	251	251	-	-	997	-	-	-	-	40,504	1,882	-
2b.1.1.1.47	Supplementary Chilled Water	-	52	-	-	-	-	-	8	60	-	-	60	-	-	-	-	-	-	1,308	-
2b.1.1.1.48	Supplementary Chilled Water - RCA	-	65	1	4	57	-	-	25	153	153	-	-	564	-	-	-	-	22,891	1,245	-
2b.1.1.1.49	Supplementary Chiller Condensing	-	21	-	-	-	-	-	3	24	-	-	24	-	-	-	-	-	-	523	-
2b.1.1.1.50	Supplementary Chiller Condensing - RCA	-	103	2	6	85	-	-	40	235	235	-	-	834	-	-	-	-	33,886	1,922	-
2b.1.1.1.51	Treated Water	-	26	-	-	-	-	-	4	30	-	-	30	-	-	-	-	-	-	639	-
2b.1.1	Totals	334	17,112	861	1,683	16,533	4,232	-	8,012	48,767	45,210	-	3,557	162,194	21,479	-	-	-	7,965,318	354,618	-

Waterford Steam Electric Station, Unit 3
Decommissioning Cost Analysis

Table C
Waterford Steam Electric Station, Unit 3
DECON Decommissioning Cost Estimate
(thousands of 2019 dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes				Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
															Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet			
2b.1.2	Scaffolding in support of decommissioning	-	1,160	21	9	106	16	-	313	1,626	1,626	-	-	939	83	-	-	-	47,510	31,575	-
Decontamination of Site Buildings																					
2b.1.3.1	Reactor Building	1,320	1,083	68	409	620	1,415	-	1,446	6,361	6,361	-	-	6,080	18,232	-	-	-	1,029,805	49,487	-
2b.1.3.2	Condensate Polishing Building	113	16	2	11	-	12	-	65	219	219	-	-	-	455	-	-	-	21,492	2,807	-
2b.1.3.3	Low Level Radioactive Waste Building	14	6	1	4	-	5	-	10	40	40	-	-	-	168	-	-	-	7,956	422	-
2b.1.3.4	RVCH Temporary Assembly Bldg	6	25	2	12	-	13	-	14	72	72	-	-	-	476	-	-	-	22,500	587	-
2b.1.3.5	Reactor Auxiliary Building	1,238	1,085	50	299	385	325	-	1,079	4,460	4,460	-	-	3,776	11,156	-	-	-	682,519	47,739	-
2b.1.3.6	Retired Steam Generator Mausoleum	7	31	2	15	-	16	-	18	89	89	-	-	-	587	-	-	-	27,750	724	-
2b.1.3.7	Solidification Facility	15	6	1	4	0	5	-	11	43	43	-	-	4	176	-	-	-	8,465	444	-
2b.1.3.8	Turbine Building	549	55	5	39	-	43	-	306	997	997	-	-	-	1,585	-	-	-	74,874	13,370	-
2b.1.3	Totals	3,263	2,308	130	793	1,005	1,833	-	2,949	12,281	12,281	-	-	9,860	32,836	-	-	-	1,875,361	115,581	-
2b.1.4	Prepare/submit License Termination Plan	-	-	-	-	-	-	613	92	705	705	-	-	-	-	-	-	-	-	-	4,096
2b.1.5	Receive NRC approval of termination plan									a											
2b.1	Subtotal Period 2b Activity Costs	3,597	20,580	1,011	2,485	17,644	6,081	613	11,367	63,379	59,822	-	3,557	172,993	54,398	-	-	-	9,888,189	501,774	4,096
Period 2b Additional Costs																					
2b.2.1	Underground Services Excavations	-	213	193	1,411	-	1,505	1,023	814	5,158	5,158	-	-	-	36,000	-	-	-	2,640,000	2,505	-
2b.2.2	IT Support and Projects	-	-	-	-	-	-	6	-	6	6	-	-	-	-	-	-	-	-	-	-
2b.2.3	Fees Paid by Headquarters	-	-	-	-	-	-	294	-	294	294	-	-	-	-	-	-	-	-	-	-
2b.2.4	Communication Plan	-	-	-	-	-	-	114	-	114	114	-	-	-	-	-	-	-	-	-	-
2b.2.5	Post-Shutdown Contractor	-	-	-	-	-	-	342	-	342	342	-	-	-	-	-	-	-	-	-	-
2b.2.6	Severance	-	-	-	-	-	-	6,000	-	6,000	6,000	-	-	-	-	-	-	-	-	-	-
2b.2.7	Retired Reactor Closure Head	-	-	164	613	-	640	-	268	1,685	1,685	-	-	-	2,869	-	-	-	276,869	2,098	2,000
2b.2.8	Fuel Pool Legacy Waste	-	53	90	60	-	521	7	162	893	893	-	-	-	-	56	-	-	7,532	667	27
2b.2.9	Water Usage	-	-	-	-	-	-	733	110	843	843	-	-	-	-	-	-	-	-	-	-
2b.2	Subtotal Period 2b Additional Costs	-	265	447	2,084	-	2,665	8,519	1,354	15,334	15,334	-	-	-	38,869	56	-	-	2,924,401	5,270	2,027
Period 2b Collateral Costs																					
2b.3.1	Process decommissioning water waste	121	-	86	182	-	266	-	163	818	818	-	-	-	779	-	-	-	46,751	152	-
2b.3.2	Process decommissioning chemical flush waste	1	-	18	64	-	102	-	37	222	222	-	-	-	169	-	-	-	17,984	32	-
2b.3.3	Small tool allowance	-	370	-	-	-	-	-	56	426	426	-	-	-	-	-	-	-	-	-	-
2b.3.4	Spent Fuel Capital and Transfer	-	-	-	-	-	-	43,903	6,585	50,488	-	50,488	-	-	-	-	-	-	-	-	-
2b.3.5	NDO	-	-	-	-	-	-	3,652	548	4,200	4,200	-	-	-	-	-	-	-	-	-	-
2b.3.6	Legal (License Termination)	-	-	-	-	-	-	2,383	357	2,741	2,741	-	-	-	-	-	-	-	-	-	-
2b.3.7	Annual Fee	-	-	-	-	-	-	237	36	273	273	-	-	-	-	-	-	-	-	-	-
2b.3.8	Corporate A&G	-	-	-	-	-	-	5,677	852	6,528	6,528	-	-	-	-	-	-	-	-	-	-
2b.3	Subtotal Period 2b Collateral Costs	122	370	104	245	-	368	55,852	8,633	65,695	15,207	50,488	-	-	948	-	-	-	64,735	184	-
Period 2b Period-Dependent Costs																					
2b.4.1	Decon supplies	1,808	-	-	-	-	-	-	452	2,260	2,260	-	-	-	-	-	-	-	-	-	-
2b.4.2	Insurance	-	-	-	-	-	-	1,873	187	2,061	2,061	-	-	-	-	-	-	-	-	-	-
2b.4.3	Property taxes	-	-	-	-	-	-	236	24	260	260	-	-	-	-	-	-	-	-	-	-
2b.4.4	Health physics supplies	-	3,554	-	-	-	-	-	888	4,442	4,442	-	-	-	-	-	-	-	-	-	-
2b.4.5	Heavy equipment rental	-	4,890	-	-	-	-	-	733	5,623	5,623	-	-	-	-	-	-	-	-	-	-
2b.4.6	Disposal of DAW generated	-	-	148	55	-	372	-	116	690	690	-	-	-	7,404	-	-	-	148,082	241	-
2b.4.7	Plant energy budget	-	-	-	-	-	-	2,484	373	2,857	2,857	-	-	-	-	-	-	-	-	-	-
2b.4.8	NRC Fees	-	-	-	-	-	-	1,713	171	1,885	1,885	-	-	-	-	-	-	-	-	-	-
2b.4.9	Emergency Planning Fees	-	-	-	-	-	-	1,688	169	1,856	-	1,856	-	-	-	-	-	-	-	-	-
2b.4.10	Indirect Overhead	-	-	-	-	-	-	4,244	637	4,881	4,881	-	-	-	-	-	-	-	-	-	-
2b.4.11	Spent Fuel Pool O&M	-	-	-	-	-	-	1,839	276	2,114	-	2,114	-	-	-	-	-	-	-	-	-
2b.4.12	Liquid Radwaste Processing Equipment/Services	-	-	-	-	-	-	463	69	532	532	-	-	-	-	-	-	-	-	-	-
2b.4.13	ISFSI Operating Costs	-	-	-	-	-	-	242	36	278	-	278	-	-	-	-	-	-	-	-	-
2b.4.14	Remedial Actions Surveys	-	-	-	-	-	-	2,287	343	2,630	2,630	-	-	-	-	-	-	-	-	-	-
2b.4.15	Security Staff Cost	-	-	-	-	-	-	29,346	4,402	33,748	33,748	-	-	-	-	-	-	-	-	-	526,501
2b.4.16	DOC Staff Cost	-	-	-	-	-	-	34,614	5,192	39,806	39,806	-	-	-	-	-	-	-	-	-	337,376
2b.4.17	Utility Staff Cost	-	-	-	-	-	-	52,823	7,924	60,747	60,747	-	-	-	-	-	-	-	-	-	626,225
2b.4	Subtotal Period 2b Period-Dependent Costs	1,808	8,443	148	55	-	372	133,853	21,992	166,671	162,422	4,249	-	-	7,404	-	-	-	148,082	241	1,490,102
2b.0	TOTAL PERIOD 2b COST	5,527	29,659	1,710	4,869	17,644	9,486	198,838	43,347	311,079	252,786	54,737	3,557	172,993	101,619	56	-	-	13,025,410	507,469	1,496,225
PERIOD 2d - Decontamination Following Wet Fuel Storage																					
Period 2d Direct Decommissioning Activities																					
2d.1.1	Remove spent fuel racks	304	30	119	78	-	561	-	323	1,416	1,416	-	-	-	2,878	-	-	-	182,827	793	-

Table C
Waterford Steam Electric Station, Unit 3
DECON Decommissioning Cost Estimate
(thousands of 2019 dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site	LLRW	Other Costs	Total Contingency	Total Costs	NRC	Spent Fuel	Site	Processed	Burial Volumes				Burial /	Craft Manhours	Utility and
						Processing Costs	Disposal Costs				Lic. Term. Costs	Management Costs	Restoration Costs	Volume Cu. Feet	Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Processed Wt., Lbs.		Contractor Manhours
Disposal of Plant Systems																					
2d.1.2.1	Fuel Pool Cooling & Purification	-	386	42	54	152	313	-	210	1,156	1,156	-	-	1,491	1,586	-	-	-	162,458	8,073	-
2d.1.2.2	HVAC (Fuel Bldg)	-	218	11	31	397	31	-	127	815	815	-	-	3,896	156	-	-	-	168,168	4,220	-
2d.1.2	Totals	-	604	53	84	549	343	-	337	1,971	1,971	-	-	5,387	1,742	-	-	-	330,626	12,293	-
Decontamination of Site Buildings																					
2d.1.3.1	Fuel Handling Building	500	524	11	44	192	48	-	429	1,747	1,747	-	-	1,887	1,314	-	-	-	139,918	21,314	-
2d.1.3	Totals	500	524	11	44	192	48	-	429	1,747	1,747	-	-	1,887	1,314	-	-	-	139,918	21,314	-
2d.1.4	Scaffolding in support of decommissioning	-	232	4	2	21	3	-	63	325	325	-	-	188	17	-	-	-	9,502	6,315	-
2d.1	Subtotal Period 2d Activity Costs	803	1,390	187	208	763	956	-	1,152	5,459	5,459	-	-	7,462	5,951	-	-	-	662,873	40,715	-
Period 2d Additional Costs																					
2d.2.1	License Termination Survey Planning	-	-	-	-	-	-	2,018	605	2,623	2,623	-	-	-	-	-	-	-	-	-	12,480
2d.2.2	Operational Equipment	-	-	23	66	738	-	-	123	951	951	-	-	11,760	-	-	-	-	294,000	32	-
2d.2.3	Water Usage	-	-	-	-	-	-	75	11	87	87	-	-	-	-	-	-	-	-	-	-
2d.2	Subtotal Period 2d Additional Costs	-	-	23	66	738	-	2,093	740	3,661	3,661	-	-	11,760	-	-	-	-	294,000	32	12,480
Period 2d Collateral Costs																					
2d.3.1	Process decommissioning water waste	57	-	41	87	-	127	-	77	389	389	-	-	-	371	-	-	-	22,274	72	-
2d.3.3	Small tool allowance	-	36	-	-	-	-	-	5	41	41	-	-	-	-	-	-	-	-	-	-
2d.3.4	Decommissioning Equipment Disposition	-	-	131	66	678	103	-	151	1,129	1,129	-	-	6,000	529	-	-	-	303,608	147	-
2d.3.5	Spent Fuel Capital and Transfer	-	-	-	-	-	-	2,313	347	2,660	-	2,660	-	-	-	-	-	-	-	-	-
2d.3.6	Corporate A&G	-	-	-	-	-	-	859	129	988	988	-	-	-	-	-	-	-	-	-	-
2d.3	Subtotal Period 2d Collateral Costs	57	36	172	153	678	230	3,172	709	5,207	2,547	2,660	-	6,000	900	-	-	-	325,882	219	-
Period 2d Period-Dependent Costs																					
2d.4.1	Decon supplies	167	-	-	-	-	-	-	42	209	209	-	-	-	-	-	-	-	-	-	-
2d.4.2	Insurance	-	-	-	-	-	-	326	33	358	358	-	-	-	-	-	-	-	-	-	-
2d.4.3	Property taxes	-	-	-	-	-	-	41	4	45	45	-	-	-	-	-	-	-	-	-	-
2d.4.4	Health physics supplies	-	374	-	-	-	-	-	94	468	468	-	-	-	-	-	-	-	-	-	-
2d.4.5	Heavy equipment rental	-	850	-	-	-	-	-	128	978	978	-	-	-	-	-	-	-	-	-	-
2d.4.6	Disposal of DAW generated	-	-	25	9	-	63	-	20	118	118	-	-	-	1,265	-	-	-	25,298	41	-
2d.4.7	Plant energy budget	-	-	-	-	-	-	230	35	265	265	-	-	-	-	-	-	-	-	-	-
2d.4.8	NRC Fees	-	-	-	-	-	-	157	16	173	173	-	-	-	-	-	-	-	-	-	-
2d.4.9	Indirect Overhead	-	-	-	-	-	-	739	111	849	787	63	-	-	-	-	-	-	-	-	-
2d.4.10	Liquid Radwaste Processing Equipment/Services	-	-	-	-	-	-	161	24	185	185	-	-	-	-	-	-	-	-	-	-
2d.4.11	ISFSI Operating Costs	-	-	-	-	-	-	42	6	48	-	48	-	-	-	-	-	-	-	-	-
2d.4.12	Remedial Actions Surveys	-	-	-	-	-	-	398	60	457	457	-	-	-	-	-	-	-	-	-	-
2d.4.13	Security Staff Cost	-	-	-	-	-	-	1,491	224	1,714	406	1,308	-	-	-	-	-	-	-	-	32,118
2d.4.14	DOC Staff Cost	-	-	-	-	-	-	4,126	619	4,745	4,745	-	-	-	-	-	-	-	-	-	40,175
2d.4.15	Utility Staff Cost	-	-	-	-	-	-	6,511	977	7,488	6,934	554	-	-	-	-	-	-	-	-	76,735
2d.4	Subtotal Period 2d Period-Dependent Costs	167	1,225	25	9	-	63	14,222	2,390	18,101	16,127	1,973	-	-	1,265	-	-	-	25,298	41	149,029
2d.0	TOTAL PERIOD 2d COST	1,028	2,650	408	437	2,178	1,249	19,487	4,991	32,427	27,794	4,633	-	25,222	8,116	-	-	-	1,308,052	41,007	161,509
PERIOD 2f - License Termination																					
Period 2f Direct Decommissioning Activities																					
2f.1.1	ORISE confirmatory survey	-	-	-	-	-	-	163	49	212	212	-	-	-	-	-	-	-	-	-	-
2f.1.2	Terminate license	-	-	-	-	-	-	-	-	a	-	-	-	-	-	-	-	-	-	-	-
2f.1	Subtotal Period 2f Activity Costs	-	-	-	-	-	-	163	49	212	212	-	-	-	-	-	-	-	-	-	-
Period 2f Additional Costs																					
2f.2.1	License Termination Survey	-	-	-	-	-	-	8,287	2,486	10,773	10,773	-	-	-	-	-	-	-	-	161,563	6,240
2f.2.2	Water Usage	-	-	-	-	-	-	98	15	112	112	-	-	-	-	-	-	-	-	-	-
2f.2	Subtotal Period 2f Additional Costs	-	-	-	-	-	-	8,385	2,501	10,885	10,885	-	-	-	-	-	-	-	-	161,563	6,240
Period 2f Collateral Costs																					
2f.3.1	DOC staff relocation expenses	-	-	-	-	-	-	1,825	274	2,098	2,098	-	-	-	-	-	-	-	-	-	-
2f.3.2	Spent Fuel Capital and Transfer	-	-	-	-	-	-	1,259	189	1,448	-	1,448	-	-	-	-	-	-	-	-	-
2f.3.3	Corporate A&G	-	-	-	-	-	-	919	138	1,057	1,057	-	-	-	-	-	-	-	-	-	-
2f.3	Subtotal Period 2f Collateral Costs	-	-	-	-	-	-	4,003	600	4,603	3,156	1,448	-	-	-	-	-	-	-	-	-

Table C
Waterford Steam Electric Station, Unit 3
DECON Decommissioning Cost Estimate
(thousands of 2019 dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site	LLRW	Other Costs	Total Contingency	Total Costs	NRC	Spent Fuel	Site	Processed Volume Cu. Feet	Burial Volumes				Burial /	Craft Manhours	Utility and
						Processing Costs	Disposal Costs				Lic. Term. Costs	Management Costs	Restoration Costs		Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Processed Wt., Lbs.		Contractor Manhours
Period 2f Period-Dependent Costs																					
2f.4.1	Insurance	-	-	-	-	-	-	628	63	691	691	-	-	-	-	-	-	-	-	-	-
2f.4.2	Property taxes	-	-	-	-	-	-	79	8	87	87	-	-	-	-	-	-	-	-	-	-
2f.4.3	Health physics supplies	-	780	-	-	-	-	-	195	975	975	-	-	-	-	-	-	-	-	-	-
2f.4.4	Disposal of DAW generated	-	-	7	3	-	18	-	5	33	33	-	-	-	351	-	-	-	7,020	11	-
2f.4.5	Plant energy budget	-	-	-	-	-	-	222	33	256	256	-	-	-	-	-	-	-	-	-	-
2f.4.6	NRC Fees	-	-	-	-	-	-	304	30	334	334	-	-	-	-	-	-	-	-	-	-
2f.4.7	Indirect Overhead	-	-	-	-	-	-	795	119	914	799	115	-	-	-	-	-	-	-	-	-
2f.4.8	ISFSI Operating Costs	-	-	-	-	-	-	81	12	93	-	93	-	-	-	-	-	-	-	-	-
2f.4.9	Security Staff Cost	-	-	-	-	-	-	2,876	431	3,307	784	2,523	-	-	-	-	-	-	-	-	61,959
2f.4.10	DOC Staff Cost	-	-	-	-	-	-	6,008	901	6,910	6,910	-	-	-	-	-	-	-	-	-	56,576
2f.4.11	Utility Staff Cost	-	-	-	-	-	-	7,391	1,109	8,499	7,428	1,071	-	-	-	-	-	-	-	-	79,826
2f.4	Subtotal Period 2f Period-Dependent Costs	-	780	7	3	-	18	18,384	2,908	22,099	18,296	3,803	-	-	351	-	-	-	7,020	11	198,361
2f.0	TOTAL PERIOD 2f COST	-	780	7	3	-	18	30,934	6,058	37,800	32,549	5,250	-	-	351	-	-	-	7,020	161,574	204,601
PERIOD 2 TOTALS		7,655	73,252	24,833	15,191	41,096	38,356	418,782	117,209	736,374	613,518	118,232	4,624	423,311	193,469	993	112	-	30,145,480	1,067,047	3,098,806
PERIOD 3b - Site Restoration																					
Period 3b Direct Decommissioning Activities																					
Demolition of Remaining Site Buildings																					
3b.1.1.1	Reactor Building	-	2,600	-	-	-	-	-	390	2,990	-	-	2,990	-	-	-	-	-	-	31,313	-
3b.1.1.2	Administration Building	-	290	-	-	-	-	-	43	333	-	-	333	-	-	-	-	-	-	2,954	-
3b.1.1.3	Auxiliary Boiler	-	11	-	-	-	-	-	2	13	-	-	13	-	-	-	-	-	-	194	-
3b.1.1.4	Chiller Building	-	47	-	-	-	-	-	7	54	-	-	54	-	-	-	-	-	-	482	-
3b.1.1.5	Condensate Polishing Building	-	119	-	-	-	-	-	18	137	-	-	137	-	-	-	-	-	-	1,351	-
3b.1.1.6	Cooling Towers	-	366	-	-	-	-	-	55	421	-	-	421	-	-	-	-	-	-	2,800	-
3b.1.1.7	Fire Pump House	-	28	-	-	-	-	-	4	33	-	-	33	-	-	-	-	-	-	290	-
3b.1.1.8	Flex N+1 Storage Bldg	-	160	-	-	-	-	-	24	184	-	-	184	-	-	-	-	-	-	1,200	-
3b.1.1.9	Intake & Discharge Structures	-	989	-	-	-	-	-	148	1,137	-	-	1,137	-	-	-	-	-	-	13,397	-
3b.1.1.10	Low Level Radioactive Waste Building	-	15	-	-	-	-	-	2	17	-	-	17	-	-	-	-	-	-	159	-
3b.1.1.11	Miscellaneous Yard Structures	-	3,653	-	-	-	-	-	548	4,201	-	-	4,201	-	-	-	-	-	-	47,326	-
3b.1.1.12	RVCH Temporary Assembly Bldg	-	115	-	-	-	-	-	17	133	-	-	133	-	-	-	-	-	-	1,110	-
3b.1.1.13	Reactor Auxiliary Building	-	2,124	-	-	-	-	-	319	2,442	-	-	2,442	-	-	-	-	-	-	14,008	-
3b.1.1.14	Retired Steam Generator Mausoleum	-	161	-	-	-	-	-	24	185	-	-	185	-	-	-	-	-	-	894	-
3b.1.1.15	Service Building	-	260	-	-	-	-	-	39	299	-	-	299	-	-	-	-	-	-	2,556	-
3b.1.1.16	Skills Training Center	-	208	-	-	-	-	-	31	239	-	-	239	-	-	-	-	-	-	1,776	-
3b.1.1.17	Solidification Facility	-	14	-	-	-	-	-	2	16	-	-	16	-	-	-	-	-	-	168	-
3b.1.1.18	Turbine Building	-	1,771	-	-	-	-	-	266	2,037	-	-	2,037	-	-	-	-	-	-	27,318	-
3b.1.1.19	Turbine Pedestal	-	588	-	-	-	-	-	88	676	-	-	676	-	-	-	-	-	-	3,324	-
3b.1.1.20	Water Treatment Building	-	76	-	-	-	-	-	11	88	-	-	88	-	-	-	-	-	-	794	-
3b.1.1.21	Fuel Handling Building	-	982	-	-	-	-	-	147	1,129	-	-	1,129	-	-	-	-	-	-	6,272	-
3b.1.1	Totals	-	14,576	-	-	-	-	-	2,186	16,763	-	-	16,763	-	-	-	-	-	-	159,686	-
Site Closeout Activities																					
3b.1.2	BackFill Site	-	872	-	-	-	-	-	131	1,002	-	-	1,002	-	-	-	-	-	-	1,621	-
3b.1.3	Grade & landscape site	-	119	-	-	-	-	-	18	136	-	-	136	-	-	-	-	-	-	301	-
3b.1.4	Final report to NRC	-	-	-	-	-	-	234	35	269	269	-	-	-	-	-	-	-	-	-	1,560
3b.1	Subtotal Period 3b Activity Costs	-	15,566	-	-	-	-	234	2,370	18,170	269	-	17,901	-	-	-	-	-	-	161,608	1,560
Period 3b Additional Costs																					
3b.2.1	Concrete Crushing	-	979	-	-	-	-	13	149	1,141	-	-	1,141	-	-	-	-	-	-	4,136	-
3b.2.2	Firing Range Closure	-	-	-	-	-	-	730	109	839	-	-	839	-	-	-	-	-	-	-	-
3b.2.3	Mobile Barrier Removal	-	864	-	-	-	-	738	240	1,842	-	-	1,842	-	-	-	-	-	-	1,440	-
3b.2.4	Construction Debris	-	-	-	-	-	-	650	98	748	-	-	748	-	-	-	-	-	-	-	-
3b.2.5	Water Usage	-	-	-	-	-	-	184	28	211	-	-	211	-	-	-	-	-	-	-	-
3b.2.6	Intake Structure Cofferdam	-	603	-	-	-	-	-	90	694	-	-	694	-	-	-	-	-	-	5,168	-
3b.2.7	Backfill Underground Services Excavations	-	1,088	-	-	-	-	-	163	1,251	-	-	1,251	-	-	-	-	-	-	5,160	-
3b.2	Subtotal Period 3b Additional Costs	-	3,534	-	-	-	-	2,314	877	6,725	-	-	6,725	-	-	-	-	-	-	15,904	-
Period 3b Collateral Costs																					
3b.3.1	Small tool allowance	-	136	-	-	-	-	-	20	157	-	-	157	-	-	-	-	-	-	-	-
3b.3.2	Spent Fuel Capital and Transfer	-	-	-	-	-	-	1,067	160	1,227	-	1,227	-	-	-	-	-	-	-	-	-
3b.3.3	Corporate A&G	-	-	-	-	-	-	1,108	166	1,274	-	-	1,274	-	-	-	-	-	-	-	-
3b.3	Subtotal Period 3b Collateral Costs	-	136	-	-	-	-	2,175	347	2,658	-	1,227	1,431	-	-	-	-	-	-	-	-

Table C
Waterford Steam Electric Station, Unit 3
DECON Decommissioning Cost Estimate
(thousands of 2019 dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes				Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
															Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet			
Period 3b Period-Dependent Costs																					
3b.4.1	Insurance	-	-	-	-	-	-	1,502	150	1,652	-	1,652	-	-	-	-	-	-	-	-	-
3b.4.2	Property taxes	-	-	-	-	-	-	189	19	208	-	208	-	-	-	-	-	-	-	-	-
3b.4.3	Heavy equipment rental	-	5,341	-	-	-	-	-	801	6,142	-	-	6,142	-	-	-	-	-	-	-	-
3b.4.4	Plant energy budget	-	-	-	-	-	-	265	40	305	-	-	305	-	-	-	-	-	-	-	-
3b.4.5	NRC ISFSI Fees	-	-	-	-	-	-	537	54	591	-	591	-	-	-	-	-	-	-	-	-
3b.4.6	Indirect Overhead	-	-	-	-	-	-	961	144	1,105	-	277	828	-	-	-	-	-	-	-	-
3b.4.7	ISFSI Operating Costs	-	-	-	-	-	-	194	29	223	-	223	-	-	-	-	-	-	-	-	-
3b.4.8	Security Staff Cost	-	-	-	-	-	-	6,608	991	7,599	-	6,026	1,573	-	-	-	-	-	-	-	144,361
3b.4.9	DOC Staff Cost	-	-	-	-	-	-	13,926	2,089	16,015	-	-	16,015	-	-	-	-	-	-	-	125,940
3b.4.10	Utility Staff Cost	-	-	-	-	-	-	8,822	1,323	10,146	-	2,547	7,599	-	-	-	-	-	-	-	100,937
3b.4	Subtotal Period 3b Period-Dependent Costs	-	5,341	-	-	-	-	33,005	5,640	43,986	-	11,524	32,462	-	-	-	-	-	-	-	371,238
3b.0	TOTAL PERIOD 3b COST	-	24,577	-	-	-	-	37,728	9,234	71,539	269	12,751	58,520	-	-	-	-	-	-	177,512	372,798
PERIOD 3c - Fuel Storage Operations/Shipping																					
Period 3c Additional Costs																					
3c.2.1	Water Usage	-	-	-	-	-	-	1,109	166	1,276	-	1,276	-	-	-	-	-	-	-	-	-
3c.2	Subtotal Period 3c Additional Costs	-	-	-	-	-	-	1,109	166	1,276	-	1,276	-	-	-	-	-	-	-	-	-
Period 3c Collateral Costs																					
3c.3.1	Spent Fuel Capital and Transfer	-	-	-	-	-	-	16,176	2,426	18,603	-	18,603	-	-	-	-	-	-	-	-	-
3c.3.2	Corporate A&G	-	-	-	-	-	-	8,831	1,325	10,155	-	10,155	-	-	-	-	-	-	-	-	-
3c.3	Subtotal Period 3c Collateral Costs	-	-	-	-	-	-	25,007	3,751	28,758	-	28,758	-	-	-	-	-	-	-	-	-
Period 3c Period-Dependent Costs																					
3c.4.1	Insurance	-	-	-	-	-	-	23,278	2,328	25,606	-	25,606	-	-	-	-	-	-	-	-	-
3c.4.2	Property taxes	-	-	-	-	-	-	2,933	293	3,226	-	3,226	-	-	-	-	-	-	-	-	-
3c.4.4	NRC ISFSI Fees	-	-	-	-	-	-	8,332	833	9,165	-	9,165	-	-	-	-	-	-	-	-	-
3c.4.5	Indirect Overhead	-	-	-	-	-	-	1,949	292	2,242	-	2,242	-	-	-	-	-	-	-	-	-
3c.4.6	ISFSI Operating Costs	-	-	-	-	-	-	3,005	451	3,456	-	3,456	-	-	-	-	-	-	-	-	-
3c.4.7	Security Staff Cost	-	-	-	-	-	-	81,248	12,187	93,435	-	93,435	-	-	-	-	-	-	-	-	1,778,960
3c.4.8	Utility Staff Cost	-	-	-	-	-	-	34,503	5,175	39,678	-	39,678	-	-	-	-	-	-	-	-	387,619
3c.4	Subtotal Period 3c Period-Dependent Costs	-	-	-	-	-	-	155,248	21,560	176,808	-	176,808	-	-	-	-	-	-	-	-	2,166,579
3c.0	TOTAL PERIOD 3c COST	-	-	-	-	-	-	181,364	25,477	206,842	-	206,842	-	-	-	-	-	-	-	-	2,166,579
PERIOD 3d - GTCC shipping																					
Period 3d Direct Decommissioning Activities																					
Nuclear Steam Supply System Removal																					
3d.1.1.1	Vessel & Internals GTCC Disposal	-	-	1,200	-	-	12,281	-	2,142	15,623	15,623	-	-	-	-	-	-	2,474	487,788	-	-
3d.1.1	Totals	-	-	1,200	-	-	12,281	-	2,142	15,623	15,623	-	-	-	-	-	-	2,474	487,788	-	-
3d.1	Subtotal Period 3d Activity Costs	-	-	1,200	-	-	12,281	-	2,142	15,623	15,623	-	-	-	-	-	-	2,474	487,788	-	-
Period 3d Additional Costs																					
3d.2.1	Water Usage	-	-	-	-	-	-	1	0	2	-	2	-	-	-	-	-	-	-	-	-
3d.2	Subtotal Period 3d Additional Costs	-	-	-	-	-	-	1	0	2	-	2	-	-	-	-	-	-	-	-	-
Period 3d Collateral Costs																					
3d.3.1	Corporate A&G	-	-	-	-	-	-	11	2	13	13	-	-	-	-	-	-	-	-	-	-
3d.3	Subtotal Period 3d Collateral Costs	-	-	-	-	-	-	11	2	13	13	-	-	-	-	-	-	-	-	-	-
Period 3d Period-Dependent Costs																					
3d.4.1	Insurance	-	-	-	-	-	-	32	3	36	36	-	-	-	-	-	-	-	-	-	-
3d.4.2	Property taxes	-	-	-	-	-	-	4	0	4	4	-	-	-	-	-	-	-	-	-	-
3d.4.4	NRC ISFSI Fees	-	-	-	-	-	-	6	1	7	-	7	-	-	-	-	-	-	-	-	-
3d.4.5	Indirect Overhead	-	-	-	-	-	-	2	0	3	3	-	-	-	-	-	-	-	-	-	-
3d.4.6	ISFSI Operating Costs	-	-	-	-	-	-	4	1	5	-	5	-	-	-	-	-	-	-	-	-
3d.4.7	Security Staff Cost	-	-	-	-	-	-	113	17	130	130	-	-	-	-	-	-	-	-	-	2,472
3d.4.8	Utility Staff Cost	-	-	-	-	-	-	48	7	55	55	-	-	-	-	-	-	-	-	-	539
3d.4	Subtotal Period 3d Period-Dependent Costs	-	-	-	-	-	-	210	29	239	228	12	-	-	-	-	-	-	-	-	3,010
3d.0	TOTAL PERIOD 3d COST	-	-	1,200	-	-	12,281	222	2,173	15,877	15,863	13	-	-	-	-	-	2,474	487,788	-	3,010

Table C
Waterford Steam Electric Station, Unit 3
DECON Decommissioning Cost Estimate
(thousands of 2019 dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes				Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
															Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet			
PERIOD 3e - ISFSI Decontamination																					
Period 3e Additional Costs																					
3e.2.1	Decommissioning of ISFSI	-	193	171	1,026	-	2,343	2,270	1,501	7,504	7,504	-	-	-	20,094	-	-	-	1,891,777	12,484	2,273
3e.2	Subtotal Period 3e Additional Costs	-	193	171	1,026	-	2,343	2,270	1,501	7,504	7,504	-	-	-	20,094	-	-	-	1,891,777	12,484	2,273
Period 3e Collateral Costs																					
3e.3.1	Corporate A&G	-	-	-	-	-	-	86	22	108	108	-	-	-	-	-	-	-	-	-	-
3e.3	Subtotal Period 3e Collateral Costs	-	-	-	-	-	-	86	22	108	108	-	-	-	-	-	-	-	-	-	-
Period 3e Period-Dependent Costs																					
3e.4.1	Insurance	-	-	-	-	-	-	80	20	101	101	-	-	-	-	-	-	-	-	-	-
3e.4.2	Property taxes	-	-	-	-	-	-	35	9	44	44	-	-	-	-	-	-	-	-	-	-
3e.4.3	Plant energy budget	-	-	-	-	-	-	49	12	62	62	-	-	-	-	-	-	-	-	-	-
3e.4.4	Indirect Overhead	-	-	-	-	-	-	41	10	51	51	-	-	-	-	-	-	-	-	-	-
3e.4.5	Security Staff Cost	-	-	-	-	-	-	69	17	86	86	-	-	-	-	-	-	-	-	-	3,448
3e.4.6	Utility Staff Cost	-	-	-	-	-	-	341	85	426	426	-	-	-	-	-	-	-	-	-	3,792
3e.4	Subtotal Period 3e Period-Dependent Costs	-	-	-	-	-	-	616	154	770	770	-	-	-	-	-	-	-	-	-	7,240
3e.0	TOTAL PERIOD 3e COST	-	193	171	1,026	-	2,343	2,972	1,676	8,382	8,382	-	-	-	20,094	-	-	-	1,891,777	12,484	9,513
PERIOD 3f - ISFSI Site Restoration																					
Period 3f Additional Costs																					
3f.2.1	Demolition of ISFSI	-	3,499	-	-	-	-	506	601	4,606	-	-	4,606	-	-	-	-	-	-	38,172	160
3f.2	Subtotal Period 3f Additional Costs	-	3,499	-	-	-	-	506	601	4,606	-	-	4,606	-	-	-	-	-	-	38,172	160
Period 3f Collateral Costs																					
3f.3.1	Small tool allowance	-	50	-	-	-	-	-	7	57	-	-	57	-	-	-	-	-	-	-	-
3f.3.2	Corporate A&G	-	-	-	-	-	-	43	6	49	-	-	49	-	-	-	-	-	-	-	-
3f.3	Subtotal Period 3f Collateral Costs	-	50	-	-	-	-	43	14	106	-	-	106	-	-	-	-	-	-	-	-
Period 3f Period-Dependent Costs																					
3f.4.2	Property taxes	-	-	-	-	-	-	17	2	19	-	-	19	-	-	-	-	-	-	-	-
3f.4.3	Heavy equipment rental	-	115	-	-	-	-	-	17	132	-	-	132	-	-	-	-	-	-	-	-
3f.4.4	Plant energy budget	-	-	-	-	-	-	25	4	28	-	-	28	-	-	-	-	-	-	-	-
3f.4.5	Indirect Overhead	-	-	-	-	-	-	20	3	23	-	-	23	-	-	-	-	-	-	-	-
3f.4.6	Security Staff Cost	-	-	-	-	-	-	15	2	17	-	-	17	-	-	-	-	-	-	-	684
3f.4.7	Utility Staff Cost	-	-	-	-	-	-	145	22	166	-	-	166	-	-	-	-	-	-	-	1,539
3f.4	Subtotal Period 3f Period-Dependent Costs	-	115	-	-	-	-	222	50	387	-	-	387	-	-	-	-	-	-	-	2,222
3f.0	TOTAL PERIOD 3f COST	-	3,664	-	-	-	-	770	664	5,099	-	-	5,099	-	-	-	-	-	-	38,172	2,382
PERIOD 3 TOTALS		-	28,435	1,371	1,026	-	14,624	223,056	39,226	307,738	24,514	219,606	63,618	-	20,094	-	-	2,474	2,379,565	228,168	2,554,283
TOTAL COST TO DECOMMISSION		11,727	104,519	26,348	16,612	41,096	58,816	832,034	186,337	1,277,489	856,219	351,173	70,097	423,311	214,882	1,808	112	2,474	32,652,000	1,320,933	6,889,649

Table C
Waterford Steam Electric Station, Unit 3
DECON Decommissioning Cost Estimate
(thousands of 2019 dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site	LLRW	Other Costs	Total Contingency	Total Costs	NRC	Spent Fuel	Site	Processed	Burial Volumes				Burial /	Craft Manhours	Utility and
						Processing Costs	Disposal Costs				Lic. Term. Costs	Management Costs	Restoration Costs	Volume Cu. Feet	Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Processed Wt., Lbs.		Contractor Manhours

TOTAL COST TO DECOMMISSION WITH 17.08% CONTINGENCY:	\$1,277,489	thousands of 2019	dollars
TOTAL NRC LICENSE TERMINATION COST IS 67.02% OR:	\$856,219	thousands of 2019	dollars
SPENT FUEL MANAGEMENT COST IS 27.49% OR:	\$351,173	thousands of 2019	dollars
NON-NUCLEAR DEMOLITION COST IS 5.49% OR:	\$70,097	thousands of 2019	dollars
TOTAL LOW-LEVEL RADIOACTIVE WASTE VOLUME BURIED (EXCLUDING GTCC):	216,802	cubic feet	
TOTAL GREATER THAN CLASS C RADWASTE VOLUME GENERATED:	2,474	cubic feet	
TOTAL SCRAP METAL REMOVED:	53,742	tons	
TOTAL CRAFT LABOR REQUIREMENTS:	1,320,933	man-hours	

End Notes:
n/a - indicates that this activity not charged as decommissioning expense
a - indicates that this activity performed by decommissioning staff
0 - indicates that this value is less than 0.5 but is non-zero
A cell containing " - " indicates a zero value

*Waterford Steam Electric Station, Unit 3
Decommissioning Cost Analysis*

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Appendix D, Page 1 of 13*

APPENDIX D
DETAILED COST ANALYSIS
SAFSTOR

Waterford Steam Electric Station, Unit 3
Decommissioning Cost Analysis

Table D
Waterford Steam Electric Station, Unit 3
SAFSTOR Decommissioning Cost Estimate
(thousands of 2019 dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes				Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
															Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet			
PERIOD 0a - Pre-Shutdown Early Planning																					
Period 0a Additional Costs																					
0a.2.1	Pre-Shutdown Contractor	-	-	-	-	-	-	8,858	-	8,858	8,858	-	-	-	-	-	-	-	-	-	-
0a.2.2	IT Support and Projects	-	-	-	-	-	-	701	-	701	701	-	-	-	-	-	-	-	-	-	-
0a.2	Subtotal Period 0a Additional Costs	-	-	-	-	-	-	9,559	-	9,559	9,559	-	-	-	-	-	-	-	-	-	-
Period 0a Collateral Costs																					
0a.3.1	NDO	-	-	-	-	-	-	3,288	493	3,781	3,781	-	-	-	-	-	-	-	-	-	-
0a.3	Subtotal Period 0a Collateral Costs	-	-	-	-	-	-	3,288	493	3,781	3,781	-	-	-	-	-	-	-	-	-	-
Period 0a Period-Dependent Costs																					
0a.4.4	NRC Fees	-	-	-	-	-	-	498	50	548	548	-	-	-	-	-	-	-	-	-	-
0a.4.5	Utility Staff Cost	-	-	-	-	-	-	4,151	623	4,774	4,774	-	-	-	-	-	-	-	-	-	-
0a.4	Subtotal Period 0a Period-Dependent Costs	-	-	-	-	-	-	4,649	672	5,322	5,322	-	-	-	-	-	-	-	-	-	-
0a.0	TOTAL PERIOD 0a COST	-	-	-	-	-	-	17,496	1,166	18,661	18,661	-	-	-	-	-	-	-	-	-	-
PERIOD 1a - Shutdown through Transition																					
Period 1a Direct Decommissioning Activities																					
1a.1.1	SAFSTOR site characterization survey	-	-	-	-	-	-	385	115	500	500	-	-	-	-	-	-	-	-	-	-
1a.1.2	Prepare preliminary decommissioning cost	-	-	-	-	-	-	195	29	224	224	-	-	-	-	-	-	-	-	-	1,300
1a.1.3	Notification of Cessation of Operations									a											
1a.1.4	Remove fuel & source material									n/a											
1a.1.5	Notification of Permanent Defueling									a											
1a.1.6	Deactivate plant systems & process waste									a											
1a.1.7	Prepare and submit PSDAR	-	-	-	-	-	-	300	45	344	344	-	-	-	-	-	-	-	-	-	2,000
1a.1.8	Review plant dwgs & specs.	-	-	-	-	-	-	195	29	224	224	-	-	-	-	-	-	-	-	-	1,300
1a.1.9	Perform detailed rad survey									a											
1a.1.10	Estimate by-product inventory	-	-	-	-	-	-	150	22	172	172	-	-	-	-	-	-	-	-	-	1,000
1a.1.11	End product description	-	-	-	-	-	-	150	22	172	172	-	-	-	-	-	-	-	-	-	1,000
1a.1.12	Detailed by-product inventory	-	-	-	-	-	-	225	34	258	258	-	-	-	-	-	-	-	-	-	1,500
1a.1.13	Define major work sequence	-	-	-	-	-	-	150	22	172	172	-	-	-	-	-	-	-	-	-	1,000
1a.1.14	Perform SER and EA	-	-	-	-	-	-	464	70	534	534	-	-	-	-	-	-	-	-	-	3,100
1a.1.15	Prepare/submit Defueled Technical Specifications	-	-	-	-	-	-	1,123	168	1,292	1,292	-	-	-	-	-	-	-	-	-	7,500
1a.1.16	Perform Site-Specific Cost Study	-	-	-	-	-	-	749	112	861	861	-	-	-	-	-	-	-	-	-	5,000
1a.1.17	Prepare/submit Irradiated Fuel Management Plan	-	-	-	-	-	-	150	22	172	172	-	-	-	-	-	-	-	-	-	1,000
Activity Specifications																					
1a.1.18.1	Prepare plant and facilities for SAFSTOR	-	-	-	-	-	-	737	111	847	847	-	-	-	-	-	-	-	-	-	4,920
1a.1.18.2	Plant systems	-	-	-	-	-	-	624	94	718	718	-	-	-	-	-	-	-	-	-	4,167
1a.1.18.3	Plant structures and buildings	-	-	-	-	-	-	467	70	537	537	-	-	-	-	-	-	-	-	-	3,120
1a.1.18.4	Waste management	-	-	-	-	-	-	300	45	344	344	-	-	-	-	-	-	-	-	-	2,000
1a.1.18.5	Facility and site dormancy	-	-	-	-	-	-	300	45	344	344	-	-	-	-	-	-	-	-	-	2,000
1a.1.18	Total	-	-	-	-	-	-	2,427	364	2,791	2,791	-	-	-	-	-	-	-	-	-	16,207
Detailed Work Procedures																					
1a.1.19.1	Plant systems	-	-	-	-	-	-	177	27	204	204	-	-	-	-	-	-	-	-	-	1,183
1a.1.19.2	Facility closeout & dormancy	-	-	-	-	-	-	180	27	207	207	-	-	-	-	-	-	-	-	-	1,200
1a.1.19	Total	-	-	-	-	-	-	357	54	410	410	-	-	-	-	-	-	-	-	-	2,383
1a.1.20	Procure vacuum drying system	-	-	-	-	-	-	15	2	17	17	-	-	-	-	-	-	-	-	-	100
1a.1.21	Drain/de-energize non-cont. systems									a											
1a.1.22	Drain & dry NSSS									a											
1a.1.23	Drain/de-energize contaminated systems									a											
1a.1.24	Decon/secure contaminated systems									a											
1a.1	Subtotal Period 1a Activity Costs	-	-	-	-	-	-	7,033	1,113	8,146	8,146	-	-	-	-	-	-	-	-	-	44,390
Period 1a Additional Costs																					
1a.2.1	IT Support and Projects	-	-	-	-	-	-	547	-	547	547	-	-	-	-	-	-	-	-	-	-
1a.2.2	Severance	-	-	-	-	-	-	4,200	-	4,200	4,200	-	-	-	-	-	-	-	-	-	-
1a.2.3	Fees Paid by Headquarters	-	-	-	-	-	-	98	-	98	98	-	-	-	-	-	-	-	-	-	-
1a.2.4	Communication Plan	-	-	-	-	-	-	342	-	342	342	-	-	-	-	-	-	-	-	-	-
1a.2.5	Post-Shutdown Contractor	-	-	-	-	-	-	815	-	815	815	-	-	-	-	-	-	-	-	-	-
1a.2.6	Water Usage	-	-	-	-	-	-	320	48	368	368	-	-	-	-	-	-	-	-	-	-

Waterford Steam Electric Station, Unit 3
Decommissioning Cost Analysis

Table D
Waterford Steam Electric Station, Unit 3
SAFSTOR Decommissioning Cost Estimate
(thousands of 2019 dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes				Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
															Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet			
1a.2	Subtotal Period 1a Additional Costs	-	-	-	-	-	-	6,322	48	6,370	6,370	-	-	-	-	-	-	-	-	-	-
Period 1a Collateral Costs																					
1a.3.1	Spent Fuel Capital and Transfer	-	-	-	-	-	-	2,060	309	2,369	-	2,369	-	-	-	-	-	-	-	-	-
1a.3.2	NDO	-	-	-	-	-	-	3,288	493	3,781	3,781	-	-	-	-	-	-	-	-	-	-
1a.3.3	Legal (License Termination)	-	-	-	-	-	-	831	125	956	956	-	-	-	-	-	-	-	-	-	-
1a.3.4	Annual Fee	-	-	-	-	-	-	83	12	95	95	-	-	-	-	-	-	-	-	-	-
1a.3.5	Corporate A&G	-	-	-	-	-	-	10,136	1,520	11,657	11,657	-	-	-	-	-	-	-	-	-	-
1a.3	Subtotal Period 1a Collateral Costs	-	-	-	-	-	-	16,398	2,460	18,858	16,489	2,369	-	-	-	-	-	-	-	-	-
Period 1a Period-Dependent Costs																					
1a.4.1	Insurance	-	-	-	-	-	-	3,349	335	3,684	3,684	-	-	-	-	-	-	-	-	-	-
1a.4.2	Property taxes	-	-	-	-	-	-	106	11	117	117	-	-	-	-	-	-	-	-	-	-
1a.4.3	Health physics supplies	-	517	-	-	-	-	-	129	646	646	-	-	-	-	-	-	-	-	-	-
1a.4.4	Heavy equipment rental	-	546	-	-	-	-	-	82	628	628	-	-	-	-	-	-	-	-	-	-
1a.4.5	Disposal of DAW generated	-	-	12	5	-	31	-	10	57	57	-	-	-	616	-	-	-	12,311	20	-
1a.4.6	Plant energy budget	-	-	-	-	-	-	1,491	224	1,714	1,714	-	-	-	-	-	-	-	-	-	-
1a.4.7	NRC Fees	-	-	-	-	-	-	1,700	170	1,870	1,870	-	-	-	-	-	-	-	-	-	-
1a.4.8	Emergency Planning Fees	-	-	-	-	-	-	1,279	128	1,407	-	1,407	-	-	-	-	-	-	-	-	-
1a.4.9	Indirect Overhead	-	-	-	-	-	-	2,833	425	3,258	3,258	-	-	-	-	-	-	-	-	-	-
1a.4.10	Spent Fuel Pool O&M	-	-	-	-	-	-	828	124	952	-	952	-	-	-	-	-	-	-	-	-
1a.4.11	ISFSI Operating Costs	-	-	-	-	-	-	109	16	125	-	125	-	-	-	-	-	-	-	-	-
1a.4.12	Security Staff Cost	-	-	-	-	-	-	14,820	2,223	17,043	17,043	-	-	-	-	-	-	-	-	-	266,058
1a.4.13	Utility Staff Cost	-	-	-	-	-	-	35,482	5,322	40,804	40,804	-	-	-	-	-	-	-	-	-	432,640
1a.4	Subtotal Period 1a Period-Dependent Costs	-	1,063	12	5	-	31	61,997	9,199	72,306	69,822	2,484	-	-	616	-	-	-	12,311	20	698,698
1a.0	TOTAL PERIOD 1a COST	-	1,063	12	5	-	31	91,750	12,819	105,680	100,826	4,853	-	-	616	-	-	-	12,311	20	743,088
PERIOD 1b - SAFSTOR Limited DECON Activities																					
Period 1b Direct Decommissioning Activities																					
Decontamination of Site Buildings																					
1b.1.1.1	Reactor Building	1,307	-	-	-	-	-	-	653	1,960	1,960	-	-	-	-	-	-	-	-	28,407	-
1b.1.1.2	Condensate Polishing Building	100	-	-	-	-	-	-	50	151	151	-	-	-	-	-	-	-	-	2,222	-
1b.1.1.3	Fuel Handling Building	443	-	-	-	-	-	-	221	664	664	-	-	-	-	-	-	-	-	8,799	-
1b.1.1.4	Low Level Radioactive Waste Building	12	-	-	-	-	-	-	6	19	19	-	-	-	-	-	-	-	-	275	-
1b.1.1.5	Reactor Auxiliary Building	1,092	-	-	-	-	-	-	546	1,637	1,637	-	-	-	-	-	-	-	-	22,751	-
1b.1.1.6	Solidification Facility	13	-	-	-	-	-	-	6	19	19	-	-	-	-	-	-	-	-	287	-
1b.1.1.7	Turbine Building	493	-	-	-	-	-	-	246	739	739	-	-	-	-	-	-	-	-	10,992	-
1b.1.1	Totals	3,459	-	-	-	-	-	-	1,730	5,189	5,189	-	-	-	-	-	-	-	-	73,735	-
1b.1	Subtotal Period 1b Activity Costs	3,459	-	-	-	-	-	-	1,730	5,189	5,189	-	-	-	-	-	-	-	-	73,735	-
Period 1b Additional Costs																					
1b.2.1	IT Support and Projects	-	-	-	-	-	-	121	-	121	121	-	-	-	-	-	-	-	-	-	-
1b.2.2	Fees Paid by Headquarters	-	-	-	-	-	-	25	-	25	25	-	-	-	-	-	-	-	-	-	-
1b.2.3	Communication Plan	-	-	-	-	-	-	9	-	9	9	-	-	-	-	-	-	-	-	-	-
1b.2.4	Post-Shutdown Contractor	-	-	-	-	-	-	101	-	101	101	-	-	-	-	-	-	-	-	-	-
1b.2.5	Water Usage	-	-	-	-	-	-	81	12	93	93	-	-	-	-	-	-	-	-	-	-
1b.2	Subtotal Period 1b Additional Costs	-	-	-	-	-	-	336	12	348	348	-	-	-	-	-	-	-	-	-	-
Period 1b Collateral Costs																					
1b.3.1	Decon equipment	1,026	-	-	-	-	-	-	154	1,180	1,180	-	-	-	-	-	-	-	-	-	-
1b.3.2	Process decommissioning water waste	221	-	150	317	-	464	-	289	1,441	1,441	-	-	-	1,359	-	-	-	81,522	265	-
1b.3.4	Small tool allowance	-	57	-	-	-	-	-	9	65	65	-	-	-	-	-	-	-	-	-	-
1b.3.5	Spent Fuel Capital and Transfer	-	-	-	-	-	-	2,929	439	3,368	-	3,368	-	-	-	-	-	-	-	-	-
1b.3.6	NDO	-	-	-	-	-	-	829	124	953	953	-	-	-	-	-	-	-	-	-	-
1b.3.7	Legal (License Termination)	-	-	-	-	-	-	218	33	251	251	-	-	-	-	-	-	-	-	-	-
1b.3.8	Annual Fee	-	-	-	-	-	-	22	3	25	25	-	-	-	-	-	-	-	-	-	-
1b.3.9	Corporate A&G	-	-	-	-	-	-	1,655	248	1,904	1,904	-	-	-	-	-	-	-	-	-	-
1b.3	Subtotal Period 1b Collateral Costs	1,246	57	150	317	-	464	5,652	1,299	9,186	5,817	3,368	-	-	1,359	-	-	-	81,522	265	-
Period 1b Period-Dependent Costs																					
1b.4.1	Decon supplies	1,656	-	-	-	-	-	-	414	2,070	2,070	-	-	-	-	-	-	-	-	-	-
1b.4.2	Insurance	-	-	-	-	-	-	844	84	929	929	-	-	-	-	-	-	-	-	-	-
1b.4.3	Property taxes	-	-	-	-	-	-	27	3	29	29	-	-	-	-	-	-	-	-	-	-

Table D
Waterford Steam Electric Station, Unit 3
SAFSTOR Decommissioning Cost Estimate
(thousands of 2019 dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes				Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
															Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet			
Period 1b Period-Dependent Costs (continued)																					
1b.4.4	Health physics supplies	-	482	-	-	-	-	-	120	602	602	-	-	-	-	-	-	-	-	-	-
1b.4.5	Heavy equipment rental	-	138	-	-	-	-	-	21	158	158	-	-	-	-	-	-	-	-	-	-
1b.4.6	Disposal of DAW generated	-	-	17	6	-	43	-	13	79	79	-	-	-	850	-	-	-	16,995	28	-
1b.4.7	Plant energy budget	-	-	-	-	-	-	376	56	432	432	-	-	-	-	-	-	-	-	-	-
1b.4.8	NRC Fees	-	-	-	-	-	-	290	29	319	319	-	-	-	-	-	-	-	-	-	-
1b.4.9	Emergency Planning Fees	-	-	-	-	-	-	322	32	355	-	355	-	-	-	-	-	-	-	-	-
1b.4.10	Indirect Overhead	-	-	-	-	-	-	433	65	498	498	-	-	-	-	-	-	-	-	-	-
1b.4.11	Spent Fuel Pool O&M	-	-	-	-	-	-	209	31	240	-	240	-	-	-	-	-	-	-	-	-
1b.4.12	ISFSI Operating Costs	-	-	-	-	-	-	27	4	32	-	32	-	-	-	-	-	-	-	-	-
1b.4.13	Security Staff Cost	-	-	-	-	-	-	3,735	560	4,296	4,296	-	-	-	-	-	-	-	-	-	67,061
1b.4.14	Utility Staff Cost	-	-	-	-	-	-	8,916	1,337	10,253	10,253	-	-	-	-	-	-	-	-	-	109,049
1b.4	Subtotal Period 1b Period-Dependent Costs	1,656	619	17	6	-	43	15,179	2,771	20,292	19,666	626	-	-	850	-	-	-	16,995	28	176,110
1b.0	TOTAL PERIOD 1b COST	6,362	676	167	323	-	507	21,167	5,812	35,014	31,020	3,994	-	-	2,208	-	-	-	98,517	74,028	176,110
PERIOD 1c - Preparations for SAFSTOR Dormancy																					
Period 1c Direct Decommissioning Activities																					
1c.1.1	Prepare support equipment for storage	-	444	-	-	-	-	-	67	511	511	-	-	-	-	-	-	-	-	3,000	-
1c.1.2	Install containment pressure equal. lines	-	36	-	-	-	-	-	5	41	41	-	-	-	-	-	-	-	-	700	-
1c.1.3	Interim survey prior to dormancy	-	-	-	-	-	-	733	220	953	953	-	-	-	-	-	-	-	-	13,933	-
1c.1.4	Secure building accesses	-	-	-	-	-	-	-	-	a	-	-	-	-	-	-	-	-	-	-	-
1c.1.5	Prepare & submit interim report	-	-	-	-	-	-	87	13	100	100	-	-	-	-	-	-	-	-	-	583
1c.1	Subtotal Period 1c Activity Costs	-	480	-	-	-	-	820	305	1,605	1,605	-	-	-	-	-	-	-	-	17,633	583
Period 1c Additional Costs																					
1c.2.1	Spent fuel pool isolation	-	-	-	-	-	-	12,325	1,849	14,174	14,174	-	-	-	-	-	-	-	-	-	-
1c.2.2	IT Support and Projects	-	-	-	-	-	-	121	-	121	121	-	-	-	-	-	-	-	-	-	-
1c.2.3	Fees Paid by Headquarters	-	-	-	-	-	-	25	-	25	25	-	-	-	-	-	-	-	-	-	-
1c.2.4	Communication Plan	-	-	-	-	-	-	9	-	9	9	-	-	-	-	-	-	-	-	-	-
1c.2.5	Post-Shutdown Contractor	-	-	-	-	-	-	101	-	101	101	-	-	-	-	-	-	-	-	-	-
1c.2.6	Water Usage	-	-	-	-	-	-	81	12	93	93	-	-	-	-	-	-	-	-	-	-
1c.2	Subtotal Period 1c Additional Costs	-	-	-	-	-	-	12,661	1,861	14,522	14,522	-	-	-	-	-	-	-	-	-	-
Period 1c Collateral Costs																					
1c.3.1	Process decommissioning water waste	206	-	141	296	-	434	-	270	1,347	1,347	-	-	-	1,271	-	-	-	76,261	248	-
1c.3.3	Small tool allowance	-	3	-	-	-	-	-	1	4	4	-	-	-	-	-	-	-	-	-	-
1c.3.4	Spent Fuel Capital and Transfer	-	-	-	-	-	-	3,358	504	3,861	-	3,861	-	-	-	-	-	-	-	-	-
1c.3.5	NDO	-	-	-	-	-	-	829	124	953	953	-	-	-	-	-	-	-	-	-	-
1c.3.6	Legal (License Termination)	-	-	-	-	-	-	218	33	251	251	-	-	-	-	-	-	-	-	-	-
1c.3.7	Annual Fee	-	-	-	-	-	-	22	3	25	25	-	-	-	-	-	-	-	-	-	-
1c.3.8	Corporate A&G	-	-	-	-	-	-	1,516	227	1,743	1,743	-	-	-	-	-	-	-	-	-	-
1c.3	Subtotal Period 1c Collateral Costs	206	3	141	296	-	434	5,942	1,162	8,184	4,322	3,861	-	-	1,271	-	-	-	76,261	248	-
Period 1c Period-Dependent Costs																					
1c.4.1	Insurance	-	-	-	-	-	-	844	84	929	929	-	-	-	-	-	-	-	-	-	-
1c.4.2	Property taxes	-	-	-	-	-	-	27	3	29	29	-	-	-	-	-	-	-	-	-	-
1c.4.3	Health physics supplies	-	215	-	-	-	-	-	54	269	269	-	-	-	-	-	-	-	-	-	-
1c.4.4	Heavy equipment rental	-	138	-	-	-	-	-	21	158	158	-	-	-	-	-	-	-	-	-	-
1c.4.5	Disposal of DAW generated	-	-	3	1	-	8	-	2	14	14	-	-	-	155	-	-	-	3,103	5	-
1c.4.6	Plant energy budget	-	-	-	-	-	-	376	56	432	432	-	-	-	-	-	-	-	-	-	-
1c.4.7	NRC Fees	-	-	-	-	-	-	290	29	319	319	-	-	-	-	-	-	-	-	-	-
1c.4.8	Emergency Planning Fees	-	-	-	-	-	-	322	32	355	-	355	-	-	-	-	-	-	-	-	-
1c.4.9	Indirect Overhead	-	-	-	-	-	-	378	57	434	434	-	-	-	-	-	-	-	-	-	-
1c.4.10	Spent Fuel Pool O&M	-	-	-	-	-	-	209	31	240	-	240	-	-	-	-	-	-	-	-	-
1c.4.11	ISFSI Operating Costs	-	-	-	-	-	-	27	4	32	-	32	-	-	-	-	-	-	-	-	-
1c.4.12	Security Staff Cost	-	-	-	-	-	-	3,735	560	4,296	4,296	-	-	-	-	-	-	-	-	-	67,061
1c.4.13	Utility Staff Cost	-	-	-	-	-	-	8,909	1,336	10,246	10,246	-	-	-	-	-	-	-	-	-	109,049
1c.4	Subtotal Period 1c Period-Dependent Costs	-	353	3	1	-	8	15,117	2,270	17,752	17,126	626	-	-	155	-	-	-	3,103	5	176,110
1c.0	TOTAL PERIOD 1c COST	206	836	144	297	-	442	34,540	5,598	42,064	37,576	4,487	-	-	1,426	-	-	-	79,364	17,886	176,693
PERIOD 1 TOTALS		6,568	2,575	323	625	-	979	147,458	24,229	182,758	169,423	13,335	-	-	4,250	-	-	-	190,191	91,934	1,095,891

Table D
Waterford Steam Electric Station, Unit 3
SAFSTOR Decommissioning Cost Estimate
(thousands of 2019 dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes				Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
															Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet			
PERIOD 2a - SAFSTOR Dormancy with Wet Spent Fuel Storage																					
Period 2a Direct Decommissioning Activities																					
2a.1.1	Quarterly Inspection										a										
2a.1.2	Semi-annual environmental survey										a										
2a.1.3	Prepare reports										a										
2a.1.4	Bituminous roof replacement	-	-	-	-	-	-	683	102	785	785	-	-	-	-	-	-	-	-	-	-
2a.1.5	Maintenance supplies	-	-	-	-	-	-	587	147	733	733	-	-	-	-	-	-	-	-	-	-
2a.1	Subtotal Period 2a Activity Costs	-	-	-	-	-	-	1,269	249	1,518	1,518	-	-	-	-	-	-	-	-	-	-
Period 2a Additional Costs																					
2a.2.1	IT Support and Projects	-	-	-	-	-	-	259	-	259	259	-	-	-	-	-	-	-	-	-	-
2a.2.2	Severance	-	-	-	-	-	-	1,800	-	1,800	1,800	-	-	-	-	-	-	-	-	-	-
2a.2.3	Fees Paid by Headquarters	-	-	-	-	-	-	441	-	441	441	-	-	-	-	-	-	-	-	-	-
2a.2.4	Communication Plan	-	-	-	-	-	-	188	-	188	188	-	-	-	-	-	-	-	-	-	-
2a.2.5	Post-Shutdown Contractor	-	-	-	-	-	-	658	-	658	658	-	-	-	-	-	-	-	-	-	-
2a.2.6	Water Usage	-	-	-	-	-	-	426	64	490	-	490	-	-	-	-	-	-	-	-	-
2a.2	Subtotal Period 2a Additional Costs	-	-	-	-	-	-	3,773	64	3,837	3,347	490	-	-	-	-	-	-	-	-	-
Period 2a Collateral Costs																					
2a.3.1	Spent Fuel Capital and Transfer	-	-	-	-	-	-	90,780	13,617	104,397	-	104,397	-	-	-	-	-	-	-	-	-
2a.3.2	NDO	-	-	-	-	-	-	6,575	986	7,562	7,562	-	-	-	-	-	-	-	-	-	-
2a.3.3	Legal (License Termination)	-	-	-	-	-	-	3,920	588	4,508	4,508	-	-	-	-	-	-	-	-	-	-
2a.3.4	Annual Fee	-	-	-	-	-	-	390	58	448	348	100	-	-	-	-	-	-	-	-	-
2a.3.5	Corporate A&G	-	-	-	-	-	-	10,736	1,610	12,346	12,346	-	-	-	-	-	-	-	-	-	-
2a.3	Subtotal Period 2a Collateral Costs	-	-	-	-	-	-	112,401	16,860	129,261	24,764	104,497	-	-	-	-	-	-	-	-	-
Period 2a Period-Dependent Costs																					
2a.4.1	Insurance	-	-	-	-	-	-	3,373	337	3,710	3,710	-	-	-	-	-	-	-	-	-	-
2a.4.2	Property taxes	-	-	-	-	-	-	425	42	467	467	-	-	-	-	-	-	-	-	-	-
2a.4.3	Health physics supplies	-	823	-	-	-	-	-	206	1,028	1,028	-	-	-	-	-	-	-	-	-	-
2a.4.4	Disposal of DAW generated	-	-	18	7	-	46	-	14	86	86	-	-	-	920	-	-	-	18,406	30	-
2a.4.5	Plant energy budget	-	-	-	-	-	-	1,193	179	1,372	1,372	-	-	-	-	-	-	-	-	-	-
2a.4.6	NRC Fees	-	-	-	-	-	-	3,089	309	3,398	3,398	-	-	-	-	-	-	-	-	-	-
2a.4.7	Emergency Planning Fees	-	-	-	-	-	-	3,038	304	3,342	-	3,342	-	-	-	-	-	-	-	-	-
2a.4.8	Indirect Overhead	-	-	-	-	-	-	1,960	294	2,254	1,868	385	-	-	-	-	-	-	-	-	-
2a.4.9	Spent Fuel Pool O&M	-	-	-	-	-	-	3,310	497	3,807	-	3,807	-	-	-	-	-	-	-	-	-
2a.4.10	ISFSI Operating Costs	-	-	-	-	-	-	435	65	501	-	501	-	-	-	-	-	-	-	-	-
2a.4.11	Security Staff Cost	-	-	-	-	-	-	52,831	7,925	60,755	47,207	13,548	-	-	-	-	-	-	-	-	947,831
2a.4.12	Utility Staff Cost	-	-	-	-	-	-	29,251	4,388	33,638	27,886	5,752	-	-	-	-	-	-	-	-	328,640
2a.4	Subtotal Period 2a Period-Dependent Costs	-	823	18	7	-	46	98,903	14,559	114,357	87,022	27,335	-	-	920	-	-	-	18,406	30	1,276,471
2a.0	TOTAL PERIOD 2a COST	-	823	18	7	-	46	216,346	31,732	248,973	116,651	132,322	-	-	920	-	-	-	18,406	30	1,276,471
PERIOD 2b - SAFSTOR Dormancy with Dry Spent Fuel Storage																					
Period 2b Direct Decommissioning Activities																					
2b.1.1	Quarterly Inspection										a										
2b.1.2	Semi-annual environmental survey										a										
2b.1.3	Prepare reports										a										
2b.1.4	Bituminous roof replacement	-	-	-	-	-	-	5,217	782	5,999	5,999	-	-	-	-	-	-	-	-	-	-
2b.1.5	Maintenance supplies	-	-	-	-	-	-	4,481	1,120	5,601	5,601	-	-	-	-	-	-	-	-	-	-
2b.1	Subtotal Period 2b Activity Costs	-	-	-	-	-	-	9,698	1,903	11,601	11,601	-	-	-	-	-	-	-	-	-	-
Period 2b Additional Costs																					
2b.2.1	Water Usage	-	-	-	-	-	-	1,559	234	1,793	-	1,793	-	-	-	-	-	-	-	-	-
2b.2	Subtotal Period 2b Additional Costs	-	-	-	-	-	-	1,559	234	1,793	-	1,793	-	-	-	-	-	-	-	-	-
Period 2b Collateral Costs																					
2b.3.1	Spent Fuel Capital and Transfer	-	-	-	-	-	-	17,600	2,640	20,240	-	20,240	-	-	-	-	-	-	-	-	-
2b.3.2	Corporate A&G	-	-	-	-	-	-	13,967	2,095	16,062	16,062	-	-	-	-	-	-	-	-	-	-
2b.3	Subtotal Period 2b Collateral Costs	-	-	-	-	-	-	31,567	4,735	36,302	16,062	20,240	-	-	-	-	-	-	-	-	-
Period 2b Period-Dependent Costs																					
2b.4.1	Insurance	-	-	-	-	-	-	25,766	2,577	28,343	28,343	-	-	-	-	-	-	-	-	-	-
2b.4.2	Property taxes	-	-	-	-	-	-	3,246	325	3,571	3,571	-	-	-	-	-	-	-	-	-	-
2b.4.3	Health physics supplies	-	3,049	-	-	-	-	-	762	3,811	3,811	-	-	-	-	-	-	-	-	-	-

Table D
Waterford Steam Electric Station, Unit 3
SAFSTOR Decommissioning Cost Estimate
(thousands of 2019 dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes				Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
															Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet			
Period 2b Period-Dependent Costs (continued)																					
2b.4.4	Disposal of DAW generated	-	-	67	25	-	170	-	53	315	315	-	-	-	3,377	-	-	-	67,549	110	-
2b.4.5	Plant energy budget	-	-	-	-	-	-	4,556	683	5,239	5,239	-	-	-	-	-	-	-	-	-	-
2b.4.6	NRC Fees	-	-	-	-	-	-	8,178	818	8,996	8,996	-	-	-	-	-	-	-	-	-	-
2b.4.7	Indirect Overhead	-	-	-	-	-	-	5,063	759	5,822	3,109	2,713	-	-	-	-	-	-	-	-	-
2b.4.8	ISFSI Operating Costs	-	-	-	-	-	-	3,326	499	3,825	-	3,825	-	-	-	-	-	-	-	-	-
2b.4.9	Security Staff Cost	-	-	-	-	-	-	117,923	17,688	135,612	32,140	103,472	-	-	-	-	-	-	-	-	2,540,761
2b.4.10	Utility Staff Cost	-	-	-	-	-	-	81,925	12,289	94,214	50,310	43,903	-	-	-	-	-	-	-	-	1,017,000
2b.4	Subtotal Period 2b Period-Dependent Costs	-	3,049	67	25	-	170	249,983	36,453	289,747	135,833	153,913	-	-	3,377	-	-	-	67,549	110	3,557,761
2b.0	TOTAL PERIOD 2b COST	-	3,049	67	25	-	170	292,807	43,325	339,442	163,496	175,946	-	-	3,377	-	-	-	67,549	110	3,557,761
PERIOD 2c - SAFSTOR Dormancy without Spent Fuel Storage																					
Period 2c Direct Decommissioning Activities																					
2c.1.1	Quarterly Inspection									a											
2c.1.2	Semi-annual environmental survey									a											
2c.1.3	Prepare reports									a											
2c.1.4	Bituminous roof replacement	-	-	-	-	-	-	3,176	476	3,652	3,652	-	-	-	-	-	-	-	-	-	-
2c.1.5	Maintenance supplies	-	-	-	-	-	-	2,728	682	3,410	3,410	-	-	-	-	-	-	-	-	-	-
2c.1	Subtotal Period 2c Activity Costs	-	-	-	-	-	-	5,904	1,158	7,062	7,062	-	-	-	-	-	-	-	-	-	-
Period 2c Additional Costs																					
2c.2.1	Water Usage	-	-	-	-	-	-	481	72	554	554	-	-	-	-	-	-	-	-	-	-
2c.2	Subtotal Period 2c Additional Costs	-	-	-	-	-	-	481	72	554	554	-	-	-	-	-	-	-	-	-	-
Period 2c Collateral Costs																					
2c.3.1	Corporate A&G	-	-	-	-	-	-	5,635	845	6,480	6,480	-	-	-	-	-	-	-	-	-	-
2c.3	Subtotal Period 2c Collateral Costs	-	-	-	-	-	-	5,635	845	6,480	6,480	-	-	-	-	-	-	-	-	-	-
Period 2c Period-Dependent Costs																					
2c.4.1	Insurance	-	-	-	-	-	-	9,720	972	10,692	10,692	-	-	-	-	-	-	-	-	-	-
2c.4.2	Property taxes	-	-	-	-	-	-	1,976	198	2,174	2,174	-	-	-	-	-	-	-	-	-	-
2c.4.3	Health physics supplies	-	1,746	-	-	-	-	-	436	2,182	2,182	-	-	-	-	-	-	-	-	-	-
2c.4.4	Disposal of DAW generated	-	-	38	14	-	95	-	30	176	176	-	-	-	1,894	-	-	-	37,871	62	-
2c.4.5	Plant energy budget	-	-	-	-	-	-	2,773	416	3,189	3,189	-	-	-	-	-	-	-	-	-	-
2c.4.6	NRC Fees	-	-	-	-	-	-	3,237	324	3,561	3,561	-	-	-	-	-	-	-	-	-	-
2c.4.7	Indirect Overhead	-	-	-	-	-	-	2,579	387	2,966	2,966	-	-	-	-	-	-	-	-	-	-
2c.4.8	Security Staff Cost	-	-	-	-	-	-	25,142	3,771	28,914	28,914	-	-	-	-	-	-	-	-	-	580,406
2c.4.9	Utility Staff Cost	-	-	-	-	-	-	25,384	3,808	29,192	29,192	-	-	-	-	-	-	-	-	-	338,570
2c.4	Subtotal Period 2c Period-Dependent Costs	-	1,746	38	14	-	95	70,812	10,341	83,045	83,045	-	-	-	1,894	-	-	-	37,871	62	918,975
2c.0	TOTAL PERIOD 2c COST	-	1,746	38	14	-	95	82,831	12,417	97,141	97,141	-	-	-	1,894	-	-	-	37,871	62	918,975
PERIOD 2 TOTALS		-	5,617	124	46	-	311	591,984	87,474	685,556	377,288	308,268	-	-	6,191	-	-	-	123,826	202	5,753,207
PERIOD 3a - Reactivate Site Following SAFSTOR Dormancy																					
Period 3a Direct Decommissioning Activities																					
3a.1.1	Prepare preliminary decommissioning cost	-	-	-	-	-	-	195	29	224	224	-	-	-	-	-	-	-	-	-	1,300
3a.1.2	Review plant dwgs & specs.	-	-	-	-	-	-	689	103	792	792	-	-	-	-	-	-	-	-	-	4,600
3a.1.3	Perform detailed rad survey									a											
3a.1.4	End product description	-	-	-	-	-	-	150	22	172	172	-	-	-	-	-	-	-	-	-	1,000
3a.1.5	Detailed by-product inventory	-	-	-	-	-	-	195	29	224	224	-	-	-	-	-	-	-	-	-	1,300
3a.1.6	Define major work sequence	-	-	-	-	-	-	1,123	168	1,292	1,292	-	-	-	-	-	-	-	-	-	7,500
3a.1.7	Perform SER and EA	-	-	-	-	-	-	464	70	534	534	-	-	-	-	-	-	-	-	-	3,100
3a.1.8	Perform Site-Specific Cost Study	-	-	-	-	-	-	749	112	861	861	-	-	-	-	-	-	-	-	-	5,000
Activity Specifications																					
3a.1.9.1	Re-activate plant & temporary facilities	-	-	-	-	-	-	1,104	166	1,269	1,142	-	127	-	-	-	-	-	-	-	7,370
3a.1.9.2	Plant systems	-	-	-	-	-	-	624	94	718	646	-	72	-	-	-	-	-	-	-	4,167
3a.1.9.3	Reactor internals	-	-	-	-	-	-	1,063	160	1,223	1,223	-	-	-	-	-	-	-	-	-	7,100
3a.1.9.4	Reactor vessel	-	-	-	-	-	-	974	146	1,120	1,120	-	-	-	-	-	-	-	-	-	6,500
3a.1.9.5	Biological shield	-	-	-	-	-	-	75	11	86	86	-	-	-	-	-	-	-	-	-	500
3a.1.9.6	Steam generators	-	-	-	-	-	-	467	70	537	537	-	-	-	-	-	-	-	-	-	3,120
3a.1.9.7	Reinforced concrete	-	-	-	-	-	-	240	36	276	138	-	138	-	-	-	-	-	-	-	1,600
3a.1.9.8	Main Turbine	-	-	-	-	-	-	60	9	69	-	-	69	-	-	-	-	-	-	-	400

Waterford Steam Electric Station, Unit 3
Decommissioning Cost Analysis

Table D
Waterford Steam Electric Station, Unit 3
SAFSTOR Decommissioning Cost Estimate
(thousands of 2019 dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes				Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
															Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet			
Activity Specifications (continued)																					
3a.1.9.9	Main Condensers	-	-	-	-	-	-	60	9	69	-	-	69	-	-	-	-	-	-	-	400
3a.1.9.10	Plant structures & buildings	-	-	-	-	-	-	467	70	537	269	-	269	-	-	-	-	-	-	-	3,120
3a.1.9.11	Waste management	-	-	-	-	-	-	689	103	792	792	-	-	-	-	-	-	-	-	-	4,600
3a.1.9.12	Facility & site closeout	-	-	-	-	-	-	135	20	155	78	-	78	-	-	-	-	-	-	-	900
3a.1.9	Total	-	-	-	-	-	-	5,957	894	6,851	6,030	-	820	-	-	-	-	-	-	-	39,777
Planning & Site Preparations																					
3a.1.10	Prepare dismantling sequence	-	-	-	-	-	-	359	54	413	413	-	-	-	-	-	-	-	-	-	2,400
3a.1.11	Plant prep. & temp. svces	-	-	-	-	-	-	3,400	510	3,910	3,910	-	-	-	-	-	-	-	-	-	-
3a.1.12	Design water clean-up system	-	-	-	-	-	-	210	31	241	241	-	-	-	-	-	-	-	-	-	1,400
3a.1.13	Rigging/Cont. Cntrl Envlps/tooling/etc.	-	-	-	-	-	-	2,400	360	2,760	2,760	-	-	-	-	-	-	-	-	-	-
3a.1.14	Procure casks/liners & containers	-	-	-	-	-	-	184	28	212	212	-	-	-	-	-	-	-	-	-	1,230
3a.1	Subtotal Period 3a Activity Costs	-	-	-	-	-	-	16,075	2,411	18,487	17,666	-	820	-	-	-	-	-	-	-	68,607
Period 3a Additional Costs																					
3a.2.1	Site Characterization	-	-	-	-	-	-	4,640	1,392	6,031	6,031	-	-	-	-	-	-	-	-	24,400	9,232
3a.2.2	Water Usage	-	-	-	-	-	-	178	27	205	205	-	-	-	-	-	-	-	-	-	-
3a.2	Subtotal Period 3a Additional Costs	-	-	-	-	-	-	4,818	1,419	6,237	6,237	-	-	-	-	-	-	-	-	24,400	9,232
Period 3a Collateral Costs																					
3a.3.1	Annual Fee	-	-	-	-	-	-	86	13	99	99	-	-	-	-	-	-	-	-	-	-
3a.3.2	Corporate A&G	-	-	-	-	-	-	2,585	388	2,973	2,973	-	-	-	-	-	-	-	-	-	-
3a.3	Subtotal Period 3a Collateral Costs	-	-	-	-	-	-	2,671	401	3,072	3,072	-	-	-	-	-	-	-	-	-	-
Period 3a Period-Dependent Costs																					
3a.4.1	Insurance	-	-	-	-	-	-	523	52	575	575	-	-	-	-	-	-	-	-	-	-
3a.4.2	Property taxes	-	-	-	-	-	-	106	11	117	117	-	-	-	-	-	-	-	-	-	-
3a.4.3	Health physics supplies	-	448	-	-	-	-	-	112	560	560	-	-	-	-	-	-	-	-	-	-
3a.4.4	Heavy equipment rental	-	546	-	-	-	-	-	82	628	628	-	-	-	-	-	-	-	-	-	-
3a.4.5	Disposal of DAW generated	-	-	10	4	-	26	-	8	48	48	-	-	-	514	-	-	-	10,287	17	-
3a.4.6	Plant energy budget	-	-	-	-	-	-	1,491	224	1,714	1,714	-	-	-	-	-	-	-	-	-	-
3a.4.7	NRC Fees	-	-	-	-	-	-	341	34	375	375	-	-	-	-	-	-	-	-	-	-
3a.4.8	Indirect Overhead	-	-	-	-	-	-	1,533	230	1,763	1,763	-	-	-	-	-	-	-	-	-	-
3a.4.9	Security Staff Cost	-	-	-	-	-	-	2,026	304	2,329	2,329	-	-	-	-	-	-	-	-	-	65,000
3a.4.10	Utility Staff Cost	-	-	-	-	-	-	20,735	3,110	23,845	23,845	-	-	-	-	-	-	-	-	-	257,920
3a.4	Subtotal Period 3a Period-Dependent Costs	-	994	10	4	-	26	26,754	4,167	31,955	31,955	-	-	-	514	-	-	-	10,287	17	322,920
3a.0	TOTAL PERIOD 3a COST	-	994	10	4	-	26	50,319	8,397	59,750	58,930	-	820	-	514	-	-	-	10,287	24,417	400,759
PERIOD 3b - Decommissioning Preparations																					
Period 3b Direct Decommissioning Activities																					
Detailed Work Procedures																					
3b.1.1.1	Plant systems	-	-	-	-	-	-	709	106	815	734	-	82	-	-	-	-	-	-	-	4,733
3b.1.1.2	Reactor internals	-	-	-	-	-	-	374	56	431	431	-	-	-	-	-	-	-	-	-	2,500
3b.1.1.3	Remaining buildings	-	-	-	-	-	-	202	30	233	58	-	174	-	-	-	-	-	-	-	1,350
3b.1.1.4	CRD cooling assembly	-	-	-	-	-	-	150	22	172	172	-	-	-	-	-	-	-	-	-	1,000
3b.1.1.5	CRD housings & ICI tubes	-	-	-	-	-	-	150	22	172	172	-	-	-	-	-	-	-	-	-	1,000
3b.1.1.6	Incore instrumentation	-	-	-	-	-	-	150	22	172	172	-	-	-	-	-	-	-	-	-	1,000
3b.1.1.7	Reactor vessel	-	-	-	-	-	-	544	82	625	625	-	-	-	-	-	-	-	-	-	3,630
3b.1.1.8	Facility closeout	-	-	-	-	-	-	180	27	207	103	-	103	-	-	-	-	-	-	-	1,200
3b.1.1.9	Missile shields	-	-	-	-	-	-	67	10	78	78	-	-	-	-	-	-	-	-	-	450
3b.1.1.10	Biological shield	-	-	-	-	-	-	180	27	207	207	-	-	-	-	-	-	-	-	-	1,200
3b.1.1.11	Steam generators	-	-	-	-	-	-	689	103	792	792	-	-	-	-	-	-	-	-	-	4,600
3b.1.1.12	Reinforced concrete	-	-	-	-	-	-	150	22	172	86	-	86	-	-	-	-	-	-	-	1,000
3b.1.1.13	Main Turbine	-	-	-	-	-	-	234	35	269	-	-	269	-	-	-	-	-	-	-	1,560
3b.1.1.14	Main Condensers	-	-	-	-	-	-	234	35	269	-	-	269	-	-	-	-	-	-	-	1,560
3b.1.1.15	Auxiliary building	-	-	-	-	-	-	409	61	470	423	-	47	-	-	-	-	-	-	-	2,730
3b.1.1.16	Reactor building	-	-	-	-	-	-	409	61	470	423	-	47	-	-	-	-	-	-	-	2,730
3b.1.1	Total	-	-	-	-	-	-	4,829	724	5,553	4,477	-	1,077	-	-	-	-	-	-	-	32,243
3b.1	Subtotal Period 3b Activity Costs	-	-	-	-	-	-	4,829	724	5,553	4,477	-	1,077	-	-	-	-	-	-	-	32,243
Period 3b Additional Costs																					
3b.2.1	Water Usage	-	-	-	-	-	-	119	18	137	137	-	-	-	-	-	-	-	-	-	-
3b.2	Subtotal Period 3b Additional Costs	-	-	-	-	-	-	119	18	137	137	-	-	-	-	-	-	-	-	-	-

Waterford Steam Electric Station, Unit 3
Decommissioning Cost Analysis

Table D
Waterford Steam Electric Station, Unit 3
SAFSTOR Decommissioning Cost Estimate
(thousands of 2019 dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site	LLRW	Other Costs	Total Contingency	Total Costs	NRC	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes				Burial /		Utility and Contractor Manhours
						Processing Costs	Disposal Costs				Lic. Term. Costs				Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Processed Wt., Lbs.	Craft Manhours	
Period 3b Collateral Costs																					
3b.3.1	Decon equipment	1,026	-	-	-	-	-	-	154	1,180	1,180	-	-	-	-	-	-	-	-	-	-
3b.3.2	DOC staff relocation expenses	-	-	-	-	-	-	1,825	274	2,098	2,098	-	-	-	-	-	-	-	-	-	-
3b.3.3	Pipe cutting equipment	-	1,200	-	-	-	-	-	180	1,380	1,380	-	-	-	-	-	-	-	-	-	-
3b.3.4	Annual Fee	-	-	-	-	-	-	44	7	51	51	-	-	-	-	-	-	-	-	-	-
3b.3.5	Corporate A&G	-	-	-	-	-	-	1,342	201	1,543	1,543	-	-	-	-	-	-	-	-	-	-
3b.3	Subtotal Period 3b Collateral Costs	1,026	1,200	-	-	-	-	3,211	815	6,252	6,252	-	-	-	-	-	-	-	-	-	-
Period 3b Period-Dependent Costs																					
3b.4.1	Decon supplies	38	-	-	-	-	-	-	10	48	48	-	-	-	-	-	-	-	-	-	-
3b.4.2	Insurance	-	-	-	-	-	-	430	43	473	473	-	-	-	-	-	-	-	-	-	-
3b.4.3	Property taxes	-	-	-	-	-	-	54	5	60	60	-	-	-	-	-	-	-	-	-	-
3b.4.4	Health physics supplies	-	252	-	-	-	-	-	63	315	315	-	-	-	-	-	-	-	-	-	-
3b.4.5	Heavy equipment rental	-	278	-	-	-	-	-	42	320	320	-	-	-	-	-	-	-	-	-	-
3b.4.6	Disposal of DAW generated	-	-	6	2	-	15	-	5	28	28	-	-	-	296	-	-	-	5,930	10	-
3b.4.7	Plant energy budget	-	-	-	-	-	-	760	114	874	874	-	-	-	-	-	-	-	-	-	-
3b.4.8	NRC Fees	-	-	-	-	-	-	174	17	191	191	-	-	-	-	-	-	-	-	-	-
3b.4.9	Indirect Overhead	-	-	-	-	-	-	949	142	1,092	1,092	-	-	-	-	-	-	-	-	-	-
3b.4.10	Security Staff Cost	-	-	-	-	-	-	1,032	155	1,187	1,187	-	-	-	-	-	-	-	-	-	33,123
3b.4.11	DOC Staff Cost	-	-	-	-	-	-	6,159	924	7,083	7,083	-	-	-	-	-	-	-	-	-	59,357
3b.4.12	Utility Staff Cost	-	-	-	-	-	-	10,566	1,585	12,151	12,151	-	-	-	-	-	-	-	-	-	131,433
3b.4	Subtotal Period 3b Period-Dependent Costs	38	530	6	2	-	15	20,125	3,105	23,820	23,820	-	-	-	296	-	-	-	5,930	10	223,913
3b.0	TOTAL PERIOD 3b COST	1,064	1,730	6	2	-	15	28,283	4,662	35,762	34,685	-	1,077	-	296	-	-	-	5,930	10	256,156
PERIOD 3 TOTALS		1,064	2,724	16	6	-	41	78,602	13,060	95,512	93,615	-	1,897	-	811	-	-	-	16,217	24,426	656,915
PERIOD 4a - Large Component Removal																					
Period 4a Direct Decommissioning Activities																					
Nuclear Steam Supply System Removal																					
4a.1.1.1	Reactor Coolant Piping	18	67	25	32	103	139	-	83	468	468	-	-	615	651	-	-	-	86,409	1,865	-
4a.1.1.2	Pressurizer Quench Tank	2	7	4	5	16	21	-	11	66	66	-	-	93	99	-	-	-	13,123	206	-
4a.1.1.3	Reactor Coolant Pumps & Motors	22	75	67	202	-	2,502	-	693	3,562	3,562	-	-	-	10,576	-	-	-	775,440	2,578	80
4a.1.1.4	Pressurizer	7	51	468	176	-	685	-	261	1,648	1,648	-	-	-	2,895	-	-	-	241,113	1,509	1,500
4a.1.1.5	Steam Generators	44	5,664	1,857	2,560	2,983	3,799	-	3,405	20,314	20,314	-	-	39,095	16,059	-	-	-	3,153,777	11,242	2,250
4a.1.1.6	Retired Steam Generator Units	-	-	1,857	2,560	2,983	3,799	-	1,967	13,168	13,168	-	-	39,095	16,059	-	-	-	3,153,777	5,400	2,250
4a.1.1.7	CRDMs/ICIs/Service Structure Removal	34	316	421	120	226	587	-	337	2,040	2,040	-	-	2,430	3,919	-	-	-	281,113	7,470	-
4a.1.1.8	Reactor Vessel Internals	41	6,367	7,317	514	-	8,654	311	11,127	34,329	34,329	-	-	-	2,568	751	112	-	265,321	24,207	1,127
4a.1.1.9	Vessel & Internals GTCC Disposal	-	-	-	-	-	12,281	-	1,842	14,123	14,123	-	-	-	-	-	-	2,474	487,788	-	-
4a.1.1.10	Reactor Vessel	-	7,830	1,955	1,019	-	3,766	311	8,545	23,425	23,425	-	-	-	15,917	-	-	-	999,420	24,207	1,127
4a.1.1	Totals	168	20,378	13,971	7,188	6,311	36,234	621	28,271	113,143	113,143	-	-	81,328	68,742	751	112	2,474	9,457,279	78,684	8,333
Removal of Major Equipment																					
4a.1.2	Main Turbine/Generator	-	392	259	71	763	-	-	249	1,735	1,735	-	-	5,069	-	-	-	-	304,131	8,533	-
4a.1.3	Main Condensers	-	1,049	171	64	966	-	-	434	2,683	2,683	-	-	8,551	-	-	-	-	384,814	23,003	-
Cascading Costs from Clean Building Demolition																					
4a.1.4.1	Reactor Building	-	453	-	-	-	-	-	68	521	521	-	-	-	-	-	-	-	-	5,495	-
4a.1.4.2	Condensate Polishing Building	-	12	-	-	-	-	-	2	14	14	-	-	-	-	-	-	-	-	115	-
4a.1.4.3	Fuel Handling Building	-	72	-	-	-	-	-	11	82	82	-	-	-	-	-	-	-	-	570	-
4a.1.4.4	Low Level Radioactive Waste Building	-	2	-	-	-	-	-	0	2	2	-	-	-	-	-	-	-	-	18	-
4a.1.4.5	Reactor Auxiliary Building	-	233	-	-	-	-	-	35	268	268	-	-	-	-	-	-	-	-	1,499	-
4a.1.4.6	Solidification Facility	-	2	-	-	-	-	-	0	2	2	-	-	-	-	-	-	-	-	19	-
4a.1.4.7	Turbine Building	-	194	-	-	-	-	-	29	223	223	-	-	-	-	-	-	-	-	2,980	-
4a.1.4	Totals	-	968	-	-	-	-	-	145	1,113	1,113	-	-	-	-	-	-	-	-	10,696	-
Disposal of Plant Systems																					
4a.1.5.1	Air Evacuation	-	95	-	-	-	-	-	14	109	-	-	109	-	-	-	-	-	-	2,336	-
4a.1.5.2	Auxiliary Boiler	-	63	-	-	-	-	-	9	72	-	-	72	-	-	-	-	-	-	1,489	-
4a.1.5.3	Auxiliary Boiler - RCA	-	25	0	1	20	-	-	9	56	56	-	-	197	-	-	-	-	7,991	470	-
4a.1.5.4	Auxiliary Steam	-	15	-	-	-	-	-	2	17	-	-	17	-	-	-	-	-	-	367	-
4a.1.5.5	Auxiliary Steam - RCA	-	10	0	1	9	-	-	4	23	23	-	-	84	-	-	-	-	3,403	189	-
4a.1.5.6	Blowdown	-	508	10	34	513	-	-	210	1,275	1,275	-	-	5,036	-	-	-	-	204,498	10,265	-
4a.1.5.7	Boze	-	25	-	-	-	-	-	4	29	-	-	29	-	-	-	-	-	-	622	-
4a.1.5.8	Carbon Dioxide/Hydrogen/Nitrogen	-	14	-	-	-	-	-	2	16	-	-	16	-	-	-	-	-	-	323	-

Waterford Steam Electric Station, Unit 3
Decommissioning Cost Analysis

Table D
Waterford Steam Electric Station, Unit 3
SAFSTOR Decommissioning Cost Estimate
(thousands of 2019 dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes				Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
															Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet			
Disposal of Plant Systems (continued)																					
4a.1.5.9	Carbon Dioxide/Hydrogen/Nitrogen - RCA	-	11	0	0	5	-	-	4	21	21	-	-	52	-	-	-	-	2,101	236	-
4a.1.5.10	Chemical Feed	-	14	-	-	-	-	-	2	17	-	-	17	-	-	-	-	-	-	339	-
4a.1.5.11	Chemical Feed - RCA	-	7	0	0	4	-	-	2	14	14	-	-	44	-	-	-	-	1,784	118	-
4a.1.5.12	Circulating Water	-	150	-	-	-	-	-	23	173	-	-	173	-	-	-	-	-	-	3,785	-
4a.1.5.13	Condensate	-	1,002	60	197	2,983	-	-	734	4,976	4,976	-	-	29,264	-	-	-	-	1,188,407	21,611	-
4a.1.5.14	Condensate Makeup	-	582	12	41	618	-	-	246	1,500	1,500	-	-	6,067	-	-	-	-	246,371	11,829	-
4a.1.5.15	Condensate Polisher	-	740	21	67	1,020	-	-	350	2,198	2,198	-	-	10,011	-	-	-	-	406,540	15,637	-
4a.1.5.16	Extraction Steam	-	470	25	83	1,253	-	-	320	2,152	2,152	-	-	12,293	-	-	-	-	499,207	10,198	-
4a.1.5.17	Feedwater	-	2,168	93	307	4,638	-	-	1,293	8,498	8,498	-	-	45,499	-	-	-	-	1,847,740	45,629	-
4a.1.5.18	Gland Seal	-	10	-	-	-	-	-	2	12	-	-	12	-	-	-	-	-	-	265	-
4a.1.5.19	HVAC (Other Bldg)	-	66	-	-	-	-	-	10	76	-	-	76	-	-	-	-	-	-	1,754	-
4a.1.5.20	HVAC (Service Bldg)	-	27	-	-	-	-	-	4	31	-	-	31	-	-	-	-	-	-	744	-
4a.1.5.21	HVAC (Turbine Bldg)	-	133	-	-	-	-	-	20	153	-	-	153	-	-	-	-	-	-	3,618	-
4a.1.5.22	Main Steam	-	616	22	71	1,070	-	-	327	2,105	2,105	-	-	10,497	-	-	-	-	426,279	12,933	-
4a.1.5.23	Movable Incore Nuclear Instrumentation	-	6	0	1	3	4	-	3	18	18	-	-	32	23	-	-	-	2,717	133	-
4a.1.5.24	Primary Makeup	-	61	-	-	-	-	-	9	70	-	-	70	-	-	-	-	-	-	1,405	-
4a.1.5.25	Reheat Steam	-	304	29	95	1,443	-	-	310	2,182	2,182	-	-	14,159	-	-	-	-	575,011	6,747	-
4a.1.5.26	Seal Oil	-	7	-	-	-	-	-	1	8	-	-	8	-	-	-	-	-	-	166	-
4a.1.5.27	Traveling Screen Wash	-	46	-	-	-	-	-	7	53	-	-	53	-	-	-	-	-	-	1,105	-
4a.1.5.28	Turbine Building Cooling	-	145	-	-	-	-	-	22	167	-	-	167	-	-	-	-	-	-	3,629	-
4a.1.5.29	Turbine Lube Oil	-	25	-	-	-	-	-	4	28	-	-	28	-	-	-	-	-	-	604	-
4a.1.5	Totals	-	7,345	273	898	13,581	4	-	3,947	26,049	25,019	-	1,031	133,232	23	-	-	-	5,412,048	158,548	-
4a.1.6	Scaffolding in support of decommissioning	-	858	16	7	85	13	-	233	1,213	1,213	-	-	751	66	-	-	-	38,008	23,367	-
4a.1	Subtotal Period 4a Activity Costs	168	30,990	14,690	8,230	21,706	36,251	621	33,280	145,936	144,905	-	1,031	228,931	68,831	751	112	2,474	15,596,280	302,832	8,333
Period 4a Additional Costs																					
4a.2.1	Water Usage	-	-	-	-	-	-	328	49	377	377	-	-	-	-	-	-	-	-	-	-
4a.2	Subtotal Period 4a Additional Costs	-	-	-	-	-	-	328	49	377	377	-	-	-	-	-	-	-	-	-	-
Period 4a Collateral Costs																					
4a.3.1	Process decommissioning water waste	5	-	10	20	-	30	-	14	80	80	-	-	-	88	-	-	-	5,271	17	-
4a.3.3	Small tool allowance	-	259	-	-	-	-	-	39	298	268	-	30	-	-	-	-	-	-	-	-
4a.3.4	Annual Fee	-	-	-	-	-	-	119	18	137	137	-	-	-	-	-	-	-	-	-	-
4a.3.5	Corporate A&G	-	-	-	-	-	-	3,401	510	3,911	3,911	-	-	-	-	-	-	-	-	-	-
4a.3	Subtotal Period 4a Collateral Costs	5	259	10	20	-	30	3,520	581	4,426	4,396	-	30	-	88	-	-	-	5,271	17	-
Period 4a Period-Dependent Costs																					
4a.4.1	Decon supplies	104	-	-	-	-	-	-	26	130	130	-	-	-	-	-	-	-	-	-	-
4a.4.2	Insurance	-	-	-	-	-	-	1,167	117	1,283	1,283	-	-	-	-	-	-	-	-	-	-
4a.4.3	Property taxes	-	-	-	-	-	-	147	15	162	162	-	-	-	-	-	-	-	-	-	-
4a.4.4	Health physics supplies	-	2,138	-	-	-	-	-	534	2,672	2,672	-	-	-	-	-	-	-	-	-	-
4a.4.5	Heavy equipment rental	-	2,952	-	-	-	-	-	443	3,395	3,395	-	-	-	-	-	-	-	-	-	-
4a.4.6	Disposal of DAW generated	-	-	109	40	-	275	-	86	510	510	-	-	-	5,472	-	-	-	109,447	178	-
4a.4.7	Plant energy budget	-	-	-	-	-	-	1,959	294	2,253	2,253	-	-	-	-	-	-	-	-	-	-
4a.4.8	NRC Fees	-	-	-	-	-	-	471	47	518	518	-	-	-	-	-	-	-	-	-	-
4a.4.9	Indirect Overhead	-	-	-	-	-	-	2,204	331	2,535	2,535	-	-	-	-	-	-	-	-	-	-
4a.4.10	Liquid Radwaste Processing Equipment/Services	-	-	-	-	-	-	576	86	663	663	-	-	-	-	-	-	-	-	-	-
4a.4.11	Remedial Actions Surveys	-	-	-	-	-	-	1,424	214	1,638	1,638	-	-	-	-	-	-	-	-	-	-
4a.4.12	Security Staff Cost	-	-	-	-	-	-	2,803	420	3,223	3,223	-	-	-	-	-	-	-	-	-	89,932
4a.4.13	DOC Staff Cost	-	-	-	-	-	-	20,014	3,002	23,016	23,016	-	-	-	-	-	-	-	-	-	198,569
4a.4.14	Utility Staff Cost	-	-	-	-	-	-	28,844	4,327	33,171	33,171	-	-	-	-	-	-	-	-	-	359,726
4a.4	Subtotal Period 4a Period-Dependent Costs	104	5,090	109	40	-	275	59,609	9,941	75,169	75,169	-	-	-	5,472	-	-	-	109,447	178	648,226
4a.0	TOTAL PERIOD 4a COST	278	36,339	14,809	8,290	21,706	36,556	64,078	43,851	225,907	224,847	-	1,061	228,931	74,391	751	112	2,474	15,711,000	303,027	656,560
PERIOD 4b - Site Decontamination																					
Period 4b Direct Decommissioning Activities																					
4b.1.1	Remove spent fuel racks	276	30	119	78	-	561	-	310	1,375	1,375	-	-	-	2,878	-	-	-	182,827	793	-
Disposal of Plant Systems																					
4b.1.2.1	Boric Acid Makeup	-	29	-	-	-	-	-	4	33	-	-	33	-	-	-	-	-	-	680	-
4b.1.2.2	Boron Management	-	589	60	91	553	394	-	348	2,034	2,034	-	-	5,423	2,002	-	-	-	348,398	12,387	-
4b.1.2.3	Chemical and Volume Control	-	267	28	33	76	199	-	135	738	738	-	-	743	1,004	-	-	-	94,935	5,270	-

Waterford Steam Electric Station, Unit 3
Decommissioning Cost Analysis

Table D
Waterford Steam Electric Station, Unit 3
SAFSTOR Decommissioning Cost Estimate
(thousands of 2019 dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes				Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
															Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet			
Disposal of Plant Systems (continued)																					
4b.1.2.4	Chilled Water	-	46	-	-	-	-	-	7	53	-	-	53	-	-	-	-	-	-	1,158	-
4b.1.2.5	Chilled Water - RCA	-	280	5	15	224	-	-	106	629	629	-	-	2,196	-	-	-	-	89,167	5,148	-
4b.1.2.6	Component Cooling Water	-	1,874	79	259	3,921	-	-	1,103	7,237	7,237	-	-	38,467	-	-	-	-	1,562,178	39,084	-
4b.1.2.7	Containment Building	-	39	0	1	22	-	-	13	77	77	-	-	218	-	-	-	-	8,855	742	-
4b.1.2.8	Containment Spray	-	123	13	23	156	94	-	82	491	491	-	-	1,527	480	-	-	-	92,626	2,647	-
4b.1.2.9	Demineralized Water	-	105	-	-	-	-	-	16	121	-	-	121	-	-	-	-	-	-	2,439	-
4b.1.2.10	Demineralized Water - RCA	-	183	3	9	141	-	-	69	405	405	-	-	1,384	-	-	-	-	56,204	3,326	-
4b.1.2.11	Electrical Clean - RCA	-	4,969	114	366	5,539	-	-	2,140	13,129	13,129	-	-	54,342	-	-	-	-	2,206,853	90,221	-
4b.1.2.12	Electrical Clean Non-RCA	-	2,354	-	-	-	-	-	353	2,707	-	-	2,707	-	-	-	-	-	-	55,575	-
4b.1.2.13	Electrical Contaminated	-	701	12	39	594	-	-	271	1,618	1,618	-	-	5,829	-	-	-	-	236,720	13,522	-
4b.1.2.14	Electro-Hydraulic Fluid	-	4	-	-	-	-	-	1	5	-	-	5	-	-	-	-	-	-	100	-
4b.1.2.15	Electro-Hydraulic Fluid - RCA	-	7	0	0	4	-	-	2	13	13	-	-	38	-	-	-	-	1,543	114	-
4b.1.2.16	Emergency Breathing Air	-	6	-	-	-	-	-	1	6	-	-	6	-	-	-	-	-	-	144	-
4b.1.2.17	Emergency Diesel Generator	-	69	-	-	-	-	-	10	79	-	-	79	-	-	-	-	-	-	1,586	-
4b.1.2.18	Emergency Diesel Generator - RCA	-	168	3	8	123	-	-	62	364	364	-	-	1,206	-	-	-	-	48,972	3,018	-
4b.1.2.19	Fire Protection	-	222	-	-	-	-	-	33	255	-	-	255	-	-	-	-	-	-	5,250	-
4b.1.2.20	Fire Protection - RCA	-	569	12	40	605	-	-	240	1,467	1,467	-	-	5,930	-	-	-	-	240,841	10,660	-
4b.1.2.21	Fuel Pool Cooling & Purification	-	352	29	42	242	188	-	180	1,033	1,033	-	-	2,374	950	-	-	-	157,464	7,198	-
4b.1.2.22	Gaseous Waste Management	-	70	5	9	85	23	-	38	229	229	-	-	832	114	-	-	-	41,215	1,562	-
4b.1.2.23	HVAC (Containment Bldg)	-	856	40	133	2,014	-	-	540	3,584	3,584	-	-	19,758	-	-	-	-	802,380	16,485	-
4b.1.2.24	HVAC (Control Bldg)	-	39	-	-	-	-	-	6	45	-	-	45	-	-	-	-	-	-	975	-
4b.1.2.25	HVAC (Fuel Bldg)	-	199	8	28	419	-	-	118	773	773	-	-	4,114	-	-	-	-	167,084	3,659	-
4b.1.2.26	HVAC (Reactor Auxiliary Bldg)	-	900	33	110	1,665	-	-	495	3,203	3,203	-	-	16,339	-	-	-	-	663,544	17,319	-
4b.1.2.27	Instrument Air	-	26	-	-	-	-	-	4	29	-	-	29	-	-	-	-	-	-	627	-
4b.1.2.28	Instrument Air - RCA	-	93	1	3	47	-	-	31	174	174	-	-	459	-	-	-	-	18,658	1,761	-
4b.1.2.29	Leak Rate Testing	-	9	-	-	-	-	-	1	11	-	-	11	-	-	-	-	-	-	233	-
4b.1.2.30	Liquid Waste Management	-	138	13	14	30	87	-	64	347	347	-	-	295	438	-	-	-	40,281	2,794	-
4b.1.2.31	Post Accident Sampling	-	32	1	3	43	-	-	15	93	93	-	-	422	-	-	-	-	17,144	663	-
4b.1.2.32	Potable Water	-	7	-	-	-	-	-	1	8	-	-	8	-	-	-	-	-	-	173	-
4b.1.2.33	Potable Water - RCA	-	51	1	2	34	-	-	18	107	107	-	-	335	-	-	-	-	13,594	914	-
4b.1.2.34	Primary Sampling	-	102	37	43	160	235	-	118	696	696	-	-	1,570	1,183	-	-	-	140,414	2,505	-
4b.1.2.35	Reactor Coolant	-	8	0	0	5	1	-	3	17	17	-	-	45	7	-	-	-	2,279	161	-
4b.1.2.36	Refrigeration	-	7	-	-	-	-	-	1	8	-	-	8	-	-	-	-	-	-	156	-
4b.1.2.37	Refrigeration - RCA	-	12	0	0	7	-	-	4	23	23	-	-	67	-	-	-	-	2,709	200	-
4b.1.2.38	Resin Waste Management	-	49	5	6	19	32	-	24	135	135	-	-	182	163	-	-	-	17,874	974	-
4b.1.2.39	Safety Injection	-	782	111	212	1,839	648	-	676	4,268	4,268	-	-	18,038	3,299	-	-	-	943,550	16,655	-
4b.1.2.40	Sanitary System	-	20	-	-	-	-	-	3	23	-	-	23	-	-	-	-	-	-	502	-
4b.1.2.41	Secondary Sampling	-	27	-	-	-	-	-	4	31	-	-	31	-	-	-	-	-	-	649	-
4b.1.2.42	Secondary Sampling - RCA	-	17	0	1	10	-	-	6	34	34	-	-	100	-	-	-	-	4,049	299	-
4b.1.2.43	Service Air	-	20	-	-	-	-	-	3	23	-	-	23	-	-	-	-	-	-	498	-
4b.1.2.44	Service Air - RCA	-	64	1	3	39	-	-	22	129	129	-	-	385	-	-	-	-	15,647	1,301	-
4b.1.2.45	Site Security	-	4	-	-	-	-	-	1	4	-	-	4	-	-	-	-	-	-	88	-
4b.1.2.46	Solid Waste Management	-	19	2	3	20	14	-	12	71	71	-	-	194	72	-	-	-	12,474	411	-
4b.1.2.47	Sump Pump - Contaminated	-	133	9	12	77	53	-	61	344	344	-	-	751	267	-	-	-	47,684	2,683	-
4b.1.2.48	Sump Pump - RCA	-	100	2	7	102	-	-	41	251	251	-	-	997	-	-	-	-	40,504	1,882	-
4b.1.2.49	Supplementary Chilled Water	-	52	-	-	-	-	-	8	60	-	-	60	-	-	-	-	-	-	1,308	-
4b.1.2.50	Supplementary Chilled Water - RCA	-	65	1	4	57	-	-	25	153	153	-	-	564	-	-	-	-	22,891	1,245	-
4b.1.2.51	Supplementary Chiller Condensing	-	21	-	-	-	-	-	3	24	-	-	24	-	-	-	-	-	-	523	-
4b.1.2.52	Supplementary Chiller Condensing - RCA	-	103	2	6	85	-	-	40	235	235	-	-	834	-	-	-	-	33,886	1,922	-
4b.1.2.53	Treated Water	-	26	-	-	-	-	-	4	30	-	-	30	-	-	-	-	-	-	639	-
4b.1.2	Totals	-	17,006	631	1,527	18,955	1,967	-	7,570	47,657	44,100	-	3,557	185,958	9,979	-	-	-	8,192,619	342,036	-
4b.1.3	Scaffolding in support of decommissioning	-	1,287	25	11	127	19	-	350	1,819	1,819	-	-	1,127	99	-	-	-	57,012	35,051	-
Decontamination of Site Buildings																					
4b.1.4.1	Reactor Building	1,190	908	65	385	620	418	-	1,084	4,669	4,669	-	-	6,080	14,062	-	-	-	915,010	42,985	-
4b.1.4.2	Condensate Polishing Building	101	7	1	6	-	6	-	55	176	176	-	-	-	228	-	-	-	10,758	2,357	-
4b.1.4.3	Fuel Handling Building	446	442	8	28	192	31	-	375	1,524	1,524	-	-	1,887	694	-	-	-	110,650	18,521	-
4b.1.4.4	Low Level Radioactive Waste Building	13	3	0	2	-	2	-	8	28	28	-	-	-	84	-	-	-	3,978	326	-
4b.1.4.5	RVCH Temporary Assembly Bldg	3	11	1	6	-	6	-	7	34	34	-	-	-	238	-	-	-	11,250	258	-
4b.1.4.6	Reactor Auxiliary Building	1,105	820	31	162	385	177	-	887	3,567	3,567	-	-	3,776	5,654	-	-	-	422,623	39,982	-
4b.1.4.7	Retired Steam Generator Mausoleum	3	14	1	7	-	8	-	8	42	42	-	-	-	294	-	-	-	13,872	318	-
4b.1.4.8	Solidification Facility	13	3	0	2	0	2	-	8	30	30	-	-	4	88	-	-	-	4,325	343	-
4b.1.4.9	Turbine Building	496	25	3	20	-	21	-	263	827	827	-	-	-	793	-	-	-	37,440	11,466	-
4b.1.4	Totals	3,371	2,233	110	618	1,197	672	-	2,695	10,897	10,897	-	-	11,748	22,135	-	-	-	1,529,906	116,555	-

Waterford Steam Electric Station, Unit 3
Decommissioning Cost Analysis

Table D
Waterford Steam Electric Station, Unit 3
SAFSTOR Decommissioning Cost Estimate
(thousands of 2019 dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes				Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
															Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet			
4b.1.5	Prepare/submit License Termination Plan	-	-	-	-	-	-	613	92	705	705	-	-	-	-	-	-	-	-	-	4,096
4b.1.6	Receive NRC approval of termination plan									a											
4b.1	Subtotal Period 4b Activity Costs	3,647	20,556	885	2,235	20,280	3,220	613	11,016	62,453	58,896	-	3,557	198,833	35,091	-	-	-	9,962,364	494,435	4,096
Period 4b Additional Costs																					
4b.2.1	License Termination Survey Planning	-	-	-	-	-	-	2,018	605	2,623	2,623	-	-	-	-	-	-	-	-	-	12,480
4b.2.2	Underground Services Excavations	-	213	193	1,411	-	1,505	1,023	814	5,158	5,158	-	-	-	36,000	-	-	-	2,640,000	2,505	-
4b.2.3	Decommissioning of ISFSI	-	193	171	1,026	-	2,343	2,972	1,676	8,382	8,382	-	-	-	20,094	-	-	-	1,891,777	12,484	9,513
4b.2.4	Operational Equipment	-	-	23	66	738	-	-	123	951	951	-	-	11,760	-	-	-	-	294,000	32	-
4b.2.5	Fuel Pool Legacy Waste	-	53	90	60	-	521	7	162	893	893	-	-	-	-	56	-	-	7,532	667	27
4b.2.6	Retired Reactor Closure Head	-	-	164	613	-	640	-	268	1,685	1,685	-	-	-	2,869	-	-	-	276,869	2,098	2,000
4b.2.7	Water Usage	-	-	-	-	-	-	411	62	473	473	-	-	-	-	-	-	-	-	-	-
4b.2	Subtotal Period 4b Additional Costs	-	459	642	3,176	738	5,008	6,432	3,711	20,165	20,165	-	-	11,760	58,963	56	-	-	5,110,178	17,786	24,020
Period 4b Collateral Costs																					
4b.3.1	Process decommissioning water waste	12	-	22	45	-	66	-	31	177	177	-	-	-	195	-	-	-	11,687	38	-
4b.3.3	Small tool allowance	-	373	-	-	-	-	-	56	429	429	-	-	-	-	-	-	-	-	-	-
4b.3.4	Decommissioning Equipment Disposition	-	-	131	66	678	103	-	151	1,129	1,129	-	-	6,000	529	-	-	-	303,608	147	-
4b.3.5	Annual Fee	-	-	-	-	-	-	181	27	208	208	-	-	-	-	-	-	-	-	-	-
4b.3.6	Corporate A&G	-	-	-	-	-	-	3,522	528	4,050	4,050	-	-	-	-	-	-	-	-	-	-
4b.3	Subtotal Period 4b Collateral Costs	12	373	153	112	678	170	3,703	793	5,993	5,993	-	-	6,000	724	-	-	-	315,295	185	-
Period 4b Period-Dependent Costs																					
4b.4.1	Decon supplies	1,767	-	-	-	-	-	-	442	2,209	2,209	-	-	-	-	-	-	-	-	-	-
4b.4.2	Insurance	-	-	-	-	-	-	1,460	146	1,606	1,606	-	-	-	-	-	-	-	-	-	-
4b.4.3	Property taxes	-	-	-	-	-	-	184	18	202	202	-	-	-	-	-	-	-	-	-	-
4b.4.4	Health physics supplies	-	3,291	-	-	-	-	-	823	4,114	4,114	-	-	-	-	-	-	-	-	-	-
4b.4.5	Heavy equipment rental	-	3,810	-	-	-	-	-	572	4,382	4,382	-	-	-	-	-	-	-	-	-	-
4b.4.6	Disposal of DAW generated	-	-	138	51	-	347	-	108	645	645	-	-	-	6,917	-	-	-	138,333	226	-
4b.4.7	Plant energy budget	-	-	-	-	-	-	1,936	290	2,226	2,226	-	-	-	-	-	-	-	-	-	-
4b.4.8	NRC Fees	-	-	-	-	-	-	494	49	543	543	-	-	-	-	-	-	-	-	-	-
4b.4.9	Indirect Overhead	-	-	-	-	-	-	2,604	391	2,994	2,994	-	-	-	-	-	-	-	-	-	-
4b.4.10	Liquid Radwaste Processing Equipment/Services	-	-	-	-	-	-	721	108	829	829	-	-	-	-	-	-	-	-	-	-
4b.4.11	Remedial Actions Surveys	-	-	-	-	-	-	1,782	267	2,049	2,049	-	-	-	-	-	-	-	-	-	-
4b.4.12	Security Staff Cost	-	-	-	-	-	-	3,507	526	4,033	4,033	-	-	-	-	-	-	-	-	-	112,548
4b.4.13	DOC Staff Cost	-	-	-	-	-	-	24,475	3,671	28,146	28,146	-	-	-	-	-	-	-	-	-	241,303
4b.4.14	Utility Staff Cost	-	-	-	-	-	-	34,339	5,151	39,489	39,489	-	-	-	-	-	-	-	-	-	424,981
4b.4	Subtotal Period 4b Period-Dependent Costs	1,767	7,102	138	51	-	347	71,501	12,563	93,469	93,469	-	-	-	6,917	-	-	-	138,333	226	778,832
4b.0	TOTAL PERIOD 4b COST	5,426	28,490	1,817	5,573	21,696	8,745	82,249	28,083	182,080	178,523	-	3,557	216,593	101,694	56	-	-	15,526,170	512,631	806,948
PERIOD 4f - License Termination																					
Period 4f Direct Decommissioning Activities																					
4f.1.1	ORISE confirmatory survey	-	-	-	-	-	-	163	49	212	212	-	-	-	-	-	-	-	-	-	-
4f.1.2	Terminate license									a											
4f.1	Subtotal Period 4f Activity Costs	-	-	-	-	-	-	163	49	212	212	-	-	-	-	-	-	-	-	-	-
Period 4f Additional Costs																					
4f.2.1	License Termination Survey	-	-	-	-	-	-	8,287	2,486	10,773	10,773	-	-	-	-	-	-	-	-	161,563	6,240
4f.2.2	Water Usage	-	-	-	-	-	-	77	11	88	88	-	-	-	-	-	-	-	-	-	-
4f.2	Subtotal Period 4f Additional Costs	-	-	-	-	-	-	8,364	2,498	10,861	10,861	-	-	-	-	-	-	-	-	161,563	6,240
Period 4f Collateral Costs																					
4f.3.1	DOC staff relocation expenses	-	-	-	-	-	-	1,825	274	2,098	2,098	-	-	-	-	-	-	-	-	-	-
4f.3.2	Corporate A&G	-	-	-	-	-	-	815	122	937	937	-	-	-	-	-	-	-	-	-	-
4f.3	Subtotal Period 4f Collateral Costs	-	-	-	-	-	-	2,639	396	3,035	3,035	-	-	-	-	-	-	-	-	-	-
Period 4f Period-Dependent Costs																					
4f.4.1	Insurance	-	-	-	-	-	-	631	63	694	694	-	-	-	-	-	-	-	-	-	-
4f.4.2	Property taxes	-	-	-	-	-	-	79	8	87	87	-	-	-	-	-	-	-	-	-	-
4f.4.3	Health physics supplies	-	779	-	-	-	-	-	195	974	974	-	-	-	-	-	-	-	-	-	-
4f.4.4	Disposal of DAW generated	-	-	7	3	-	18	-	5	32	32	-	-	-	349	-	-	-	6,974	11	-
4f.4.5	Plant energy budget	-	-	-	-	-	-	223	33	256	256	-	-	-	-	-	-	-	-	-	-
4f.4.6	NRC Fees	-	-	-	-	-	-	213	21	235	235	-	-	-	-	-	-	-	-	-	-
4f.4.7	Indirect Overhead	-	-	-	-	-	-	800	120	920	920	-	-	-	-	-	-	-	-	-	-

Table D
Waterford Steam Electric Station, Unit 3
SAFSTOR Decommissioning Cost Estimate
(thousands of 2019 dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes				Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
															Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet			
Period 4f Period-Dependent Costs (continued)																					
4f.4.8	Security Staff Cost	-	-	-	-	-	-	678	102	780	780	-	-	-	-	-	-	-	-	-	18,669
4f.4.9	DOC Staff Cost	-	-	-	-	-	-	6,031	905	6,935	6,935	-	-	-	-	-	-	-	-	-	56,784
4f.4.10	Utility Staff Cost	-	-	-	-	-	-	6,847	1,027	7,874	7,874	-	-	-	-	-	-	-	-	-	73,897
4f.4	Subtotal Period 4f Period-Dependent Costs	-	779	7	3	-	18	15,502	2,479	18,787	18,787	-	-	-	349	-	-	-	6,974	11	149,350
4f.0	TOTAL PERIOD 4f COST	-	779	7	3	-	18	26,668	5,422	32,896	32,896	-	-	-	349	-	-	-	6,974	161,574	155,590
PERIOD 4 TOTALS		5,704	65,609	16,633	13,866	43,402	45,318	172,996	77,356	440,883	436,266	-	4,617	445,524	176,434	807	112	2,474	31,244,140	977,233	1,619,097
PERIOD 5b - Site Restoration																					
Period 5b Direct Decommissioning Activities																					
Demolition of Remaining Site Buildings																					
5b.1.1.1	Reactor Building	-	2,600	-	-	-	-	-	390	2,990	-	-	2,990	-	-	-	-	-	-	31,313	-
5b.1.1.2	Administration Building	-	290	-	-	-	-	-	43	333	-	-	333	-	-	-	-	-	-	2,954	-
5b.1.1.3	Auxiliary Boiler	-	11	-	-	-	-	-	2	13	-	-	13	-	-	-	-	-	-	194	-
5b.1.1.4	Chiller Building	-	47	-	-	-	-	-	7	54	-	-	54	-	-	-	-	-	-	482	-
5b.1.1.5	Condensate Polishing Building	-	119	-	-	-	-	-	18	137	-	-	137	-	-	-	-	-	-	1,351	-
5b.1.1.6	Cooling Towers	-	366	-	-	-	-	-	55	421	-	-	421	-	-	-	-	-	-	2,800	-
5b.1.1.7	Fire Pump House	-	28	-	-	-	-	-	4	33	-	-	33	-	-	-	-	-	-	290	-
5b.1.1.8	Flex N+1 Storage Bldg	-	160	-	-	-	-	-	24	184	-	-	184	-	-	-	-	-	-	1,200	-
5b.1.1.9	Fuel Handling Building	-	982	-	-	-	-	-	147	1,129	-	-	1,129	-	-	-	-	-	-	6,272	-
5b.1.1.10	Intake & Discharge Structures	-	989	-	-	-	-	-	148	1,137	-	-	1,137	-	-	-	-	-	-	13,397	-
5b.1.1.11	Low Level Radioactive Waste Building	-	15	-	-	-	-	-	2	17	-	-	17	-	-	-	-	-	-	159	-
5b.1.1.12	Miscellaneous Yard Structures	-	3,653	-	-	-	-	-	548	4,201	-	-	4,201	-	-	-	-	-	-	47,326	-
5b.1.1.13	RVCH Temporary Assembly Bldg	-	115	-	-	-	-	-	17	133	-	-	133	-	-	-	-	-	-	1,110	-
5b.1.1.14	Reactor Auxiliary Building	-	2,124	-	-	-	-	-	319	2,442	-	-	2,442	-	-	-	-	-	-	14,008	-
5b.1.1.15	Retired Steam Generator Mausoleum	-	161	-	-	-	-	-	24	185	-	-	185	-	-	-	-	-	-	894	-
5b.1.1.16	Service Building	-	260	-	-	-	-	-	39	299	-	-	299	-	-	-	-	-	-	2,556	-
5b.1.1.17	Skills Training Center	-	208	-	-	-	-	-	31	239	-	-	239	-	-	-	-	-	-	1,776	-
5b.1.1.18	Solidification Facility	-	14	-	-	-	-	-	2	16	-	-	16	-	-	-	-	-	-	168	-
5b.1.1.19	Turbine Building	-	1,771	-	-	-	-	-	266	2,037	-	-	2,037	-	-	-	-	-	-	27,318	-
5b.1.1.20	Turbine Pedestal	-	588	-	-	-	-	-	88	676	-	-	676	-	-	-	-	-	-	3,324	-
5b.1.1.21	Water Treatment Building	-	76	-	-	-	-	-	11	88	-	-	88	-	-	-	-	-	-	794	-
5b.1.1	Totals	-	14,576	-	-	-	-	-	2,186	16,763	-	-	16,763	-	-	-	-	-	-	159,686	-
Site Closeout Activities																					
5b.1.2	BackFill Site	-	872	-	-	-	-	-	131	1,002	-	-	1,002	-	-	-	-	-	-	1,621	-
5b.1.3	Grade & landscape site	-	119	-	-	-	-	-	18	136	-	-	136	-	-	-	-	-	-	301	-
5b.1.4	Final report to NRC	-	-	-	-	-	-	234	35	269	269	-	-	-	-	-	-	-	-	-	1,560
5b.1	Subtotal Period 5b Activity Costs	-	15,566	-	-	-	-	234	2,370	18,170	269	-	17,901	-	-	-	-	-	-	161,608	1,560
Period 5b Additional Costs																					
5b.2.1	Concrete Crushing	-	979	-	-	-	-	13	149	1,141	-	-	1,141	-	-	-	-	-	-	4,136	-
5b.2.2	Firing Range Closure	-	-	-	-	-	-	730	109	839	-	-	839	-	-	-	-	-	-	-	-
5b.2.3	Mobile Barrier Removal	-	864	-	-	-	-	738	240	1,842	-	-	1,842	-	-	-	-	-	-	1,440	-
5b.2.4	Demolition of ISFSI	-	3,499	-	-	-	-	506	601	4,606	-	-	4,606	-	-	-	-	-	-	38,172	160
5b.2.5	Construction Debris	-	-	-	-	-	-	650	98	748	-	-	748	-	-	-	-	-	-	-	-
5b.2.6	Intake Structure Cofferdam	-	603	-	-	-	-	-	90	694	-	-	694	-	-	-	-	-	-	5,168	-
5b.2.7	Water Usage	-	-	-	-	-	-	128	19	147	-	-	147	-	-	-	-	-	-	-	-
5b.2.8	Backfill Underground Services Excavations	-	1,088	-	-	-	-	-	163	1,251	-	-	1,251	-	-	-	-	-	-	5,160	-
5b.2	Subtotal Period 5b Additional Costs	-	7,033	-	-	-	-	2,764	1,470	11,267	-	-	11,267	-	-	-	-	-	-	54,076	160
Period 5b Collateral Costs																					
5b.3.1	Small tool allowance	-	183	-	-	-	-	-	27	211	-	-	211	-	-	-	-	-	-	-	-
5b.3.2	Corporate A&G	-	-	-	-	-	-	715	107	822	-	-	822	-	-	-	-	-	-	-	-
5b.3	Subtotal Period 5b Collateral Costs	-	183	-	-	-	-	715	135	1,033	-	-	1,033	-	-	-	-	-	-	-	-
Period 5b Period-Dependent Costs																					
5b.4.2	Property taxes	-	-	-	-	-	-	189	19	208	-	-	208	-	-	-	-	-	-	-	-
5b.4.3	Heavy equipment rental	-	5,341	-	-	-	-	-	801	6,142	-	-	6,142	-	-	-	-	-	-	-	-
5b.4.4	Plant energy budget	-	-	-	-	-	-	265	40	305	-	-	305	-	-	-	-	-	-	-	-
5b.4.5	Indirect Overhead	-	-	-	-	-	-	573	86	658	-	-	658	-	-	-	-	-	-	-	-
5b.4.6	Security Staff Cost	-	-	-	-	-	-	1,615	242	1,858	-	-	1,858	-	-	-	-	-	-	-	44,449
5b.4.7	DOC Staff Cost	-	-	-	-	-	-	13,926	2,089	16,015	-	-	16,015	-	-	-	-	-	-	-	125,940

Table D
Waterford Steam Electric Station, Unit 3
SAFSTOR Decommissioning Cost Estimate
(thousands of 2019 dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes				Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
															Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet			
Period 5b Period-Dependent Costs (continued)																					
5b.4.8	Utility Staff Cost	-	-	-	-	-	-	6,445	967	7,412	-	-	7,412	-	-	-	-	-	-	-	72,230
5b.4	Subtotal Period 5b Period-Dependent Costs	-	5,341	-	-	-	-	23,014	4,244	32,598	-	-	32,598	-	-	-	-	-	-	-	242,619
5b.0	TOTAL PERIOD 5b COST	-	28,124	-	-	-	-	26,726	8,218	63,068	269	-	62,799	-	-	-	-	-	-	215,684	244,339
PERIOD 5 TOTALS		-	28,124	-	-	-	-	26,726	8,218	63,068	269	-	62,799	-	-	-	-	-	-	215,684	244,339
TOTAL COST TO DECOMMISSION		13,336	104,648	17,096	14,543	43,402	46,649	1,035,262	211,502	1,486,438	1,095,521	321,603	69,314	445,524	187,686	807	112	2,474	31,574,380	1,309,479	9,369,449

TOTAL COST TO DECOMMISSION WITH 16.59% CONTINGENCY:	\$1,486,438	thousands of 2019 dollars
TOTAL NRC LICENSE TERMINATION COST IS 73.7% OR:	\$1,095,521	thousands of 2019 dollars
SPENT FUEL MANAGEMENT COST IS 21.64% OR:	\$321,603	thousands of 2019 dollars
NON-NUCLEAR DEMOLITION COST IS 4.66% OR:	\$69,314	thousands of 2019 dollars
TOTAL LOW-LEVEL RADIOACTIVE WASTE VOLUME BURIED (EXCLUDING GTCC):	188,606	cubic feet
TOTAL GREATER THAN CLASS C RADWASTE VOLUME GENERATED:	2,474	cubic feet
TOTAL SCRAP METAL REMOVED:	53,913	tons
TOTAL CRAFT LABOR REQUIREMENTS:	1,309,479	man-hours

End Notes:
n/a - indicates that this activity not charged as decommissioning expense
a - indicates that this activity performed by decommissioning staff
0 - indicates that this value is less than 0.5 but is non-zero
A cell containing " - " indicates a zero value

***Waterford Steam Electric Station, Unit 3
Decommissioning Cost Analysis***

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APPENDIX E

DETAILED COST ANALYSIS

ISFSI

Table E
Waterford Steam Electric Station, Unit 3
ISFSI Decommissioning Cost Estimate
(thousands of 2019 dollars)

Activity Description	Removal Costs	Packaging Costs	Transport Costs	LLRW Disposal Costs	Other Costs	Total Costs	Burial Volume Class A (cubic feet)	Craft Hours	Oversight and Contractor Hours
Decommissioning Contractor									
Planning (characterization, specs and procedures)	-	-	-	-	326	326	-	-	1,120
Decontamination (overpack disposition)	193	171	1,026	2,343	27	3,760	20,094	2,067	-
License Termination (radiological surveys)	-	-	-	-	1,463	1,463	-	10,417	-
Subtotal	193	171	1,026	2,343	1,815	5,549	20,094	12,484	1,120
Supporting Costs									
NRC and NRC Contractor Fees and Costs	-	-	-	-	455	455	-	-	1,153
Corporate A&G	-	-	-	-	86	86	-	-	-
Insurance	-	-	-	-	80	80	-	-	-
Property taxes	-	-	-	-	35	35	-	-	-
Plant energy budget	-	-	-	-	49	49	-	-	-
Indirect Overhead	-	-	-	-	41	41	-	-	-
Security Staff Cost	-	-	-	-	69	69	-	-	3,448
Oversight Staff	-	-	-	-	341	341	-	-	3,792
Subtotal	-	-	-	-	1,157	1,157	-	-	8,393
Total (w/o contingency)	193	171	1,026	2,343	2,972	6,705	20,094	12,484	9,513
Total (w/25% contingency)	241	214	1,282	2,929	3,715	8,382			

The application of contingency (25%) is consistent with the evaluation criteria referenced by the NRC in NUREG-1757 ("Consolidated Decommissioning Guidance, Financial Assurance, Recordkeeping, and Timeliness," U.S. NRC's Office of Nuclear Material Safety and Safeguards, NUREG-1757, Vol. 3, Rev. 1, February 2012)