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RA-16-026

March 30, 2016

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555-0001

Oyster Creek Nuclear Generating Station
Renewed Facility Operating License No. DPR-16
NRC Docket Nos. 50-219 and 72-15

Subject: Submittal of Updated Decommissioning Cost Analysis for Oyster Creek Nuclear Generating Station

Reference: Letter from James Barstow (Exelon Generation Company, LLC) to U.S. Nuclear Regulatory Commission – Submittal of Preliminary Decommissioning Cost Estimate and Spent Fuel Management Plan, dated December 30, 2014 (ML14365A067)

In the referenced letter dated December 30, 2014, Exelon Generation Company, LLC (Exelon) submitted preliminary Decommissioning Cost Estimate (DCE) information pursuant to 10 CFR 50.75(f)(3) for Oyster Creek Nuclear Generating Station (OCNGS). The OCNGS DCE was based on data that was originally developed in 2011. The OCNGS DCE information has been updated in accordance with Exelon's normal practice of updating DCEs every five years and is attached.

There are no new regulatory commitments contained in this letter.

If you have any questions or require additional information, please contact Paul Bonnett at 610-765-5264.

Respectfully,

James Barstow
Director, Licensing and Regulatory Affairs
Exelon Generation Company, LLC

Attachment: Decommissioning Cost Analysis for the Oyster Creek Nuclear Generating Station – March 2016

cc: Regional Administrator - NRC Region I
NRC Senior Resident Inspector - Oyster Creek Nuclear Generating Station
NRC Project Manager - Oyster Creek Nuclear Generating Station
Director, Bureau of Nuclear Engineering, New Jersey Department of Environmental Protection
Mayor of Lacey Township, Forked River, New Jersey

ATTACHMENT

Decommissioning Cost Analysis for the
Oyster Creek Nuclear Generating Station – March 2016

(Updated Information)

DECOMMISSIONING COST ANALYSIS

for the

OYSTER CREEK NUCLEAR GENERATING STATION

prepared for

Exelon Generation Company LLC

prepared by

TLG Services, Inc.
Bridgewater, Connecticut

March 2016

APPROVALS

Project Manager	William A. Cloutier, Jr.	21 Mar 2016 Date
Project Engineer	John A. Carlson	3/21/16 Date
Technical Manager	Francis W. Seymore	3/21/16 Date

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REVISION LOG

No.	Date	Item Revised	Reason for Revision
0	21 Mar 2016		Original Issue

EXECUTIVE SUMMARY

This report presents estimates of the cost to decommission the Oyster Creek Nuclear Generating Station (Oyster Creek) for the identified decommissioning scenarios following the cessation of plant operations in 2019. The estimates are designed to provide Exelon Generation Company LLC (Exelon) with the information to assess its current decommissioning liability, as it relates to Oyster Creek.

The analysis relies upon site-specific, technical information, originally developed in an evaluation for the GPU Nuclear Corporation in 1997-99,[1] last revised in 2011-2014,[2] and now updated to reflect current assumptions pertaining to the disposition of the nuclear plant and relevant industry experience in undertaking such projects. The costs are based on several key assumptions in areas of regulation, component characterization, high-level radioactive waste management, low-level radioactive waste disposal, performance uncertainties (contingency) and site restoration requirements.

The analysis is not a detailed engineering evaluation, but an estimate prepared in advance of the eventual detailed engineering required to carry out the decommissioning of the nuclear unit. It may also not reflect the actual plan to decommission Oyster Creek; the plan may differ from the assumptions made in this analysis based on facts that exist at the time of decommissioning.

The plant inventory was reviewed for this analysis. It serves as the basis for the decontamination and dismantling requirements, cost, and the decommissioning waste streams. The review confirmed that while there were no substantive changes to the configuration of the plant or site facilities since the prior study that would impact decommissioning, the radiological status of two of the site structures (Old Radwaste Building and New Radwaste Building) were revised to Exelon's assessment of the ultimate disposition requirements for these structures.

The primary goal of the decommissioning is the removal and disposal of the contaminated systems and structures so that the plant's operating license can be terminated. The analysis recognizes that spent fuel will be stored at the site in the reactor building's storage pool and/or in an independent spent fuel storage installation (ISFSI) until such time that it can be transferred to a Department of

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1 "Decommissioning Cost Analysis for the Oyster Creek Nuclear Generating Station ," Document No. G01-1271-003, TLG Services, Inc., February 1999

2 "Decommissioning Cost Analysis for the Oyster Creek Nuclear Generating Station," Document No. E16-1640-002, TLG Services, Inc., Rev. 4, December 2014

Energy (DOE) facility. Consequently, the estimates also include those costs to manage and subsequently decommission these storage facilities.

The costs to decommission Oyster Creek, for the scenarios evaluated, are tabulated at the end of this section. Costs are reported in 2016 dollars and include monies anticipated to be spent for radiological remediation and operating license termination, spent fuel management, and site restoration activities.

A complete discussion of the assumptions relied upon in this analysis is provided in Section 3, along with schedules of annual expenditures for each scenario. A sequence of significant project activities is provided in Section 4 with a timeline for each scenario. Detailed cost reports used to generate the summary tables contained within this document are provided in Appendices C through F.

The current operating license expires in 2029; however, this study assumes that the plant will retire at the end of 2019, ten years prior to the expiration of its operating license. This estimate includes additional resources to support the engineering, planning, and licensing efforts for the station; this is done to support a decommissioning schedule similar to the prior estimate. The estimates include the continued operation of the reactor building as an interim wet fuel storage facility for approximately five and one-half years after operations cease. In the DECON and SAFSTOR scenarios, all fuel in the pool is relocated to an ISFSI to await transfer to a DOE facility (the fuel is assumed to remain in the storage pool for the Delayed DECON scenario and transferred directly from the pool to DOE). The ISFSI will remain operational until the Department of Energy (DOE) is able to complete the transfer of the fuel to a federal facility (e.g., a monitored retrievable storage facility).[3] The estimates also include the dismantling of non-essential structures and limited restoration of the site.

Alternatives and Regulations

The Nuclear Regulatory Commission (NRC or Commission) provided initial decommissioning requirements in its rule adopted on June 27, 1988.[4] In this rule, the NRC set forth financial criteria for decommissioning licensed nuclear power

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3 Projected expenditures for spent fuel management identified in the cost analysis do not consider any compensation for damages with regard to the delays incurred by Exelon in the timely removal of spent fuel by the DOE. Collection of spent fuel damages from the DOE is expected to provide the majority of funds needed for spent fuel management following shutdown

4 U.S. Code of Federal Regulations, Title 10, Parts 30, 40, 50, 51, 70 and 72, "General Requirements for Decommissioning Nuclear Facilities," Nuclear Regulatory Commission, 53 Fed. Reg. 24018, June 27, 1988

facilities. The regulations addressed planning needs, timing, funding methods, and environmental review requirements for decommissioning. The rule also defined three decommissioning alternatives as being acceptable to the NRC: DECON, SAFSTOR, and ENTOMB.

> DECON is defined as "the alternative in which the equipment, structures, and portions of a facility and site containing radioactive contaminants are removed or decontaminated to a level that permits the property to be released for unrestricted use shortly after cessation of operations."[5]
>
> SAFSTOR is defined as "the alternative in which the nuclear facility is placed and maintained in a condition that allows the nuclear facility to be safely stored and subsequently decontaminated (deferred decontamination) to levels that permit release for unrestricted use."[6] Decommissioning is to be completed within 60 years, although longer time periods will be considered when necessary to protect public health and safety.
>
> ENTOMB is defined as "the alternative in which radioactive contaminants are encased in a structurally long-lived material, such as concrete; the entombed structure is appropriately maintained and continued surveillance is carried out until the radioactive material decays to a level permitting unrestricted release of the property."[7] As with the SAFSTOR alternative, decommissioning is currently required to be completed within 60 years although longer time periods will also be considered when necessary to protect public health and safety.
>
> The 60-year restriction has limited the practicality for the ENTOMB alternative at commercial reactors that generate significant amounts of long-lived radioactive material. In 1997, the Commission directed its staff to re-evaluate this alternative and identify the technical requirements and regulatory actions that would be necessary for entombment to become a viable option. The resulting evaluation provided several recommendations, however, rulemaking has been deferred based upon several factors (e.g., no licensee has committed to pursuing the entombment option, the unresolved issues associated with the disposition of greater-than-Class C material (GTCC), and the NRC's current priorities) at least until after the additional

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5 Ibid. Page FR24022, Column 3

6 Ibid.

7 Ibid. Page FR24023, Column 2

research studies are complete. The Commission concurred with the staff's recommendation.

In 1996, the NRC published revisions to its general requirements for decommissioning nuclear power plants to clarify ambiguities and codify procedures and terminology as a means of enhancing efficiency and uniformity in the decommissioning process.[8] The amendments allow for greater public participation and better define the transition process from operations to decommissioning. Regulatory Guide 1.184, Rev. 1, issued in October 2013, further described the methods and procedures that are acceptable to the NRC staff for implementing the requirements of the 1996 revised rule that relate to the initial activities and the major phases of the decommissioning process. The costs and schedules presented in this analysis follow the general guidance and sequence in the amended regulations. The format and content of the estimates is also consistent with the recommendations of Regulatory Guide 1.202, issued February 2005.[9]

In 2011, the NRC published amended regulations to improve decommissioning planning and thereby reduce the likelihood that any current operating facility will become a legacy site.[10] The amended regulations require licensees to conduct their operations to minimize the introduction of residual radioactivity into the site, which includes the site's subsurface soil and groundwater. Licensees also may be required to perform site surveys to determine whether residual radioactivity is present in subsurface areas and to keep records of these surveys with records important for decommissioning. The amended regulations require licensees to report additional details in their decommissioning cost estimate as well as requiring additional financial reporting and assurances. These additional details are included in this analysis, including the ISFSI decommissioning estimate (Appendix F).

Decommissioning Scenarios

The following decommissioning scenarios were evaluated for Oyster Creek. The scenarios selected are representative of alternatives available to Exelon and are defined as follow:

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8 U.S. Code of Federal Regulations, Title 10, Parts 2, 50 and 51, "Decommissioning of Nuclear Power Reactors," Nuclear Regulatory Commission, 61 Fed. Reg. 39278, July 29, 1996

9 "Standard Format and Content of Decommissioning Cost Estimates for Nuclear Power Reactors," Regulatory Guide 1.202, Nuclear Regulatory Commission, February 2005

10 U.S. Code of Federal Regulations, Title 10, Parts 20, 30, 40, 50, 70, and 72, "Decommissioning Planning," Nuclear Regulatory Commission, 76 Fed. Reg. 35512, June 17, 2011

1. DECON: In the first scenario, Oyster Creek shuts down at the end of 2019. Spent fuel is relocated from the wet storage pool to the ISFSI so as to facilitate decontamination and dismantling activities within the reactor building. Decommissioning of the plant systems and structures proceeds while waiting for the last of the spent fuel to be placed into the ISFSI. Once the spent fuel has been transferred to the ISFSI, the remaining portions of the reactor building are decommissioned. All power block structures and supporting facilities are then demolished. Spent fuel storage operations continue at the site, independent of decommissioning operations, until the transfer of the fuel to the DOE is complete, assumed for purposes of this study to be in the year 2035. At that time, the ISFSI is decommissioned and the site released for alternative use.

2. Delayed DECON: In the second scenario, the station is prepared for an abbreviated period of safe-storage following a 2019 shutdown. The spent fuel resident in the reactor building's storage pool remains in the pool until it can be transferred to the DOE (i.e., the ISFSI is not used to off-load the pool following the cessation of operations). Decommissioning is scheduled to commence once the transfer of the fuel to the DOE is complete (i.e., after the year 2035).

3. SAFSTOR: The station is also placed into safe-storage following a 2019 shutdown in the third scenario. However, decommissioning is deferred beyond the fuel storage period to the maximum extent permitted by the current regulations. Similar to the DECON alternative, the spent fuel in the wet storage pool is relocated to the ISFSI for interim storage. The unit remains in protective storage following the removal of spent fuel from the site. Decommissioning operations commence such that license termination is completed within the required 60-year period.

Methodology

The methodology used to develop the estimates follows the basic approach originally presented in the cost estimating guidelines [11] developed by the Atomic Industrial Forum (now Nuclear Energy Institute). This reference describes a unit cost factor method for estimating decommissioning activity costs. The unit cost factors used in this analysis incorporate site-specific costs and the latest available information about worker productivity in decommissioning.

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11 T.S. LaGuardia et al., "Guidelines for Producing Commercial Nuclear Power Plant Decommissioning Cost Estimates," AIF/NESP-036, May 1986

An activity duration critical path is used to determine the total decommissioning program schedule. This is required for calculating the carrying costs, which include program management, administration, field engineering, equipment rental, quality assurance, and security. This systematic approach for assembling decommissioning estimates ensures a high degree of confidence in the reliability of the resulting costs.

The estimates also reflect lessons learned from previously completed decommissioning projects, including TLG's involvement in the Shippingport Station decommissioning, completed in 1989, and the decommissioning of the Cintichem reactor, hot cells and associated facilities, completed in 1997. In addition, the planning and engineering for the Rancho Seco, Trojan, Yankee Rowe, Big Rock Point, Maine Yankee, Humboldt Bay-3, Oyster Creek, Connecticut Yankee, Crystal River, San Onofre and Vermont Yankee nuclear units have provided additional insight into the process, the regulatory aspects, and the technical challenges of decommissioning commercial nuclear units.

Contingency

Consistent with cost estimating practice, contingencies are applied to the decontamination and dismantling costs developed as "specific provision for unforeseeable elements of cost within the defined project scope, particularly important where previous experience relating estimates and actual costs has shown that unforeseeable events which will increase costs are likely to occur."[12] The cost elements in the estimates are based on ideal conditions; therefore, the types of unforeseeable events that are almost certain to occur in decommissioning, based on industry experience, are addressed through a percentage contingency applied on a line-item basis. This contingency factor is a nearly universal element in all large-scale construction and demolition projects. It should be noted that contingency, as used in this analysis, does not account for price escalation and inflation in the cost of decommissioning over the remaining operating life of the station.

Contingency funds are expected to be fully expended throughout the program. As such, inclusion of contingency is necessary to provide assurance that sufficient funding will be available to accomplish the intended tasks.

Low-Level Radioactive Waste Disposal

The contaminated and activated material generated in the decontamination and dismantling of a commercial nuclear reactor is classified as low-level (radioactive) waste, although not all of the material is suitable for "shallow-land" disposal. With

12 Project and Cost Engineers' Handbook, Second Edition, American Association of Cost Engineers, Marcel Dekker, Inc., New York, New York, p. 239

the passage of the "Low-Level Radioactive Waste Policy Act" in 1980,[13] and its Amendments of 1985,[14] the states became ultimately responsible for the disposition of low-level radioactive waste generated within their own borders.

New Jersey is a member of the three-state Atlantic Interstate Low-Level Radioactive Waste Management Compact, formed after South Carolina formally joined the Northeast Regional Compact. The Barnwell Low-Level Radioactive Waste Management Facility located in South Carolina is expected to be available to support the decommissioning of Oyster Creek. It is also assumed that Exelon can access other disposal sites, should it prove cost-effective. As such, rate schedules for both the Barnwell and the Energy*Solutions*' facility in Clive, Utah are used to generate disposal costs.

For the purpose of this analysis, the Energy*Solutions*' facility is used as the basis for estimating the disposal cost for the lowest level and majority of the radioactive waste (Class A [15]). Energy*Solutions* does not have a license to dispose of the more highly radioactive waste (Classes B and C), for example, generated in the dismantling of the reactor vessel. Class B and C wastes are assumed to be disposed of at the Barnwell facility.

The dismantling of the components residing closest to the reactor core generates radioactive waste considered unsuitable for shallow-land disposal (i.e., low-level radioactive waste with concentrations of radionuclides that exceed the limits established by the NRC for Class C radioactive waste (GTCC)). The Low-Level Radioactive Waste Policy Amendments Act of 1985 assigned the federal government the responsibility for the disposal of this material. The Act also stated that the beneficiaries of the activities resulting in the generation of such radioactive waste bear all reasonable costs of disposing of such waste. However, to date, the federal government has not identified a cost for disposing of GTCC or a schedule for acceptance.

For purposes of this analysis, the GTCC radioactive waste is assumed to be packaged and disposed of in a similar manner as high-level waste and at a cost equivalent to that envisioned for the spent fuel. The GTCC is packaged in the same canisters used for spent fuel and either stored on site or shipped directly to a DOE facility as it is generated (depending upon the timing of the decommissioning and whether the spent fuel has been removed from the site prior to the start of decommissioning).

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13 "Low-Level Radioactive Waste Policy Act of 1980," Public Law 96-573, 1980

14 "Low-Level Radioactive Waste Policy Amendments Act of 1985," Public Law 99-240, 1986

15 U.S. Code of Federal Regulations, Title 10, Part 61, "Licensing Requirements for Land Disposal of Radioactive Waste"

A significant portion of the waste material generated during decommissioning may only be potentially contaminated by radioactive materials. This waste can be analyzed on site or shipped off site to licensed facilities for further analysis, for processing and/or for conditioning/recovery. Reduction in the volume of low-level radioactive waste requiring disposal in a licensed low-level radioactive waste disposal facility can be accomplished through a variety of methods, including analyses and surveys or decontamination to isolate the portion of waste that does not require disposal as radioactive waste, compaction, incineration or metal melt. The estimates reflect the savings from waste recovery/volume reduction.

High-Level Radioactive Waste Management

Congress passed the "Nuclear Waste Policy Act"[16] (NWPA) in 1982, assigning the federal government's long-standing responsibility for disposal of the spent nuclear fuel created by the commercial nuclear generating plants to the DOE. The NWPA provided that DOE would enter into contracts with utilities in which DOE would promise to take the utilities' spent fuel and high-level radioactive waste and utilities would pay the cost of the disposition services for that material. NWPA, along with the individual contracts with the utilities, specified that the DOE was to begin accepting spent fuel by January 31, 1998.

Since the original legislation, the DOE has announced several delays in the program schedule. By January 1998, the DOE had failed to accept any spent fuel or high level waste, as required by the NWPA and utility contracts. Delays continue and, as a result, generators have initiated legal action against the DOE in an attempt to obtain compensation for DOE's partial breach of contract.[17] To date no spent fuel has been accepted from commercial generating sites for disposal.

In 2010 the administration appointed a Blue Ribbon Commission on America's Nuclear Future (Blue Ribbon Commission) to make recommendations for a new plan for nuclear waste disposal. The Blue Ribbon Commission's charter includes a requirement that it consider "[o]ptions for safe storage of used nuclear fuel while final disposition pathways are selected and deployed."[18]

16 "Nuclear Waste Policy Act of 1982 and Amendments," DOE's Office of Civilian Radioactive Management, 1982

17 Settlement: Exelon and the U.S. Department of Justice, in close consultation with the DOE, under which the government will reimburse Exelon for costs associated with storage of spent fuel at the company's nuclear stations pending DOE fulfilling its contractual obligation to accept commercial spent nuclear fuel. Additional amounts reimbursed annually for future costs. August 5, 2004

18 Charter of the Blue Ribbon Commission on America's Nuclear Future, "Objectives and Scope of Activities," http://www.brc.gov/index.php?q=page/charter

On January 26, 2012, the Blue Ribbon Commission issued its "Report to the Secretary of Energy" containing a number of recommendations on nuclear waste disposal. Two of the recommendations that may impact decommissioning planning are:

- "[T]he United States [should] establish a program that leads to the timely development of one or more consolidated storage facilities"[19]
- "[T]he United States should undertake an integrated nuclear waste management program that leads to the timely development of one or more permanent deep geological facilities for the safe disposal of spent fuel and high-level nuclear waste."[20]

In January 2013, the DOE issued the "Strategy for the Management and Disposal of Used Nuclear Fuel and High-Level Radioactive Waste," in response to the recommendations made by the Blue Ribbon Commission and as "a framework for moving toward a sustainable program to deploy an integrated system capable of transporting, storing, and disposing of used nuclear fuel..."[21] This document states:

"With the appropriate authorizations from Congress, the Administration currently plans to implement a program over the next 10 years that:

- Sites, designs and licenses, constructs and begins operations of a pilot interim storage facility by 2021 with an initial focus on accepting used nuclear fuel from shut-down reactor sites;
- Advances toward the siting and licensing of a larger interim storage facility to be available by 2025 that will have sufficient capacity to provide flexibility in the waste management system and allows for acceptance of enough used nuclear fuel to reduce expected government liabilities; and
- Makes demonstrable progress on the siting and characterization of repository sites to facilitate the availability of a geologic repository by 2048."[22]

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19 "Blue Ribbon Commission on America's Nuclear Future, Report to the Secretary of Energy," http://www.brc.gov/, p. 32, January 2012

20 Ibid., p.27

21 "Strategy for the Management and Disposal of Used Nuclear Fuel and High-Level Radioactive Waste," U.S. DOE, January 11, 2013

22 Ibid., p.2

The NRC's review of DOE's license application to construct a geologic repository at Yucca Mountain was suspended in 2011 when the Administration slashed the budget for completing that work. However, the US Court of Appeals for the District of Columbia Circuit issued a writ of mandamus (in August 2013)[23] ordering NRC to comply with federal law and restart its review of DOE's Yucca Mountain repository license application to the extent of previously appropriated funding for the review. That review is now complete with the publication of the five-volume safety evaluation report. A supplement to DOE's environmental impact statement and an adjudicatory hearing on the contentions filed by interested parties must be completed before a licensing decision can be made.

The DOE's generator allocation/receipt schedules are based upon the oldest fuel receiving the highest priority. With a large fleet of reactors, Exelon is able to re-assign allocations between its units to minimize on-site storage costs. The assemblies residing on site at the time of shutdown would be scheduled for pickup in 2033 through 2035 (assuming the cessation of plant operations in 2019). The DECON and SAFSTOR scenarios will require procurement of 48 multi-purpose canisters (at 61 assemblies per canister).

The NRC requires that licensees establish a program to manage and provide funding for the caretaking of all irradiated fuel at the reactor site until title of the fuel is transferred to the Secretary of Energy, pursuant to 10 CFR Part 50.54(bb).[24] This requirement is prepared for through inclusion of certain cost elements in the decommissioning estimates, for example, associated with the isolation and continued operation of the spent fuel pool and the ISFSI.

The spent fuel pool is expected to contain freshly discharged assemblies (from the most recent refueling cycles) as well as the final reactor core at shutdown. In the DECON and SAFSTOR scenarios, the assemblies are packaged into multi-purpose, dry storage canisters (DSCs) over the first five and one half years after shutdown for transfer to the ISFSI for interim storage. It is assumed that this period provides the necessary cooling for the final core to meet the transport and/or storage requirements for decay heat. In the Delayed DECON scenario, the pool is kept operational until the entire fuel inventory resident in the pool at shutdown has been transferred to the DOE.

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23 United States Court of Appeals for the District Of Columbia Circuit, In Re: Aiken County, et al, August 2013http://www.cadc.uscourts.gov/internet/opinions.nsf/BAE0CF34F762EBD985257BC6004DEB18/$file/11-1271-1451347.pdf

24 U.S. Code of Federal Regulations, Title 10, Part 50, "Domestic Licensing of Production and Utilization Facilities," Subpart 54 (bb), "Conditions of Licenses"

An ISFSI, operated under a Part 50 General License (in accordance with 10 CFR 72, Subpart K[25]), has been constructed to support continued plant operations. The facility is assumed to be expanded to support decommissioning. This will allow decommissioning activities to proceed within the reactor building.

DOE has breached its obligations to remove fuel from reactor sites, and has also failed to provide the plant owners with information about how it will ultimately perform. DOE officials have stated that DOE does not have an obligation to accept already-canistered fuel without an amendment to DOE's contracts with plant licensees to remove the fuel (the "Standard Contract"), but DOE has not explained what any such amendment would involve. Consequently, Exelon has no information or expectations on how DOE will remove fuel from the site in the future. In the absence of information about how DOE will perform, and for purposes of this analysis only, it is assumed that DOE will accept already-canistered fuel. If this assumption is incorrect, it is assumed that DOE will have liability for costs incurred to transfer the fuel to DOE-supplied containers.

Exelon's position is that the DOE has a contractual obligation to accept Oyster Creek's fuel earlier than the projections set out above consistent with its contract commitments. No assumption made in this study should be interpreted to be inconsistent with this claim. However, including the cost of storing spent fuel in this study is appropriate to ensure the availability of sufficient decommissioning funds at the end of the station's life if the DOE has not met its obligation. The cost for the interim storage of spent fuel has been calculated and is separately presented as "Spent Fuel Management" expenditures in this report.

Site Restoration

The efficient removal of the contaminated materials at the site may result in damage to many of the site structures. Blasting, coring, drilling, and the other decontamination activities can substantially damage power block structures, potentially weakening the footings and structural supports. It is unreasonable to anticipate that these structures would be repaired and preserved after the radiological contamination is removed. The cost to dismantle site structures with a work force already mobilized is more efficient and less costly than if the process were deferred. Experience at shutdown generating stations has shown that plant facilities quickly degrade without maintenance, adding additional expense and creating potential hazards to the public and the demolition work force.

[25] U.S. Code of Federal Regulations, Title 10, Part 72, Subpart K, "General License for Storage of Spent Fuel at Power Reactor Sites."

This estimate assumes that some site features will remain following the decommissioning project. These include the existing electrical switchyard, which is assumed to remain functional in support of the regional electrical distribution system. The existing shoreline will also be left intact.

Consequently, non-essential site structures addressed by this analysis are removed to a nominal depth of three feet below the local grade level wherever possible. The site is then graded and stabilized. The cost for the site restoration of non-essential and/or non-contaminated structures has been calculated and is separately presented as "Site Restoration" expenditures in this report.

Summary

The costs to decommission Oyster Creek were evaluated for several decommissioning scenarios, incorporating the attributes of both the DECON and SAFSTOR decommissioning alternatives. Regardless of the timing of the decommissioning activities, the estimates to decommissioning Oyster Creek assume the removal of all contaminated and activated plant components and structural materials, such that Exelon may then have unrestricted use of the site with no further requirements for an operating license. Delayed decommissioning is initiated after the spent fuel has been removed from the site and is accomplished within the 60-year period required by current NRC regulations. In the interim, the spent fuel remains in storage at the site until such time that the transfer to a DOE facility can be completed. Once the transfer is complete, the storage facilities are also decommissioned.

The alternatives evaluated in this analysis are described in Section 2. The assumptions are presented in Section 3, along with schedules of annual expenditures. The major cost contributors are identified in Section 6, with detailed activity costs, waste volumes, and associated manpower requirements delineated in Appendices C through F. The major cost components are also identified in the cost summary provided at the end of this section.

The cost elements in the estimates for the DECON, Delayed DECON and SAFSTOR alternatives are assigned to one of three subcategories: NRC License Termination (radiological remediation), Spent Fuel Management, and Site Restoration. The subcategory "NRC License Termination" is used to accumulate costs that are consistent with "decommissioning" as defined by the NRC in its financial assurance regulations (i.e., 10 CFR §50.75). The cost reported for this subcategory is generally sufficient to terminate the unit's operating license, recognizing that there may be some additional cost impact from spent fuel management. The License Termination

cost subcategory also includes costs to decommission the ISFSI (as required by 10 CFR §72.30). Section 3.4.1 provides the basis for the ISFSI decommissioning cost.

The "Spent Fuel Management" subcategory contains costs associated with the containerization and transfer of spent fuel from the wet storage pool to a DOE transport cask or to the ISFSI for interim storage, as well as the transfer of the spent fuel in storage at the ISFSI to the DOE. Costs are included for the operation of the storage pool and the management of the ISFSI until such time that the transfer is complete. It does not include any spent fuel management expenses incurred prior to the cessation of plant operations, nor does it include any costs related to the final disposal of the spent fuel.

"Site Restoration" is used to capture costs associated with the dismantling and demolition of buildings and facilities demonstrated to be free from contamination. This includes structures never exposed to radioactive materials, as well as those facilities that have been decontaminated to appropriate levels. Structures are removed to a depth of three feet below grade and backfilled to conform to local surface elevation.

It should be noted that the costs assigned to these subcategories are allocations. Delegation of cost elements is for the purposes of comparison (e.g., with NRC financial guidelines) or to permit specific financial treatment (e.g., Asset Retirement Obligation determinations). In reality, there can be considerable interaction between the activities in the three subcategories. For example, Exelon may decide to remove non-contaminated structures early in the project to improve access to highly contaminated facilities or plant components. In these instances, the non-contaminated removal costs could be reassigned from Site Restoration to an NRC License Termination support activity. However, in general, the allocations represent a reasonable accounting of those costs that can be expected to be incurred for the specific subcomponents of the total estimated program cost, if executed as described.

As noted within this document, the estimates were developed and costs are presented in 2016 dollars. As such, the estimates do not reflect the escalation of costs (due to inflationary and market forces) over the remaining operating life of the plant or during the decommissioning period.

DECON ALTERNATIVE
DECOMMISSIONING COST ELEMENTS
(thousands of 2016 dollars)

Cost Element	Cost
Decontamination	26,905
Removal	189,632
Packaging	28,319
Transportation	27,935
Waste Disposal	90,821
Off-site Waste Processing	14,125
Program Management [1]	368,284
Security	161,086
Spent Fuel Pool Isolation	13,062
Spent Fuel Storage (Direct Costs)[2]	149,339
Insurance and Regulatory Fees	23,331
Energy	12,518
Characterization and Licensing Surveys	31,678
Property Taxes	18,525
Miscellaneous Equipment	7,391
Site O&M	0
Total [3]	1,162,949

Cost Element	Cost
NRC License Termination	888,715
Spent Fuel Management	217,703
Site Restoration	56,531
Total [3]	1,162,949

[1] Includes engineering costs

[2] Includes costs for the dry storage system components, spent fuel loading and transfer, spent fuel pool O&M and EP fees, but excludes program management costs (staffing), security and other related costs

[3] Columns may not add due to rounding

DELAYED DECON ALTERNATIVE
DECOMMISSIONING COST ELEMENTS
(thousands of 2016 dollars)

Cost Element	Cost
Decontamination	28,626
Removal	173,223
Packaging	21,649
Transportation	23,098
Waste Disposal	78,321
Off-site Waste Processing	16,331
Program Management [1]	414,595
Security	259,588
Spent Fuel Pool Isolation	13,062
Spent Fuel Storage (Direct Costs)[2]	83,870
Insurance and Regulatory Fees	30,587
Energy	17,608
Characterization and Licensing Surveys	29,422
Property Taxes	25,189
Miscellaneous Equipment	11,033
Site O&M	0
Total [3]	1,226,200

Cost Element	Cost
NRC License Termination	823,222
Spent Fuel Management	345,937
Site Restoration	57,042
Total [3]	1,226,200

[1] Includes engineering costs

[2] Includes costs for spent fuel loading and transfer, spent fuel pool O&M and EP fees, but excludes program management costs (staffing), security and other related costs

[3] Columns may not add due to rounding

SAFSTOR ALTERNATIVE
DECOMMISSIONING COST ELEMENTS
(thousands of 2016 dollars)

Cost Element	Cost
Decontamination	28,289
Removal	175,193
Packaging	20,337
Transportation	21,285
Waste Disposal	76,857
Off-site Waste Processing	16,394
Program Management [1]	427,716
Security	269,559
Spent Fuel Pool Isolation	13,062
Spent Fuel Storage (Direct Costs)[2]	147,508
Insurance and Regulatory Fees	73,990
Energy	23,190
Characterization and Licensing Surveys	28,948
Property Taxes	68,035
Miscellaneous Equipment	20,121
Site O&M	0
Total [3]	1,410,484

Cost Element	Cost
NRC License Termination	1,077,728
Spent Fuel Management	274,794
Site Restoration	57,962
Total [3]	1,410,484

[1] Includes engineering costs

[2] Includes costs for the dry storage system components, spent fuel loading and transfer, spent fuel pool O&M and EP fees, but excludes program management costs (staffing), security and other related costs

[3] Columns may not add due to rounding

1. INTRODUCTION

This report presents estimates of the cost to decommission the Oyster Creek Nuclear Generating Station (Oyster Creek), for the selected decommissioning scenarios following the cessation of plant operations at the end of 2019. The estimates are designed to provide Exelon Generation Company LLC (Exelon), with the information to assess its current decommissioning liability, as it relates to Oyster Creek.

The analysis relies upon site-specific, technical information, originally developed in an evaluation for the GPU Nuclear Corporation in 1997-99,[1]* last revised in 2011-2014,[2] and now updated to reflect current assumptions pertaining to the disposition of the nuclear plant and relevant industry experience in undertaking such projects. The costs are based on several key assumptions in areas of regulation, component characterization, high-level radioactive waste management, low-level radioactive waste disposal, performance uncertainties (contingency) and site restoration requirements.

The analysis is not a detailed engineering evaluation, but an estimate prepared in advance of the detailed engineering required to carry out the decommissioning of the nuclear unit. It may also not reflect the actual plan to decommission Oyster Creek; the plan may differ from the assumptions made in this analysis based on facts that exist at the time of decommissioning.

The plant inventory was reviewed for this analysis. It serves as the basis for the decontamination and dismantling requirements, cost, and the decommissioning waste streams. The review confirmed that while there were no substantive changes to the configuration of the plant or site facilities since the prior study that would impact decommissioning, the radiological status of two the site structures (Old Radwaste Building and New Radwaste Building) were revised to Exelon's assessment of the ultimate disposition requirements for these structures.

1.1 OBJECTIVES OF STUDY

The objectives of this study are to prepare comprehensive estimates of the cost to decommission Oyster Creek, to provide a sequence or schedule for the associated activities, and to develop waste stream projections from the decontamination and dismantling activities. The plant's operating license

* Annotated references for citations in Sections 1-6 are provided in Section 7.

currently expires on April 9, 2029; however, this study assumes that the plant will be permanently retired on December 31, 2019.

1.2 SITE DESCRIPTION

The Oyster Creek nuclear unit is about two miles inland from the shore of Barnegat Bay on the coast of New Jersey. The site is approximately nine miles south of Toms River, New Jersey; about fifty miles east of Philadelphia, Pennsylvania; and sixty miles south of Newark, New Jersey. The generating station is comprised of a single reactor with supporting facilities.

Oyster Creek was designed and constructed by the General Electric Company Atomic Power Equipment Department as a turnkey project. The reactor is a single-cycle, forced circulation boiling water reactor producing steam for direct use in the steam turbine. The reactor vessel and the recirculation system are contained within the drywell of a pressure absorption containment system housed within the reactor building. The primary containment system consists of the drywell, vent pipes, and a pool of water contained in the absorption chamber (torus). The reactor building encloses the primary containment system, thereby providing a secondary containment.

Oyster Creek presently operates under a full term operating license at a maximum thermal power level of about 1930 MWth with a corresponding gross electrical output of approximately 670 MWe. Heat produced in the reactor is converted to electrical energy by the steam and power conversion system. A turbine-generator system converts the thermal energy of steam produced by the reactor into mechanical shaft power and then into electrical energy. The turbine consists of a high-pressure, double-flow turbine element and three double-flow, low-pressure turbine elements all aligned in tandem. The generator is a direct-driven 60 Hertz, 24,000 volt, conductor-cooled, synchronous generator rated at 687,500 kVA. The turbine is operated in a closed feedwater cycle which condenses the steam; the heated feedwater is returned to the reactor. Heat rejected in the main condensers is removed by the circulating water system.

The circulating water system provides the heat sink required for removal of waste heat in the power plant's thermal cycle. Water is drawn from Barnegat Bay through a 140 foot wide intake canal which follows the general course of the south branch of Forked River. The system has the principal function of removing heat by absorbing this energy in the main condenser. After passing through the plant condensers, the water is routed through the discharge canal which empties into Barnegat Bay.

1.3 REGULATORY GUIDANCE

The Nuclear Regulatory Commission (NRC or Commission) provided initial decommissioning requirements in its rule "General Requirements for Decommissioning Nuclear Facilities," issued in June 1988.[3] This rule set forth financial criteria for decommissioning licensed nuclear power facilities. The regulation addressed decommissioning planning needs, timing, funding methods, and environmental review requirements. The intent of the rule was to ensure that decommissioning would be accomplished in a safe and timely manner and that adequate funds would be available for this purpose. Subsequent to the rule, the NRC issued Regulatory Guide 1.159, "Assuring the Availability of Funds for Decommissioning Nuclear Reactors,[4]" which provided additional guidance to the licensees of nuclear facilities on the financial methods acceptable to the NRC staff for complying with the requirements of the rule. The regulatory guide addressed the funding requirements and provided guidance on the content and form of the financial assurance mechanisms indicated in the rule.

The rule defined three decommissioning alternatives as being acceptable to the NRC: DECON, SAFSTOR, and ENTOMB. The DECON alternative assumes that any contaminated or activated portion of the plant's systems, structures, and facilities are removed or decontaminated to levels that permit the site to be released for unrestricted use shortly after the cessation of plant operations.

The rule also placed limits on the time allowed to complete the decommissioning process. For the SAFSTOR alternative, the process is restricted in overall duration to 60 years, unless it can be shown that a longer duration is necessary to protect public health and safety. The guidelines for ENTOMB are similar, providing the NRC with both sufficient leverage and flexibility to ensure that these deferred options are only used in situations where it is reasonable and consistent with the definition of decommissioning. At the conclusion of a 50 to 60-year dormancy period (or longer for ENTOMB if the NRC approves such a case), the site would still require significant remediation to meet the unrestricted release limits for license termination.

The ENTOMB alternative has not been viewed as a viable option for power reactors due to the significant time required to isolate the long-lived radionuclides for decay to permissible levels. However, with rulemaking permitting the controlled release of a site, the NRC did re-evaluate the alternative.[5] The resulting feasibility study, based upon an assessment by Pacific Northwest National Laboratory, concluded that the method did have conditional merit for some, if not most, reactors. The staff also found that

additional rulemaking would be needed before this option could be treated as a generic alternative. The NRC had considered rulemaking to alter the 60-year time for completing decommissioning and to clarify the use of engineered barriers for reactor entombments.[6] However, the NRC's staff has recommended that rulemaking be deferred, based upon several factors, e.g., no licensee has committed to pursuing the entombment option, the unresolved issues associated with the disposition of greater-than-Class C material (GTCC), and the NRC's current priorities, at least until after the additional research studies are complete. The Commission concurred with the staff's recommendation.

In 1996, the NRC published revisions to the general requirements for decommissioning nuclear power plants.[7] When the regulations were originally adopted in 1988, it was assumed that the majority of licensees would decommission at the end of the facility's operating licensed life. Since that time, several licensees permanently and prematurely ceased operations. Exemptions from certain operating requirements were required once the reactor was defueled to facilitate the decommissioning. Each case was handled individually, without clearly defined generic requirements. The NRC amended the decommissioning regulations in 1996 to clarify ambiguities and codify procedures and terminology as a means of enhancing efficiency and uniformity in the decommissioning process. The new amendments allow for greater public participation and better define the transition process from operations to decommissioning.

Under the revised regulations, licensees will submit written certification to the NRC within 30 days after permanent cessation of operations. Certification will also be required once the fuel is permanently removed from the reactor vessel. Submittal of these notices will entitle the licensee to a fee reduction and eliminate the obligation to follow certain requirements needed only during operation of the reactor. Within two years of submitting notice of permanent cessation of operations, the licensee is required to submit a Post-Shutdown Decommissioning Activities Report (PSDAR) to the NRC. The PSDAR describes the planned decommissioning activities, the associated sequence and schedule, and an estimate of expected costs. Prior to completing decommissioning, the licensee is required to submit applications to the NRC to terminate the license, which will include a License Termination Plan (LTP).

In 2011, the NRC published amended regulations to improve decommissioning planning and thereby reduce the likelihood that any current operating facility will become a legacy site.[8] The amended regulations require licensees to conduct their operations to minimize the introduction of residual radioactivity

into the site, which includes the site's subsurface soil and groundwater. Licensees also may be required to perform site surveys to determine whether residual radioactivity is present in subsurface areas and to keep records of these surveys with records important for decommissioning. The amended regulations require licensees to report additional details in their decommissioning cost estimate as well as requiring additional financial reporting and assurances. These additional details, including an ISFSI decommissioning estimate, are included in this analysis.

1.3.1 High-Level Radioactive Waste Management

Congress passed the "Nuclear Waste Policy Act"[9] (NWPA) in 1982, assigning the federal government's long-standing responsibility for disposal of the spent nuclear fuel created by the commercial nuclear generating plants to the DOE. The NWPA provided that DOE would enter into contracts with utilities in which DOE would promise to take the utilities' spent fuel and high-level radioactive waste and utilities would pay the cost of the disposition services for that material. NWPA, along with the individual contracts with the utilities, specified that the DOE was to begin accepting spent fuel by January 31, 1998.

Since the original legislation, the DOE has announced several delays in the program schedule. By January 1998, the DOE had failed to accept any spent fuel or high level waste, as required by the NWPA and utility contracts. Delays continue and, as a result, generators have initiated legal action against the DOE in an attempt to obtain compensation for DOE's partial breach of contract.[10] To date no spent fuel has been accepted from commercial generating sites for disposal.

In 2010 the administration appointed a Blue Ribbon Commission on America's Nuclear Future (Blue Ribbon Commission) to make recommendations for a new plan for nuclear waste disposal. The Blue Ribbon Commission's charter includes a requirement that it consider "[o]ptions for safe storage of used nuclear fuel while final disposition pathways are selected and deployed."[11]

On January 26, 2012, the Blue Ribbon Commission issued its "Report to the Secretary of Energy" containing a number of recommendations on nuclear waste disposal. Two of the recommendations that may impact decommissioning planning are:

- "[T]he United States [should] establish a program that leads to the timely development of one or more consolidated storage facilities"[12]
- "[T]he United States should undertake an integrated nuclear waste management program that leads to the timely development of one or more permanent deep geological facilities for the safe disposal of spent fuel and high-level nuclear waste."

In January 2013, the DOE issued the "Strategy for the Management and Disposal of Used Nuclear Fuel and High-Level Radioactive Waste," in response to the recommendations made by the Blue Ribbon Commission and as "a framework for moving toward a sustainable program to deploy an integrated system capable of transporting, storing, and disposing of used nuclear fuel..."[13] This document states:

"With the appropriate authorizations from Congress, the Administration currently plans to implement a program over the next 10 years that:

- Sites, designs and licenses, constructs and begins operations of a pilot interim storage facility by 2021 with an initial focus on accepting used nuclear fuel from shut-down reactor sites;
- Advances toward the siting and licensing of a larger interim storage facility to be available by 2025 that will have sufficient capacity to provide flexibility in the waste management system and allows for acceptance of enough used nuclear fuel to reduce expected government liabilities; and
- Makes demonstrable progress on the siting and characterization of repository sites to facilitate the availability of a geologic repository by 2048."

The NRC's review of DOE's license application to construct a geologic repository at Yucca Mountain was suspended in 2011 when the Administration slashed the budget for completing that work. However, the US Court of Appeals for the District of Columbia Circuit issued a writ of mandamus (in August 2013)[14] ordering NRC to comply with federal law and restart its review of DOE's Yucca Mountain repository license application to the extent of previously appropriated funding for the review. That review is now complete with the publication of the five-volume safety evaluation report. A supplement to DOE's environmental impact statement and an adjudicatory hearing on the contentions filed

by interested parties must be completed before a licensing decision can be made.

The DOE's generator allocation/receipt schedules are based upon the oldest fuel receiving the highest priority. With a large fleet of reactors, Exelon is able to re-assign allocations between its units to minimize on-site storage costs. The assemblies residing on site at the time of shutdown would be scheduled for pickup in the years 2033 through 2035 (assuming the cessation of plant operations in 2019). The DECON and SAFSTOR scenarios will require procurement of 48 multi-purpose canisters (at 61 assemblies per canister).

The NRC requires that licensees establish a program to manage and provide funding for the caretaking of all irradiated fuel at the reactor site until title of the fuel is transferred to the Secretary of Energy, pursuant to 10 CFR Part 50.54(bb).[15] This requirement is prepared for through inclusion of certain cost elements in the decommissioning estimates, for example, associated with the isolation and continued operation of the spent fuel pool and the ISFSI.

The spent fuel pool is expected to contain freshly discharged assemblies (from the most recent refueling cycles) as well as the final reactor core at shutdown. In the DECON and SAFSTOR scenarios, the assemblies are packaged into multi-purpose, dry storage canisters (DSCs) over the first five and one half years after shutdown for transfer to the ISFSI for interim storage. It is assumed that this period provides the necessary cooling for the final core to meet the transport and/or storage requirements for decay heat. In the Delayed DECON scenario, the pool is kept operational until the entire fuel inventory resident in the pool at shutdown has been transferred to the DOE.

An ISFSI, operated under a Part 50 General License (in accordance with 10 CFR 72, Subpart K[16]), has been constructed to support continued plant operations. The facility is assumed to be expanded to support decommissioning. This will allow decommissioning activities to proceed within the reactor building.

DOE has breached its obligations to remove fuel from reactor sites, and has also failed to provide the plant owners with information about how it will ultimately perform. DOE officials have stated that DOE does not have an obligation to accept already-canistered fuel without an amendment to DOE's contracts with plant licensees to remove the fuel

(the "Standard Contract"), but DOE has not explained what any such amendment would involve. Consequently, Exelon has no information or expectations on how DOE will remove fuel from the site in the future. In the absence of information about how DOE will perform, and for purposes of this analysis only, it is assumed that DOE will accept already-canistered fuel. If this assumption is incorrect, it is assumed that DOE will have liability for costs incurred to transfer the fuel to DOE-supplied containers.

Exelon's position is that the DOE has a contractual obligation to accept Oyster Creek's fuel earlier than the projections set out above consistent with its contract commitments. No assumption made in this study should be interpreted to be inconsistent with this claim. However, including the cost of storing spent fuel in this study is appropriate to ensure the availability of sufficient decommissioning funds at the end of the station's life if the DOE has not met its obligation. The cost for the interim storage of spent fuel has been calculated and is separately presented as "Spent Fuel Management" expenditures in this report.

1.3.2 Low-Level Radioactive Waste Disposal

The contaminated and activated material generated in the decontamination and dismantling of a commercial nuclear reactor is classified as low-level (radioactive) waste, although not all of the material is suitable for "shallow-land" disposal. With the passage of the "Low-Level Radioactive Waste Policy Act" in 1980,[17] and its Amendments of 1985,[18] the states became ultimately responsible for the disposition of low-level radioactive waste generated within their own borders. It was expected that groups of states would combine together to jointly deal with their radioactive wastes; these organizations are referred to as waste disposal compacts.

New Jersey is a member of the three-state Atlantic Interstate Low-Level Radioactive Waste Management Compact, formed after South Carolina formally joined the Northeast Regional Compact. The Barnwell Low-Level Radioactive Waste Management Facility, located in South Carolina, is expected to be available to support the decommissioning of Oyster Creek. It is also assumed that Exelon can access other disposal sites, should it prove cost-effective. As such, rate schedules for both the Barnwell and the Energy*Solutions*' facility in Clive, Utah are used to generate disposal costs.

For the purpose of this analysis, the Energy*Solutions*' facility is used as the basis for estimating the disposal cost for the lowest level and majority of the radioactive waste (Class A [19]). Energy*Solutions* does not have a license to dispose of the more highly radioactive waste (Classes B and C), for example, generated in the dismantling of the reactor vessel. Class B and C wastes are assumed to be disposed of at the Barnwell facility.

The dismantling of the components residing closest to the reactor core generates radioactive waste considered unsuitable for shallow-land disposal (i.e., low-level radioactive waste with concentrations of radionuclides that exceed the limits established by the NRC for Class C radioactive waste (GTCC)). The Low-Level Radioactive Waste Policy Amendments Act of 1985 assigned the federal government the responsibility for the disposal of this material. The Act also stated that the beneficiaries of the activities resulting in the generation of such radioactive waste bear all reasonable costs of disposing of such waste. However, to date, the federal government has not identified a cost for disposing of GTCC or a schedule for acceptance.

For purposes of this analysis, the GTCC radioactive waste is assumed to be packaged and disposed of in a similar manner as high-level waste (i.e., in a geologic repository) and at a cost equivalent to that envisioned for the spent fuel. The GTCC is packaged in the same canisters used for spent fuel and either stored on site or shipped directly to a DOE facility as it is generated (depending upon the timing of the decommissioning and whether the spent fuel has been removed from the site prior to the start of decommissioning).

A significant portion of the metallic waste material generated during decommissioning may only be potentially contaminated by radioactive materials. This waste can be surveyed on site or shipped off site to licensed facilities for further analysis, for processing and/or for conditioning/recovery. Reduction in the volume of low-level radioactive waste requiring disposal in a licensed low-level radioactive waste disposal facility can be accomplished through a variety of methods, including analyses and surveys or decontamination to isolate the portion of waste that does not require disposal as radioactive waste, compaction, incineration or metal melt. The estimates reflect the savings from waste recovery/volume reduction.

1.3.3 Radiological Criteria for License Termination

In 1997, the NRC published Subpart E, "Radiological Criteria for License Termination,"[20] amending 10 CFR §20. This subpart provides radiological criteria for releasing a facility for unrestricted use. The regulation states that the site can be released for unrestricted use if radioactivity levels are such that the average member of a critical group would not receive a Total Effective Dose Equivalent (TEDE) in excess of 25 millirem per year, and provided that residual radioactivity has been reduced to levels that are As Low As Reasonably Achievable (ALARA). The decommissioning estimates for Oyster Creek assume that the site will be remediated to a residual level consistent with the NRC-prescribed level as well as the State of New Jersey's remedial action levels for radioactive material.

It should be noted that the NRC and the Environmental Protection Agency (EPA) differ on the amount of residual radioactivity considered acceptable in site remediation. The EPA has two limits that apply to radioactive materials. An EPA limit of 15 millirem per year is derived from criteria established by the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA or Superfund).[21] An additional limit of 4 millirem per year, as defined in 40 CFR §141.16, is applied to drinking water.[22]

On October 9, 2002, the NRC signed an agreement with the EPA on the radiological decommissioning and decontamination of NRC-licensed sites. The Memorandum of Understanding (MOU)[23] provides that EPA will defer exercise of authority under CERCLA for the majority of facilities decommissioned under NRC authority. The MOU also includes provisions for NRC and EPA consultation for certain sites when, at the time of license termination, (1) groundwater contamination exceeds EPA-permitted levels; (2) NRC contemplates restricted release of the site; and/or (3) residual radioactive soil concentrations exceed levels defined in the MOU.

The MOU does not impose any new requirements on NRC licensees and should reduce the involvement of the EPA with NRC licensees who are decommissioning. Most sites are expected to meet the NRC criteria for unrestricted use, and the NRC believes that only a few sites will have groundwater or soil contamination in excess of the levels specified in the MOU that trigger consultation with the EPA. However, if there are other hazardous materials on the site, the EPA may be involved in the

cleanup. As such, the possibility of dual regulation remains for certain licensees. The present study does not include any costs for this occurrence.

2. DECOMMISSIONING ALTERNATIVES

Detailed cost estimates were developed to decommission Oyster Creek based upon the approved decommissioning alternatives: DECON and SAFSTOR. Although the alternatives differ with respect to technique, process, cost, and schedule, they attain the same result: the ultimate release of the site for unrestricted use.

Three decommissioning scenarios were evaluated for Oyster Creek. The scenarios selected are representative of alternatives available to Exelon and are defined as follows:

1. DECON: In the first scenario, Oyster Creek shuts down at the end of 2019. Spent fuel is relocated from the wet storage pool to the ISFSI so as to facilitate decontamination and dismantling activities within the reactor building. Decommissioning of the plant systems and structures proceeds while waiting for the last of the spent fuel to be placed into the ISFSI. Once the spent fuel has been transferred to the ISFSI, the remaining portions of the reactor building are decommissioned. All power block structures and supporting facilities are then demolished. Spent fuel is relocated from the wet storage pool to the ISFSI so as to facilitate decontamination and dismantling activities within the reactor building. Spent fuel storage operations continue at the site, independent of decommissioning operations, until the transfer of the fuel to the DOE is complete, assumed for purposes of this study to be in the year 2035. At that time, the ISFSI is decommissioned and the site released for alternative use.

2. Delayed DECON: In the second scenario, the station is prepared for an abbreviated period of safe-storage following a 2019 shutdown. The spent fuel resident in the reactor building's storage pool remains in the pool until it can be transferred to the DOE (i.e., the ISFSI is not used to off-load the pool following the cessation of operations). Decommissioning is scheduled to commence once the transfer of the fuel to the DOE is complete (i.e., after the year 2035).

3. SAFSTOR: The station is also placed into safe-storage following a 2019 shutdown in the third scenario. However, decommissioning is deferred beyond the fuel storage period to the maximum extent permitted by the current regulations. Similar to the DECON alternative, the spent fuel in the wet storage pool is relocated to the ISFSI for interim storage. The unit remains in protective storage following the removal of spent fuel from the site.

Decommissioning operations commence such that license termination is completed within the required 60-year period.

The following sections describe the basic activities associated with each alternative. Although detailed procedures for each activity identified are not provided, and the actual sequence of work may vary, the activity descriptions provide a basis not only for estimating but also for the expected scope of work (i.e., engineering and planning at the time of decommissioning).

The conceptual approach that the NRC has described in its regulations divides decommissioning into three phases. The initial phase commences with the effective date of permanent cessation of operations and involves the transition of both plant and licensee from reactor operations (i.e., power production) to facilitate de-activation and closure. During the first phase, notification is to be provided to the NRC certifying the permanent cessation of operations and the removal of fuel from the reactor vessel. The licensee would then be prohibited from reactor operation.

The second phase encompasses activities during the storage period or during major decommissioning activities, or a combination of the two. The third phase pertains to the activities involved in license termination. The decommissioning estimates developed for Oyster Creek are also divided into phases or periods; however, demarcation of the phases is based upon major milestones within the project or significant changes in the projected expenditures.

2.1 DECON

The DECON alternative, as defined by the NRC, is "the alternative in which the equipment, structures, and portions of a facility and site containing radioactive contaminants are removed or decontaminated to a level that permits the property to be released for unrestricted use shortly after cessation of operations." This study does not address the cost to dispose of the spent fuel residing at the site; such costs are funded through a surcharge on electrical generation. However, the study does estimate the costs incurred with the interim on-site storage of the fuel pending shipment by the DOE to an off-site disposal facility. Those costs are separately presented as "Spent Fuel Management Expenditures" in this report.

2.1.1 Period 1 - Preparations

In anticipation of the cessation of plant operations, detailed preparations are undertaken to provide a smooth transition from plant operations to site decommissioning. Through implementation of a

staffing transition plan, the organization required to manage the intended decommissioning activities is assembled from available plant staff and outside resources. Preparations include the planning for permanent defueling of the reactor, revision of technical specifications applicable to the operating conditions and requirements, a characterization of the facility and major components, and the development of the PSDAR.

Engineering and Planning

The PSDAR, required prior to or within two years of permanent cessation of operations, provides a description of the licensee's planned decommissioning activities, a timetable, a site-specific decommissioning cost estimate, and the associated financial requirements of the intended decommissioning program. Upon receipt of the PSDAR, the NRC will make the document available to the public for comment in a local meeting to be held in the vicinity of the reactor site. Ninety days following submittal and NRC receipt of the PSDAR, the licensee may begin to perform major decommissioning activities under a modified 10 CFR §50.59 procedure (10 CFR §50.59 establishes the conditions under which licensees may make changes to the facility or procedures and conduct test or experiments without prior NRC approval). Major activities are defined as any activity that results in permanent removal of major radioactive components, permanently modifies the structure of the containment, or results in dismantling components (for shipment) containing GTCC, as defined by 10 CFR §61. Major components are further defined as comprising the reactor vessel and internals, large bore reactor recirculation system piping, and other large components that are radioactive. The NRC includes the following additional criteria for use of the §50.59 process in decommissioning. The proposed activity must not:

- foreclose release of the site for possible unrestricted use,
- significantly increase decommissioning costs,
- cause any significant environmental impact, or
- violate the terms of the licensee's existing license.

Existing operational technical specifications are reviewed and modified to reflect plant conditions and the safety concerns associated with permanent cessation of operations. The environmental impact associated with the planned decommissioning activities is also considered. Typically, a licensee will not be allowed to proceed if the

consequences of a particular decommissioning activity are greater than that bounded by previously evaluated environmental assessments or impact statements. In this instance, the licensee would have to submit a license amendment for the specific activity and update the environmental report.

The decommissioning program outlined in the PSDAR will be designed to accomplish the required tasks within the ALARA guidelines (as defined in 10 CFR §20) for protection of personnel from exposure to radiation hazards. It will also address the continued protection of the health and safety of the public and the environment during the dismantling activity. Consequently, with the development of the PSDAR, activity specifications, cost-benefit and safety analyses, and work packages and procedures, would be assembled to support the proposed decontamination and dismantling activities.

Site Preparations

Following final plant shutdown, and in preparation for actual decommissioning activities, the following activities are initiated:

- Characterization of the site and surrounding environs. This includes radiation surveys of work areas, major components (including the reactor vessel and its internals), internal piping, and primary shield cores.
- Isolation of the spent fuel storage pool and fuel handling systems, such that decommissioning operations can commence on the balance of the plant. Decommissioning operations are scheduled around the fuel handling area to optimize the overall project schedule. The fuel is transferred to the ISFSI as it decays to the point that it meets the definition of standard fuel (DECON and SAFSTOR alternatives), or the DOE (Delayed DECON). Consequently, it is assumed that the fuel pool remains operational for approximately five and one-half years following the cessation of operations.
- Specification of transport and disposal requirements for activated materials and/or hazardous materials, including shielding and waste stabilization.
- Development of procedures for occupational exposure control, control and release of liquid and gaseous effluent, processing of radwaste (including dry-active waste, resins, filter media, metallic and non-

metallic components generated in decommissioning), site security and emergency programs, and industrial safety.

2.1.2 Period 2 - Decommissioning Operations

This period includes the physical decommissioning activities associated with the removal and disposal of contaminated and activated components and structures, including the successful amendment of the 10 CFR §50 operating license (releasing the site, exclusive of the ISFSI). Significant decommissioning activities in this phase include:

- Construction of temporary facilities and/or modification of existing facilities to support dismantling activities. This may include a centralized processing area to facilitate equipment removal and component preparations for off-site disposal.
- Reconfiguration and modification of site structures and facilities as needed to support decommissioning operations. This may include the upgrading of roads (on and off site) to facilitate hauling and transport. Modifications may be required to the containment structure to facilitate access of large/heavy equipment. Modifications may also be required to the refueling area of the reactor building to support the segmentation of the reactor vessel internals and component extraction.
- Design and fabrication of temporary and permanent shielding to support removal and transportation activities, construction of contamination control envelopes, and the procurement of specialty tooling.
- Procurement (lease or purchase) of shipping canisters, cask liners, and industrial packages.
- Decontamination of components and piping systems as required to control (minimize) worker exposure.
- Removal of piping and components no longer essential to support decommissioning operations.
- Transfer of the steam separator and dryer assemblies to the dryer-separator pool for segmentation. Segmentation by weight and activity maximizes the loading of the shielded transport casks. The operations are conducted under water using remotely-operated tooling and contamination controls.

- Disconnection of the control blades from the drives on the vessel lower head. Blades are transferred to the spent fuel pool for packaging.
- Disassembly, segmentation, and packaging of the core shroud and in-core guide tubes. Some of the material is expected to exceed Class C disposal requirements. As such, those segments are packaged in modified fuel storage canisters for geologic disposal.
- Removal and segmentation of the remaining internals, fuel support castings, and core plate assembly.
- Removal of spent fuel storage racks from spent fuel pool, and cleanup of spent fuel pool.
- Draining and decontamination of the reactor well and the permanent sealing of the spent fuel transfer gate. Installation of a shielded platform for segmentation of the reactor vessel. Cutting operations are performed in air using remotely operated equipment within a contamination control envelope, with the water level maintained just below the cut to minimize the working area dose rates. Sections are transferred to the dryer-separator pool for packaging and interim storage.
- Disconnection of the control rod drives and instrumentation tubes from reactor vessel lower head. The lower reactor head and vessel support skirt are then segmented.
- Removal of the reactor recirculation pumps. Exterior surfaces are decontaminated and openings covered. Components can serve as their own burial containers provided that all penetrations are properly sealed.
- Demolition of the sacrificial shield activated concrete by controlled demolition.

At least two years prior to the anticipated date of license termination, an LTP is required. Submitted as a supplement to the Final Safety Analysis Report (FSAR) or its equivalent, the plan must include: a site characterization, description of the remaining dismantling activities, plans for site remediation, procedures for the final radiation survey, designation of the end use of the site, an updated cost estimate to complete the decommissioning, and any associated environmental concerns. The NRC will notice the receipt of the plan, make the plan available for public comment, and schedule a local meeting. LTP approval will be subject to any conditions and limitations as deemed

appropriate by the Commission. The licensee may then commence with the final remediation of site facilities and services, including:

- Removal of remaining plant systems and associated components as they become nonessential to the decommissioning program or worker health and safety (e.g., waste collection and treatment systems, electrical power and ventilation systems).
- Removal of the steel liners from the drywell, disposing of the activated and contaminated sections as radioactive waste. Removal of any activated/contaminated concrete.
- Removal of the steel liners from the steam separator and dryer pool, reactor well and spent fuel storage pool.
- Surveys of the decontaminated areas of the containment structure.
- Removal of the contaminated equipment and material from the turbine and radwaste buildings, and any other contaminated facility. Use radiation and contamination control techniques until radiation surveys indicate that the structures can be released for unrestricted access and conventional demolition. This activity may necessitate the dismantling and disposition of most of the systems and components (both clean and contaminated) located within these buildings. This activity will facilitate surface decontamination and subsequent verification surveys required prior to obtaining release for demolition.
- Removal of the remaining components, equipment, and plant services in support of the area release survey(s).
- Routing of material removed in the decontamination and dismantling to a central processing area. Material certified to be free of contamination is released for unrestricted disposition, e.g., as scrap, recycle, or general disposal. Contaminated material is characterized and segregated for additional off-site processing (disassembly, chemical cleaning, volume reduction, and waste treatment), and/or packaged for controlled disposal at a low-level radioactive waste disposal facility.

Incorporated into the LTP is the Final Survey Plan. This plan identifies the radiological surveys to be performed once the decontamination activities are completed and is developed using the guidance provided in the "Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM)."[24] This document incorporates the statistical approaches

to survey design and data interpretation used by the EPA. It also identifies commercially available instrumentation and procedures for conducting radiological surveys. Use of this guidance ensures that the surveys are conducted in a manner that provides a high degree of confidence that applicable NRC criteria are satisfied. Once the survey is complete, the results are provided to the NRC in a format that can be verified. The NRC then reviews and evaluates the information, performs an independent confirmation of radiological site conditions, and makes a determination on the requested change to the operating license (that would release the property, exclusive of the ISFSI, for unrestricted use).

The NRC will amend the operating license to reduce the licensed area to the ISFSI area if it determines that site remediation has been performed in accordance with the LTP, and that the terminal radiation survey and associated documentation demonstrate that the facility is suitable for release.

2.1.3 Period 3 - Site Restoration

Following completion of decommissioning operations, site restoration activities will begin. Efficient removal of the contaminated materials and verification that residual radionuclide concentrations are below the NRC limits will result in substantial damage to many of the structures. Although performed in a controlled and safe manner, blasting, coring, drilling, scarification (surface removal), and the other decontamination activities will substantially degrade power block structures including the reactor, turbine and radwaste buildings. Under certain circumstances, verifying that subsurface radionuclide concentrations meet NRC site release requirements will require removal of grade slabs and lower floors, potentially weakening footings and structural supports. This removal activity will be necessary for those facilities and plant areas where historical records, when available, indicate the potential for radionuclides having been present in the soil, where system failures have been recorded, or where it is required to confirm that subsurface process and drain lines were not breached over the operating life of the station.

Dismantling of site structures following decommissioning is clearly the most appropriate and cost-effective option. It is unreasonable to anticipate that these structures would be repaired and preserved after the radiological contamination is removed. The effort to dismantle site structures with a work force already mobilized on site is more efficient

than if the process were deferred. Site facilities quickly degrade without maintenance, adding additional expense and creating potential hazards to the public as well as to future workers. Abandonment creates a breeding ground for vermin infestation as well as other biological hazards.

This cost study presumes that non-essential structures and site facilities are dismantled as a continuation of the decommissioning activity. Foundations and exterior walls are removed to a nominal depth of three feet below grade. The three-foot depth allows for the placement of gravel for drainage, as well as topsoil, so that vegetation can be established for erosion control. Site areas affected by the dismantling activities are restored and the plant area graded as required to prevent ponding and inhibit the refloating of subsurface materials.

Non-contaminated concrete rubble produced by demolition activities is processed to remove reinforcing steel and miscellaneous embedments. The processed material is then used on site to backfill foundation voids. Excess non-contaminated materials are trucked to an off-site area for disposal as construction debris.

2.1.4 ISFSI Operations and Decommissioning

The ISFSI will continue to operate under a general license (10 CFR §50) following the amendment of the operating license to release the adjacent (power block) property. Assuming the DOE starts accepting fuel from Oyster Creek in 2033, transfer of spent fuel from the ISFSI is anticipated to continue through the year 2035.

At the conclusion of the spent fuel transfer process, the ISFSI will be decommissioned. The Commission will terminate the §50 license(s) if it determines that the remediation of the ISFSI has been performed in accordance with an ISFSI license termination plan and that the final radiation survey and associated documentation demonstrate that the facility is suitable for release. Once the requirements are satisfied, the NRC can terminate the license for the ISFSI.

Exelon is using the Transnuclear, Inc., NUHOMS® system for dry storage of spent fuel. The horizontal, concrete storage system is designed to store 61 undamaged boiling water spent fuel assemblies.

For purposes of this cost analysis, it is assumed that once the DSCs have been removed, any required decontamination is performed on the horizontal storage modules (HSMs) (some minor neutron-induced activation is assumed), and the license for the facility terminated, the HSMs can be dismantled. The concrete storage pad is then removed and the area regraded. This topic is discussed in greater detail in section 3.4.1.

2.2 SAFSTOR and Delayed DECON

The NRC defines SAFSTOR as "the alternative in which the nuclear facility is placed and maintained in a condition that allows the nuclear facility to be safely stored and subsequently decontaminated (deferred decontamination) to levels that permit release for unrestricted use." The facility is left intact (during the dormancy period), with structures maintained in a sound condition. Systems not required to operate in support of the spent fuel pool or site surveillance and security are drained, de-energized, and secured. Minimal cleaning/removal of loose contamination and/or fixation and sealing of remaining contamination are performed. Access to contaminated areas is secured to provide controlled access for inspection and maintenance.

The engineering and planning requirements are similar to those for the DECON alternative, although a shorter time period is expected for these activities due to the more limited work scope. Site preparations are also similar to those for the DECON alternative. However, with the exception of the required radiation surveys and site characterizations, the mobilization and preparation of site facilities is less extensive.

The following discussion is appropriate for both the SAFSTOR and Delayed DECON scenarios, the primary differences being in the storage method for spent fuel. In the Delayed DECON scenario, the fuel remains in the reactor building's storage pool until such time that the transfer to a DOE facility is complete. Decommissioning operations are assumed to begin once fuel is off site. By contrast, in the SAFSTOR scenario, the spent fuel is relocated to the ISFSI. The plant remains in safe-storage even after the fuel is removed from site. Decommissioning operations are initiated such that the license is terminated within the required 60-year time period.

2.2.1 Period 1 - Preparations

Preparations for long-term storage include the planning for permanent defueling of the reactor, revision of technical specifications appropriate to the operating conditions and requirements, a characterization of the facility and major components, and the development of the PSDAR.

The process of placing the plant in safe-storage includes, but is not limited to, the following activities:

- Isolation of the spent fuel storage services and fuel handling systems located in the reactor building so that safe-storage operations may commence on the balance of the plant. This activity may be carried out by plant personnel in accordance with existing operating technical specifications. Activities are scheduled around the fuel handling systems to the greatest extent possible.
- Draining and de-energizing of the non-contaminated systems not required to support continued site operations or maintenance.
- Disposing of contaminated filter elements and resin beds not required for processing wastes from layup activities for future operations.
- Draining of the reactor vessel, with the internals left in place and the vessel head secured.
- Draining and de-energizing non-essential, contaminated systems with decontamination as required for future maintenance and inspection.
- Preparing lighting and alarm systems whose continued use is required; de-energizing portions of fire protection, electric power, and HVAC systems whose continued use is not required.
- Cleaning of the loose surface contamination from building access pathways.
- Performing an interim radiation survey of plant, posting warning signs where appropriate.
- Erecting physical barriers and/or securing all access to radioactive or contaminated areas, except as required for inspection and maintenance.
- Installing security and surveillance monitoring equipment and relocating security fence around secured structures, as required.

2.2.2 Period 2 - Dormancy

The second phase identified by the NRC in its rule addresses licensed activities during a storage period and is applicable to the dormancy phases of the deferred decommissioning alternatives. Dormancy activities include a 24-hour security force, preventive and corrective maintenance on security systems, area lighting, general building maintenance, heating and ventilation of buildings, routine radiological inspections of contaminated structures, maintenance of structural integrity, and a site environmental and radiation monitoring program. Resident maintenance personnel perform equipment maintenance, inspection activities, routine services to maintain safe conditions, adequate lighting, heating, and ventilation, and periodic preventive maintenance on essential site services.

An environmental surveillance program is carried out during the dormancy period to ensure that releases of radioactive material to the environment are prevented and/or detected and controlled. Appropriate emergency procedures are established and initiated for potential releases that exceed prescribed limits. The environmental surveillance program constitutes an abbreviated version of the program in effect during normal plant operations.

Security during the dormancy period is necessary to protect the spent nuclear fuel while it is on site, prevent unauthorized entry, and to protect the public from the consequences of their own actions. The security fence, sensors, alarms, and other surveillance equipment provide security. Fire and radiation alarms are also monitored and maintained. While remote surveillance is an option, it does not offer the immediate response time of a physical presence.

The transfer of the spent fuel to a DOE facility continues during this period until complete. Fuel is shipped exclusively from the ISFSI in the SAFSTOR scenario and from the pool and the ISFSI in the Delayed DECON scenario.

The length of the dormancy period is such that decommissioning (license termination) is accomplished within 60 years of final shutdown. The start of decommissioning activities in the Delayed DECON scenario is concurrent with the end of the fuel transfer activity (i.e. to an off-site DOE facility).

It is required that the licensee submit an application to terminate the license, along with a LTP (described in Section 2.1.2), thereby initiating the third phase.

2.2.3 Periods 3 and 4 - Delayed Decommissioning

Prior to the commencement of decommissioning operations, preparations are undertaken to reactivate site services and prepare for decommissioning. Preparations include engineering and planning, a detailed site characterization, and the assembly of a decommissioning management organization. Final planning for activities and the writing of activity specifications and detailed procedures are also initiated at this time.

Much of the work in developing a termination plan is relevant to the development of the detailed engineering plans and procedures. The activities associated with this phase and the follow-on decontamination and dismantling processes are detailed in Sections 2.1.1 and 2.1.2. The primary difference between the sequences anticipated for the DECON and deferred scenarios is the absence, in the latter, of any constraint on the availability of the fuel storage pool located within the reactor building for decommissioning.

Variations in the length of the dormancy period are expected to have some effect upon the quantities of radioactive wastes generated from system and structure removal operations. However, given the levels of radioactivity and spectrum of radionuclides expected from fifty years of plant operation, no plant process system identified as being contaminated upon final shutdown will become releasable due to the decay period alone (i.e., there is no significant reduction in the waste generated from the decommissioning activities). Due to the lower activity levels, a greater percentage of the waste volume can be designated for off-site processing and recovery.

The delay in decommissioning also yields lower working area radiation levels. As such, the estimates for the delayed scenarios incorporate reduced ALARA controls for the lower occupational exposure potential.

Although the initial radiation levels due to ^{60}Co will substantially decrease during the dormancy period, the internal components of the reactor vessel will still exhibit sufficiently high radiation dose rates to require remote sectioning under water due to the presence of long-lived

radionuclides such as ^{94}Nb, ^{59}Ni, and ^{63}Ni. Therefore, the dismantling procedures described for the DECON alternative would still be employed during this scenario. Portions of the sacrificial shield will still be radioactive due to the presence of activated trace elements with long half-lives (^{152}Eu and ^{154}Eu). Decontamination will require controlled removal and disposal. It is assumed that radioactive corrosion products on inner surfaces of piping and components will not have decayed to levels that will permit unrestricted use or allow conventional removal. These systems and components will be surveyed as they are removed and disposed of in accordance with the existing radioactive release criteria.

2.2.4 Period 5 - Site Restoration

Following completion of decommissioning operations, site-restoration activities can begin. Dismantling, as a continuation of the decommissioning process, is a cost-effective option, as described in Section 2.1.3. The basis for the dismantling cost in this scenario is consistent with that described for DECON, presuming the removal of structures and site facilities to a nominal depth of three feet below grade and the limited restoration of the site.

3. COST ESTIMATES

The cost estimates prepared for decommissioning Oyster Creek consider the unique features of the site, including the NSSS, power generation systems, support services, site buildings, and ancillary facilities. The basis of the estimates, including the sources of information relied upon, the estimating methodology employed, site-specific considerations, and other pertinent assumptions, is described in this section.

3.1 BASIS OF ESTIMATES

The estimates were developed using the site-specific, technical information from the 2011-2014 analysis. The plant inventory, the basis for the decontamination and dismantling requirements and cost, and the decommissioning waste streams, was reviewed for this analysis. Review of systems and structural information confirmed that there were no substantive changes since the prior study that would impact decommissioning. The site-specific considerations and assumptions used in the previous evaluation were also revisited. Modifications were incorporated where experience from ongoing decommissioning programs provided viable alternatives or improved processes.

3.2 METHODOLOGY

The methodology used to develop the estimates follows the basic approach originally presented in the AIF/NESP-036 study report, "Guidelines for Producing Commercial Nuclear Power Plant Decommissioning Cost Estimates,"[25] and the DOE "Decommissioning Handbook."[26] These documents present a unit factor method for estimating decommissioning activity costs, which simplifies the estimating calculations. Unit factors for concrete removal ($/cubic yard), steel removal ($/ton), and cutting costs ($/inch) were developed using local labor rates. The activity-dependent costs were estimated with the item quantities (cubic yards and tons), developed from plant drawings and inventory documents. Removal rates and material costs for the conventional disposition of components and structures relied upon information available in the industry publication, "Building Construction Cost Data," published by R.S. Means.[27]

The unit factor method provides a demonstrable basis for establishing reliable cost estimates. The detail provided in the unit factors, including activity duration, labor costs (by craft), and equipment and consumable costs, ensures that essential elements have not been omitted. Appendix A presents the

detailed development of a typical unit factor. Appendix B provides the values contained within one set of factors developed for this analysis.

This analysis reflects lessons learned from TLG's involvement in the Shippingport Station Decommissioning Project, completed in 1989, as well as the decommissioning of the Cintichem reactor, hot cells, and associated facilities, completed in 1997. In addition, the planning and engineering for the Pathfinder, Shoreham, Rancho Seco, Trojan, Yankee Rowe, Big Rock Point, Maine Yankee, Humboldt Bay-3, Oyster Creek, Connecticut Yankee, San Onofre-1, Crystal River and Vermont Yankee nuclear units have provided additional insight into the process, the regulatory aspects, and the technical challenges of decommissioning commercial nuclear units.

Work Difficulty Factors

TLG has historically applied work difficulty adjustment factors (WDFs) to account for the inefficiencies in working in a power plant environment. WDFs were assigned to each unique set of unit factors, commensurate with the inefficiencies associated with working in confined, hazardous environments. The ranges used for the WDFs are as follows:

- Access Factor 0% to 50%
- Respiratory Protection Factor 0% to 25%
- Radiation/ALARA Factor 0% to 100%
- Protective Clothing Factor 0% to 50%
- Work Break Factor 8.33%

The factors and their associated range of values were developed in conjunction with the AIF/NESP-036 study. The application of the factor is discussed in more detail in that publication and in Appendix G.

Scheduling Program Durations

The unit factors, adjusted by the WDFs as described above, are applied against the inventory of materials to be removed in the radiologically controlled areas. The resulting man-hours, or crew-hours, are used in the development of the decommissioning program schedule, using resource loading and event sequencing considerations. The scheduling of conventional removal and dismantling activities are based upon productivity information available from the "Building Construction Cost Data" publication.

An area-by-area activity duration critical path was used to develop the total decommissioning program schedule. The unit cost factors, adjusted for WDF's as described above, were applied against the inventory of materials to be removed in each defined work area. Each work area was assessed for the most efficient number of workers/crews for the decommissioning activities. These adjusted unit cost factors were applied against the available manpower so that an overall duration for removal of components and piping from each work area could be calculated. Work area identification is consistent with the Survey Tracking Number (STN) system utilized by the GPU Nuclear Corporation (GPU) radiological services group in the 1997 timeframe. An index of the GPU STN's is provided in Appendix H.

The program schedule is used to determine the period-dependent costs for program management, administration, field engineering, equipment rental, contracted services, etc. The study relies upon regional or site-specific salary and wage rates for the personnel associated with the intended program.

3.3 FINANCIAL COMPONENTS OF THE COST MODEL

TLG's proprietary decommissioning cost model, DECCER, produces a number of distinct cost elements. These direct expenditures, however, do not comprise the total cost to accomplish the project goal, i.e., license termination and site restoration.

3.3.1 Contingency

Inherent in any cost estimate that does not rely on historical data is the inability to specify the precise source of costs imposed by factors such as tool breakage, accidents, illnesses, weather delays, and labor stoppages. In the DECCER cost model, contingency fulfills this role. Contingency is added to each line item to account for costs that are difficult or impossible to develop analytically. Such costs are historically inevitable over the duration of a job of this magnitude; therefore, this cost analysis includes funds to cover these types of expenses.

The activity- and period-dependent costs are combined to develop the total decommissioning cost. A contingency is then applied on a line-item basis, using one or more of the contingency types listed in the AIF/NESP-036 study. "Contingencies" are defined in the American Association of Cost Engineers "Project and Cost Engineers' Handbook[28] as "specific provision for unforeseeable elements of cost within the defined project scope; particularly important where previous experience

relating estimates and actual costs has shown that unforeseeable events which will increase costs are likely to occur." The cost elements in this analysis are based upon ideal conditions and maximum efficiency; therefore, consistent with industry practice, a contingency factor has been applied. In the AIF/NESP-036 study, the types of unforeseeable events that are likely to occur in decommissioning are discussed and guidelines are provided for percentage contingency in each category. It should be noted that contingency, as used in this analysis, does not account for price escalation and inflation in the cost of decommissioning over the remaining operating life of the station.

The use and role of contingency within decommissioning estimates is not a "safety factor issue." Safety factors provide additional security and address situations that may never occur. Contingency funds are expected to be fully expended throughout the program. They also provide assurance that sufficient funding is available to accomplish the intended tasks. An estimate without contingency, or from which contingency has been removed, can disrupt the orderly progression of events and jeopardize a successful conclusion to the decommissioning process.

For example, the most technologically challenging task in decommissioning a commercial nuclear plant is the disposition of the reactor vessel and internal components, now highly radioactive after a lifetime of exposure to core activity. The disposition of these components forms the basis of the critical path (schedule) for decommissioning operations. Cost and schedule are interdependent, and any deviation in schedule has a significant impact on cost for performing a specific activity.

Disposition of the reactor vessel internals involves the underwater cutting of complex components that are highly radioactive. Costs are based upon optimum segmentation, handling, and packaging scenarios. The schedule is primarily dependent upon the turnaround time for the heavily shielded shipping casks, including preparation, loading, and decontamination of the containers for transport. The number of casks required is a function of the pieces generated in the segmentation activity, a value calculated on optimum performance of the tooling employed in cutting the various subassemblies. The expected optimization, however, may not be achieved, resulting in delays and additional program costs. For this reason, contingency must be included to mitigate the consequences of the expected inefficiencies inherent in

this complex activity, along with related concerns associated with the operation of highly specialized tooling, field conditions, and water clarity.

Contingency funds are an integral part of the total cost to complete the decommissioning process. Exclusion of this component puts at risk a successful completion of the intended tasks and, potentially, subsequent related activities. For this study, TLG examined the major activity-related problems (decontamination, segmentation, equipment handling, packaging, transport, and waste disposal) that necessitate a contingency. Individual activity contingencies ranged from 10% to 75%, depending on the degree of difficulty judged to be appropriate from TLG's actual decommissioning experience. The contingency values used in this study are as follows:

Decontamination	50%
Contaminated Component Removal	25%
Contaminated Component Packaging	10%
Contaminated Component Transport	15%
Low-Level Radioactive Waste Disposal	25%
Reactor Segmentation	75%
NSSS Component Removal	25%
Reactor Waste Packaging	25%
Reactor Waste Transport	25%
Reactor Vessel Component Disposal	50%
GTCC Disposal	15%
Non-Radioactive Component Removal	15%
Heavy Equipment and Tooling	15%
Supplies	25%
Engineering	15%
Energy	15%
Characterization and Termination Surveys	30%
Construction	15%
Taxes and Fees	10%
Insurance	10%
Staffing	15%
Spent Fuel Storage (Dry) System	15%
Spent Fuel Transfer Costs	15%

Operations and Maintenance Expenses	15%
ISFSI Decommissioning	25%

The contingency values are applied to the appropriate components of the estimates on a line item basis. A composite value is then reported at the end of each detailed estimate (as provided in Appendices C, D, and E). Appendix F, the ISFSI decommissioning calculation, uses a flat 25% contingency added at the end of the calculation.

3.3.2 Financial Risk

In addition to the routine uncertainties addressed by contingency, another cost element that is sometimes necessary to consider when bounding decommissioning costs relates to uncertainty, or risk. Examples can include changes in work scope, pricing, job performance, and other variations that could conceivably, but not necessarily, occur. Consideration is sometimes necessary to generate a level of confidence in the estimate, within a range of probabilities. TLG considers these types of costs under the broad term "financial risk." Included within the category of financial risk are:

- Transition activities and costs: ancillary expenses associated with eliminating 50% to 80% of the site labor force shortly after the cessation of plant operations, added cost for worker separation packages throughout the decommissioning program, national or company-mandated retraining, and retention incentives for key personnel.
- Delays in approval of the decommissioning plan due to intervention, public participation in local community meetings, legal challenges, and national and local hearings.
- Changes in the project work scope from the baseline estimate, involving the discovery of unexpected levels of contaminants, contamination in places not previously expected, contaminated soil previously undiscovered (either radioactive or hazardous material contamination), variations in plant inventory or configuration not indicated by the as-built drawings.
- Regulatory changes (e.g., affecting worker health and safety, site release criteria, waste transportation, and disposal).
- Policy decisions altering national commitments (e.g., in the ability to accommodate certain waste forms for disposition or in the timetable

for such, for example, in the start and rate of acceptance of spent fuel by the DOE).

- Pricing changes for basic inputs such as labor, energy, materials, and disposal. Items subject to widespread price competition (such as materials) may not show significant variation; however, others such as waste disposal could exhibit large pricing uncertainties, particularly in markets where limited access to services is available.

This cost study does not add any additional costs to the estimate for financial risk since there is insufficient historical data from which to project future liabilities. Consequently, the areas of uncertainty or risk are revisited periodically and addressed through repeated revisions or updates of the base estimates.

3.4 SITE-SPECIFIC CONSIDERATIONS

There are a number of site-specific considerations that affect the method for dismantling and removal of equipment from the site and the degree of restoration required. The cost impacts of the considerations identified below are included in this cost study.

3.4.1 Spent Fuel Management

The cost to dispose of spent fuel generated from plant operations is not reflected within the estimates to decommission Oyster Creek. Ultimate disposition of the spent fuel is within the province of the DOE's Waste Management System, as defined by the Nuclear Waste Policy Act. As such, the disposal cost was financed by a 1 mill/kWhr surcharge paid into the DOE's waste fund during operations. On November 19, 2013, the U.S. Court of Appeals for the D.C. Circuit ordered the Secretary of the Department of Energy to suspend collecting annual fees for nuclear waste disposal from nuclear power plant operators until the DOE has conducted a legally adequate fee assessment.

The NRC does, however, require licensees to establish a program to manage and provide funding for the management of all irradiated fuel at the reactor site until title of the fuel is transferred to the Secretary of Energy. This requirement is prepared for through inclusion of certain high-level waste cost elements within the estimates, as described below.

The Exelon nuclear fleet consists of 26 units at 14 sites in Illinois, Maryland, New Jersey, New York and Pennsylvania, including the

inactive units at Dresden, Peach Bottom, and Zion (Zion is included in the spent fuel analysis model since the fuel transfer to DOE will still be done as part of the Exelon allocation). The ability to complete the decommissioning of these units, particularly for the DECON and Delayed DECON alternatives, is highly dependent upon when the DOE is assumed to remove spent fuel from the sites.

The DOE's repository program assumes that spent fuel will be accepted for disposal from the nation's commercial nuclear plants in the order (the "queue") in which it was removed from service ("oldest fuel first").[29] A computer model developed by Exelon Nuclear was used to determine when the DOE would provide allocations in the queue for removal of spent fuel from the individual sites. Repository operations were based upon annual industry-wide receipt of 400 Metric Tons Heavy Metal (MTHM) in the first year of operation, a total of 3,800 MTHM in years 2 through 4 and 3,000 MTHM for year 5 and beyond.[30]

ISFSIs are constructed as necessary to maintain full-core discharge capability at the individual sites. Once the DOE begins repository operations, queue allocations are used to ship spent fuel from Exelon's operating sites. Spent fuel shipments are then made from decommissioning sites in the order of retirement.

ISFSI

An ISFSI pad has been constructed to support continued plant operations. The ISFSI will continue to operate throughout decommissioning, and beyond the conclusion of the remediation phase in the DECON decommissioning scenario, until such time that the transfer of spent fuel to the DOE can be completed. The scenario is similar for the SAFSTOR alternative; however, based upon the expected completion date for fuel transfer, the ISFSI will be emptied prior to the commencement of deferred decommissioning operations.

In the Delayed DECON scenario, the ISFSI is not used to off-load the spent fuel storage pool after reactor operations cease. However, since there are projected to be 28 loaded HSMs at the ISFSI at shutdown, ISFSI and the reactor building's spent fuel pool operations will continue until such time that the DOE can remove the fuel from the site.

Storage Canister Design

Exelon is using the Transnuclear, Inc., NUHOMS® system for dry storage of spent fuel. The horizontal, concrete storage system is designed to store 61 undamaged boiling water spent fuel assemblies. It is assumed that the NUHOMS® system will be used to off-load the pool following the cessation of plant operations (DECON and SAFSTOR).

Canister Loading and Transfer

The estimates include the cost for the labor and equipment to transfer and load each spent fuel canister into the DOE transport cask or to the ISFSI from the wet storage pool. For estimating purposes, an allowance is used to estimate the cost to transfer the fuel from the ISFSI into the DOE transport cask.

Operations and Maintenance

Operation and maintenance costs for the spent fuel pool and the ISFSI are included within the estimates and address the cost for staffing the facility, as well as security, insurance, and licensing fees. Costs are also provided for the final disposition of the facilities once the transfer is complete.

Pool operations are expected to continue approximately five and one half years after the cessation of operations (DECON and SAFSTOR) or until the spent fuel has been removed by the DOE (Delayed DECON).

ISFSI Decommissioning

In accordance with 10 CFR §72.30, licensees must have a proposed decommissioning plan for the ISFSI site and facilities that includes a cost estimate for the plan. The plan should contain sufficient information on the proposed practices and procedures for the decontamination of the ISFSI and for the disposal of residual radioactive materials after all spent fuel, high-level radioactive waste, and reactor-related GTCC waste have been removed.

The Transnuclear, Inc., NUHOMS® system is used as a basis for the ISFSI decommissioning cost analyses. The HSMs are assumed to have some level of neutron-induced activation, as a result of the long-term storage of the fuel, i.e., to levels exceeding free-release limits. As an

allowance, 10 HSMs are assumed to require remediation, equivalent to the number of HSMs required to accommodate the final core offload at Oyster Creek (560 assemblies). The cost of the disposition of this material, as well as the demolition of the ISFSI facility, is included in the estimates.

In accordance with the specific requirements of 10 CFR §72.30 for the ISFSI work scope, the cost estimate for decommissioning the ISFSI reflects: 1) the cost of an independent contractor performing the decommissioning activities; 2) an adequate contingency factor; and 3) the cost of meeting the criteria for unrestricted use. The cost summary for decommissioning the ISFSI is presented in Appendix F.

GTCC

The dismantling of the reactor internals is expected to generate radioactive waste considered unsuitable for shallow land disposal (i.e., low-level radioactive waste with concentrations of radionuclides that exceed the limits established by the NRC for Class C radioactive waste (GTCC)). The Low-Level Radioactive Waste Policy Amendments Act of 1985 stated that the beneficiaries of the activities resulting in the generation of such radioactive waste bear all reasonable costs of disposing of such waste.[31]

Although the material is not classified as high-level waste, federal regulations under the Act designate that disposal of this material is a federal responsibility under Section 3(b)(1)(D). However, the DOE has not been forthcoming with an acceptance criteria or disposition schedule for this material, and numerous questions remain as to the ultimate disposal cost and waste form requirements.

As such, for purposes of this study, the GTCC has been packaged and disposed of in the same manner as high-level waste, at a cost equivalent to that envisioned for the spent fuel. The number of canisters required and the packaged volume for GTCC was based upon experience at Maine Yankee (e.g., the constraints on loading as identified in the canister's certificate of compliance), but adjusted for the increased spent fuel capacity of the current DSCs.

It is assumed that the DOE would not accept this waste prior to completing the transfer of spent fuel. Therefore, until such time the DOE is ready to accept GTCC waste, it is reasonable to assume that this

material would remain in storage at Oyster Creek (for the DECON alternative). In the Delayed DECON and SAFSTOR scenarios, the GTCC material is shipped directly to a DOE facility as it is generated, since the fuel will have been removed from the site prior to the start of decommissioning. GTCC costs have been segregated and included within the "License Termination" expenditures.

3.4.2 Reactor Vessel and Internal Components

The NSSS (reactor vessel and reactor recirculation system components) will be decontaminated using chemical agents prior to the start of cutting operations (for DECON alternative only). A decontamination factor (average reduction) of 10 is assumed for the process.

The reactor pressure vessel and internal components are segmented for disposal in shielded, reusable transportation casks. Segmentation is performed in the dryer-separator pool, where a turntable and remote cutter are installed. The vessel is segmented in place, using a mast-mounted cutter supported off the lower head and directed from a shielded work platform installed overhead in the reactor well. Transportation cask specifications and transportation regulations dictate the segmentation and packaging methodology.

Intact disposal of reactor vessel shells has been successfully demonstrated at several of the sites that have been decommissioned. Access to navigable waterways has allowed these large packages to be transported to the Barnwell disposal site with minimal overland travel. Intact disposal of the reactor vessel and internal components can provide savings in cost and worker exposure by eliminating the complex segmentation requirements, isolation of the GTCC material, and transport/storage of the resulting waste packages. Portland General Electric (PGE) was able to dispose of the Trojan reactor as an intact package (including the internals). However, its location on the Columbia River simplified the transportation analysis since:

- the reactor package could be secured to the transport vehicle for the entire journey, i.e., the package was not lifted during transport,
- there were no man-made or natural terrain features between the plant site and the disposal location that could produce a large drop, and

- transport speeds were very low, limited by the overland transport vehicle and the river barge.

As a member of the Northwest Compact, PGE had a site available for disposal of the package - the US Ecology facility in Washington State. The characteristics of this arid site proved favorable in demonstrating compliance with land disposal regulations.

It is not known whether this option will be available when Oyster Creek ceases operation. Future viability of this option will depend upon the ultimate location of the disposal site, as well as the disposal site licensee's ability to accept highly radioactive packages and effectively isolate them from the environment. Additionally, with BWRs, the diameter of the reactor vessel may severely limit overland transport. Consequently, the study assumes the reactor vessel will require segmentation, as a bounding condition.

3.4.3 Primary System Components

Reactor recirculation piping is cut from the reactor vessel once the water level in the vessel (used for personnel shielding during dismantling and cutting operations in and around the vessel) is dropped below the nozzle zone. The piping is boxed and transported by shielded van. The reactor recirculation pumps and motors are lifted out intact, packaged, and transported for processing and/or disposal.

3.4.4 Main Turbine and Condenser

The main turbine will be dismantled using conventional maintenance procedures. The turbine rotors and shafts will be removed to a laydown area. The lower turbine casings will be removed from their anchors by controlled demolition. The main condensers will also be disassembled and moved to a laydown area. Material is then prepared for transportation to an off-site recycling facility where it will be surveyed and designated for either decontamination and volume reduction or controlled disposal. Components will be packaged and readied for transport in accordance with the intended disposition.

3.4.5 Transportation Methods

Contaminated piping, components, and structural material other than the highly activated reactor vessel and internal components will qualify

as LSA-I, II or III or Surface Contaminated Object, SCO-I or II, as described in Title 49.[32] The contaminated material will be packaged in Industrial Packages (IP-1, IP-2, or IP-3, as defined in subpart 173.411) for transport unless demonstrated to qualify as their own shipping containers. The reactor vessel and internal components are expected to be transported in accordance with Part 71, as Type B. It is conceivable that the reactor, due to its limited specific activity, could qualify as LSA-II or III. However, the high radiation levels on the outer surface would require that additional shielding be incorporated within the packaging so as to attenuate the dose to levels acceptable for transport.

Any fuel cladding failure that occurred during the lifetime of the plant is assumed to have released fission products at sufficiently low levels that the buildup of quantities of long-lived isotopes (e.g., ^{137}Cs, ^{90}Sr, or transuranics) has been prevented from reaching levels exceeding those that permit the major reactor components to be shipped under current transportation regulations and disposal requirements.

Transport of the highly activated metal, produced in the segmentation of the reactor vessel and internal components, will be by shielded truck cask. Cask shipments may exceed 95,000 pounds, including vessel segment(s), supplementary shielding, cask tie-downs, and tractor-trailer. The maximum level of activity per shipment assumed permissible was based upon the license limits of the available shielded transport casks. The segmentation scheme for the vessel and internal segments is designed to meet these limits.

The transport of large intact components (e.g., large heat exchangers and other oversized components) will be by a combination of truck, rail, and/or multi-wheeled transporter. Truck transport costs were estimated using published tariffs from Tri-State Motor Transit.[33]

3.4.6 Low-Level Radioactive Waste Disposal

To the greatest extent practical, metallic material generated in the decontamination and dismantling processes is processed to reduce the total cost of controlled disposal. Material meeting the regulatory and/or site release criterion, is released as scrap, requiring no further cost consideration. Conditioning (preparing the material to meet the waste acceptance criteria of the disposal site) and recovery of the waste stream is performed off site at a licensed processing center. Any material leaving the site is subject to a survey and release charge, at a minimum.

The mass of radioactive waste generated during the various decommissioning activities at the site is shown on a line item basis in the detailed Appendices C through F, and summarized in Section 5. The quantified waste summaries shown in these tables are consistent with 10 CFR Part 61 classifications. 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 volumes are calculated based on the exterior package dimensions for containerized material or a specific calculation for components serving as their own waste containers.

The more highly activated reactor components will be shipped in reusable, shielded truck casks with disposable liners. In calculating disposal costs, the burial fees are applied against the liner volume and weight. 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.

Disposal fees are calculated using current disposal agreements, with surcharges added for the highly activated components, for example, generated in the segmentation of the reactor vessel. The cost to disposal of the majority of the material generated from the decontamination and dismantling activities (approximately 99% for the DECON alternative) is based upon Exelon's current disposal agreement with Energy*Solutions* for its disposal facility in Clive, Utah.

Since the Energy*Solutions* facility is not able to accept the higher activity waste (Class B and C) generated in the decontamination of the reactor vessel and segmentation of the components closest to the core, the cost of disposal of this material (less than 1% of the total volume) was based upon Exelon's rates for the Barnwell facility.

A small quantity of material exceeding Class C limits (limited to material closest to the reactor core) is generally not suitable for shallow-land disposal. This material is packaged in the same multipurpose canisters used for spent fuel storage/transport.

3.4.7 Site Conditions Following Decommissioning

The NRC will amend or terminate the unit license if it determines that site remediation has been performed in accordance with the license termination plan, and that the terminal radiation survey and associated documentation demonstrate that the facility is suitable for release. The NRC's involvement in the decommissioning process will end at this point. Building codes and environmental regulations will dictate the next step in the decommissioning process, as well as Exelon's own future plans for the site, e.g., the electrical switchyard will remain in support of the electrical transmission and distribution system.

Site utility and service piping are abandoned in place. Electrical manholes are backfilled with suitable earthen material and abandoned. Asphalt surfaces in the immediate vicinity of site buildings are broken up and the material used for backfill on site, if needed. The site access road will remain.

Structures will be removed to a nominal depth of three feet below grade. Concrete rubble generated from demolition activities will be processed and made available as clean fill. Any excess rubble will be disposed offsite as construction debris. The site will be graded following the removal of non-essential structures to conform to the adjacent landscape, and vegetation will be established to inhibit erosion.

The estimates include the remediation of contaminated soil. This assumption may be affected by continued plant operations and/or future regulatory actions, such as the development of site-specific release criteria.

3.5 ASSUMPTIONS

The following are the major assumptions made in the development of the estimates for decommissioning the site.

3.5.1 Estimating Basis

The study follows the principles of ALARA through the use of work duration adjustment factors. These factors address the impact of activities such as radiological protection instruction, mock-up training, and the use of respiratory protection and protective clothing. The factors lengthen a task's duration, increasing costs and lengthening the overall

schedule. ALARA planning is considered in the costs for engineering and planning, and in the development of activity specifications and detailed procedures. Changes to worker exposure limits may impact the decommissioning cost and project schedule.

3.5.2 Labor Costs

For purposes of this analysis, it is assumed that Exelon will hire a Decommissioning Operations Contractor (DOC) to manage the decommissioning. Exelon will provide site security, radiological health and safety, quality assurance and overall site administration during the decommissioning and demolition phases. Contract personnel will provide engineering services (e.g., for preparing the activity specifications, work procedures, neutron activation, and structural analyses) under the direction of Exelon.

Plant labor costs were provided by Exelon. Average costs were provided by department or work group and included payroll overheads. Decommissioning Operations Contractor (DOC) labor costs were based on plant labor costs with modified markups to account for employee benefits, DOC overhead and profit.

The craft labor required to decontaminate and dismantle the nuclear station will be acquired through standard site contracting practices. Craft labor costs were based upon information from Exelon. Craft labor costs include applicable overheads and profit.

Staffing levels are assigned by sub-period and functional area. The types of positions and staffing levels are adjusted based upon the type of activity occurring in each sub-period.

This estimate includes additional staffing resources to support the engineering, planning, and licensing efforts for the station, prior to and following final shutdown, in order to support a decommissioning schedule similar to the prior estimate.

A profile of the staffing level for decommissioning, including contractors and craft, is provided in Figures 3.1, 3.2, and 3.3 for the DECON, Delayed DECON and SAFSTOR scenarios, respectively. The owner's staffing levels will gradually decrease after completing the removal of physical systems. Staffing levels and management support will vary based upon the amount and type of decommissioning work. Craft

manpower levels decrease after systems removal and structures decontamination and drop substantially during the delay period and the license termination survey period. However, craft levels increase again during the site restoration period due to the work associated with structures demolition.

Security, while reduced from operating levels, is maintained throughout the decommissioning for access control, material control, and to safeguard the spent fuel (in accordance with the requirements of 10 CFR Part 37, Part 72, and Part 73). Once the fuel has been transferred to the DOE in 2035, the security organization will be reduced to Part 37 requirements.

3.5.3 Design Conditions

Any fuel cladding failure that occurred during the lifetime of the plant is assumed to have released fission products at sufficiently low levels that the buildup of quantities of long-lived isotopes (e.g., ^{137}Cs, ^{90}Sr, or transuranics) has been prevented from reaching levels exceeding those that permit the major NSSS components to be shipped under current transportation regulations and disposal requirements.

The curie contents of the vessel and internals at final shutdown are derived from those listed in NUREG/CR-3474.[34] Actual estimates are derived from the curie/gram values contained therein and adjusted for the different mass of the Oyster Creek components, projected operating life, and different periods of decay. Additional short-lived isotopes were derived from NUREG/CR-0130[35] and NUREG/CR-0672,[36] and benchmarked to the long-lived values from NUREG/CR-3474.

The disposal cost for the control blades removed from the vessel with the final core load is included within the estimates. Control blade residence time in the reactor is assumed to be controlled such that the blades do not become GTCC material. Disposition of any blades stored in the pool from operations was considered an operating expense and therefore not accounted for in the estimates.

Neutron activation of the reactor building structure is confined to the sacrificial shield.

3.5.4 General

Transition Activities

Existing warehouses will be cleared of non-essential material and remain for use by Exelon and subcontractors. The plant's operating staff will perform the following activities at no additional cost or credit to the project during the transition period:

- Drain and collect fuel oils, lubricating oils, and transformer oils for recycle and/or sale.
- Drain and collect acids, caustics, and other chemical stores for recycle and/or sale.
- Processes operating waste inventories, i.e., the estimates do not address the disposition of any legacy wastes; the disposal of operating wastes during this initial period is not considered a decommissioning expense.

Scrap and Salvage

The existing plant equipment is considered obsolete and suitable for scrap as deadweight quantities only. Exelon will make economically reasonable efforts to salvage equipment following final plant shutdown. However, dismantling techniques assumed by TLG for equipment in this analysis are not consistent with removal techniques required for salvage (resale) of equipment. Experience has indicated that some buyers wanted equipment stripped down to very specific requirements before they would consider purchase. This required expensive rework after the equipment had been removed from its installed location. Since placing a salvage value on this machinery and equipment would be speculative, and the value would be small in comparison to the overall decommissioning expenses, this analysis does not attempt to quantify the possible salvage value that Exelon may realize based upon those efforts.

It is assumed, for purposes of this analysis, that any value received from the sale of scrap generated in the dismantling process would be offset by the on-site processing costs. The dismantling techniques assumed in the decommissioning estimates do not include the additional cost for size reduction and preparation to meet "furnace ready" conditions. For example, the recovery of copper from electrical cabling may require the

removal and disposition of any contaminated insulation, an added expense. With a volatile market, the potential profit margin in scrap recovery is highly speculative, regardless of the ability to free release this material. This assumption is an implicit recognition of scrap value in the disposal of clean metallic waste at no additional cost to the project.

Furniture, tools, mobile equipment such as forklifts, trucks, bulldozers, and other property will be removed at no cost or credit to the decommissioning project. Disposition may include relocation to other facilities. Spare parts will also be made available for alternative use.

The concrete debris resulting from building demolition activities is crushed on site to reduce the size of the debris. The resulting crushed concrete is used to backfill below grade voids. The rebar removed from the concrete crushing process is disposed of as scrap steel in a similar fashion as other scrap metal as discussed previously.

Energy

For estimating purposes, the plant is assumed to be de-energized, with the exception of those facilities associated with spent fuel storage. Replacement power costs are used for the cost of energy consumption during decommissioning for tooling, lighting, ventilation, and essential services.

Emergency Planning

FEMA fees associated with emergency planning are assumed to continue for approximately 18 months following the cessation of operations. At this time, the FEMA fees are discontinued. The timing is based upon the anticipated condition of the spent fuel (i.e., the hottest spent fuel assemblies are assumed to be cool enough that no substantial Zircaloy oxidation and off-site event would occur with the loss of spent fuel pool water). State fees are continued through spent fuel pool operations, i.e., until all spent fuel is placed in dry storage (DECON and SAFSTOR) or the pool is emptied (Delayed DECON).

Insurance

Costs for continuing coverage (nuclear liability and property insurance) following cessation of plant operations and during decommissioning are

included and based upon current operating premiums. Reductions in premiums throughout the decommissioning process are based upon guidance provided by Exelon.

Taxes

Property taxes are included for all decommissioning periods. Exelon provided a schedule of decreasing tax payments against the current tax assessment. These reductions continue until reaching a minimum property tax payment for the site; this level is maintained for the balance of the decommissioning program.

Disposal of Processed Water

This estimate assumes that processed water which meets state and federal release limits can be disposed of without additional cost.

Site Modifications

The perimeter fence and in-plant security barriers will be moved, as appropriate, to conform to the Site Security Plan in force during the various stages of the project.

3.6 COST ESTIMATE SUMMARY

Schedules of expenditures are provided in Tables 3.1 through 3.3. The tables delineate the cost contributors by year of expenditures as well as cost contributor (e.g., labor, materials, and waste disposal).

Additional tables in Appendices C, D and E provide detailed costs elements. The cost elements are also assigned to one of three subcategories: "License Termination," "Spent Fuel Management," and "Site Restoration." The subcategory "License Termination" is used to accumulate costs that are consistent with "decommissioning" as defined by the NRC in its financial assurance regulations (i.e., 10 CFR §50.75). The cost reported for this subcategory is generally sufficient to terminate the unit's operating license, recognizing that there may be some additional cost impact from spent fuel management. Costs are included in the years 2016-2019 for pre-planning before final shutdown; these costs are shown in Appendices C through E in sub period 0a.

The "Spent Fuel Management" subcategory contains costs associated with the containerization and transfer of spent fuel from the pool to the DOE or to the ISFSI for interim storage, and the transfer of the multipurpose canisters from the ISFSI to the DOE. Costs are also included for the operations of the pool and management of the ISFSI until such time that the transfer of all fuel from this facility to an off-site location (e.g., interim storage facility) is complete.
"Site Restoration" is used to capture costs associated with the dismantling and demolition of buildings and facilities demonstrated to be free from contamination. This includes structures never exposed to radioactive materials, as well as those facilities that have been decontaminated to appropriate levels. Structures are removed to a depth of three feet and backfilled to conform to local grade.

As discussed in Section 3.4.1, it is assumed that the DOE will not accept the GTCC waste prior to completing the transfer of spent fuel. Therefore, the cost of GTCC disposal is shown in the final year of ISFSI operation (for the DECON alternative). While designated for disposal at a federal facility along with the spent fuel, GTCC waste is still classified as low-level radioactive waste and, as such, included as a "License Termination" expense.

Decommissioning costs are reported in 2016 dollars. Costs are not inflated, escalated, or discounted over the period of expenditure (or projected lifetime of the plant).

TABLE 3.1
DECON ALTERNATIVE
TOTAL ANNUAL EXPENDITURES
(thousands, 2016 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2016	3,155	0	0	0	0	3,155
2017	3,146	0	0	0	0	3,146
2018	3,146	0	0	0	0	3,146
2019	3,146	0	0	0	0	3,146
2020	82,691	9,292	2,078	43	22,166	116,270
2021	113,165	43,743	3,072	36,055	27,518	223,552
2022	96,748	42,749	1,923	19,482	13,967	174,869
2023	91,074	26,948	1,554	13,680	12,911	146,168
2024	91,324	27,022	1,559	13,718	12,946	146,568
2025	73,812	18,480	1,189	10,915	9,167	113,563
2026	50,729	5,799	614	3,969	4,061	65,173
2027	30,743	9,330	256	8	2,891	43,229
2028	22,093	9,229	164	0	2,849	34,335
2029	6,152	108	0	0	2,479	8,739
2030	6,152	108	0	0	2,479	8,739
2031	6,152	108	0	0	2,479	8,739
2032	6,169	108	0	0	2,486	8,763
2033	6,296	539	0	0	2,479	9,314
2034	7,446	3,989	0	0	2,479	13,914
2035	7,445	4,610	0	0	8,236	20,291
2036	1,768	1,277	109	1,303	3,671	8,129
Total	712,554	203,441	12,518	99,174	135,263	1,162,949

TABLE 3.2
DELAYED DECON ALTERNATIVE
TOTAL ANNUAL EXPENDITURES
(thousands, 2016 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2016	3,155	0	0	0	0	3,155
2017	3,146	0	0	0	0	3,146
2018	3,146	0	0	0	0	3,146
2019	3,146	0	0	0	0	3,146
2020	68,653	1,745	2,078	43	12,966	85,484
2021	53,828	6,177	1,241	1,397	21,853	84,496
2022	22,985	508	414	16	6,326	30,250
2023	22,985	508	414	16	6,326	30,250
2024	23,048	510	416	16	6,343	30,333
2025	22,985	508	414	16	6,326	30,250
2026	22,985	508	414	16	6,326	30,250
2027	22,985	508	414	16	6,326	30,250
2028	23,048	510	416	16	6,343	30,333
2029	22,985	508	414	16	6,326	30,250
2030	22,985	508	414	16	6,326	30,250
2031	22,985	508	414	16	6,326	30,250
2032	23,048	510	416	16	6,343	30,333
2033	23,307	1,474	414	16	6,326	31,538
2034	25,883	9,202	414	16	6,326	41,842
2035	14,573	5,642	259	10	3,375	23,860
2036	48,795	2,188	2,078	37	2,388	55,486
2037	72,355	21,814	2,020	18,297	7,897	122,383
2038	80,489	28,439	1,892	34,589	13,903	159,311
2039	84,633	17,270	1,554	26,445	16,183	146,085
2040	53,320	6,343	753	7,848	6,045	74,308
2041	21,599	11,496	217	2	1,735	35,049
2042	12,420	7,184	124	0	1,039	20,768
Total	825,467	124,573	17,608	88,879	169,673	1,226,200

TABLE 3.3
SAFSTOR ALTERNATIVE
TOTAL ANNUAL EXPENDITURES
(thousands, 2016 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2016	3,155	0	0	0	0	3,155
2017	3,146	0	0	0	0	3,146
2018	3,146	0	0	0	0	3,146
2019	3,146	0	0	0	0	3,146
2020	71,000	8,788	2,078	43	22,166	104,075
2021	58,623	20,561	1,241	1,397	22,062	103,885
2022	27,994	15,538	414	16	6,742	50,706
2023	27,994	15,538	414	16	6,742	50,706
2024	28,071	15,580	416	16	6,761	50,844
2025	18,653	7,907	310	12	4,551	31,433
2026	9,464	401	207	8	2,395	12,476
2027	9,464	401	207	8	2,395	12,476
2028	9,490	402	208	8	2,402	12,510
2029	9,464	401	207	8	2,395	12,476
2030	9,464	401	207	8	2,395	12,476
2031	9,464	401	207	8	2,395	12,476
2032	9,490	402	208	8	2,402	12,510
2033	9,608	832	207	8	2,395	13,051
2034	10,758	4,282	207	8	2,395	17,651
2035	10,758	4,282	207	8	2,395	17,651
2036	4,325	320	208	7	2,233	7,093
2037	4,313	319	207	7	2,227	7,074
2038	4,313	319	207	7	2,227	7,074
2039	4,313	319	207	7	2,227	7,074
2040	4,325	320	208	7	2,233	7,093
2041	4,313	319	207	7	2,227	7,074
2042	4,313	319	207	7	2,227	7,074
2043	4,313	319	207	7	2,227	7,074
2044	4,325	320	208	7	2,233	7,093
2045	4,313	319	207	7	2,227	7,074
2046	4,313	319	207	7	2,227	7,074

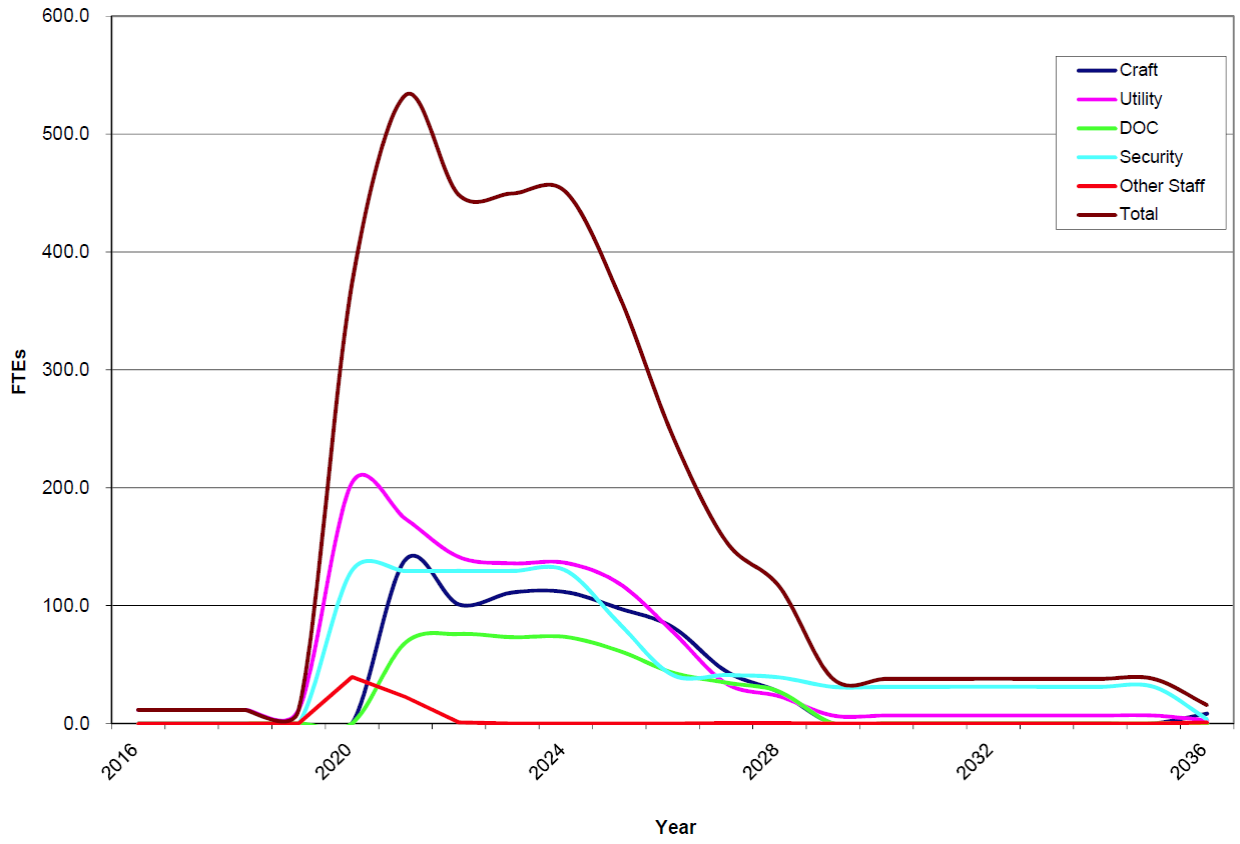
TABLE 3.3 (continued)
SAFSTOR ALTERNATIVE
TOTAL ANNUAL EXPENDITURES
(thousands, 2016 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2047	4,313	319	207	7	2,227	7,074
2048	4,325	320	208	7	2,233	7,093
2049	4,313	319	207	7	2,227	7,074
2050	4,313	319	207	7	2,227	7,074
2051	4,313	319	207	7	2,227	7,074
2052	4,325	320	208	7	2,233	7,093
2053	4,313	319	207	7	2,227	7,074
2054	4,313	319	207	7	2,227	7,074
2055	4,313	319	207	7	2,227	7,074
2056	4,325	320	208	7	2,233	7,093
2057	4,313	319	207	7	2,227	7,074
2058	4,313	319	207	7	2,227	7,074
2059	4,313	319	207	7	2,227	7,074
2060	4,325	320	208	7	2,233	7,093
2061	4,313	319	207	7	2,227	7,074
2062	4,313	319	207	7	2,227	7,074
2063	4,313	319	207	7	2,227	7,074
2064	4,325	320	208	7	2,233	7,093
2065	4,313	319	207	7	2,227	7,074
2066	4,313	319	207	7	2,227	7,074
2067	4,313	319	207	7	2,227	7,074
2068	4,325	320	208	7	2,233	7,093
2069	4,313	319	207	7	2,227	7,074
2070	4,313	319	207	7	2,227	7,074
2071	4,313	319	207	7	2,227	7,074
2072	4,325	320	208	7	2,233	7,093
2073	4,313	319	207	7	2,227	7,074
2074	4,313	319	207	7	2,227	7,074
2075	38,906	1,752	1,664	30	2,348	44,699
2076	67,269	17,369	2,049	12,634	5,763	105,083
2077	84,838	32,741	1,871	40,310	14,863	174,623

TABLE 3.3 (continued)
SAFSTOR ALTERNATIVE
TOTAL ANNUAL EXPENDITURES
(thousands, 2016 dollars)

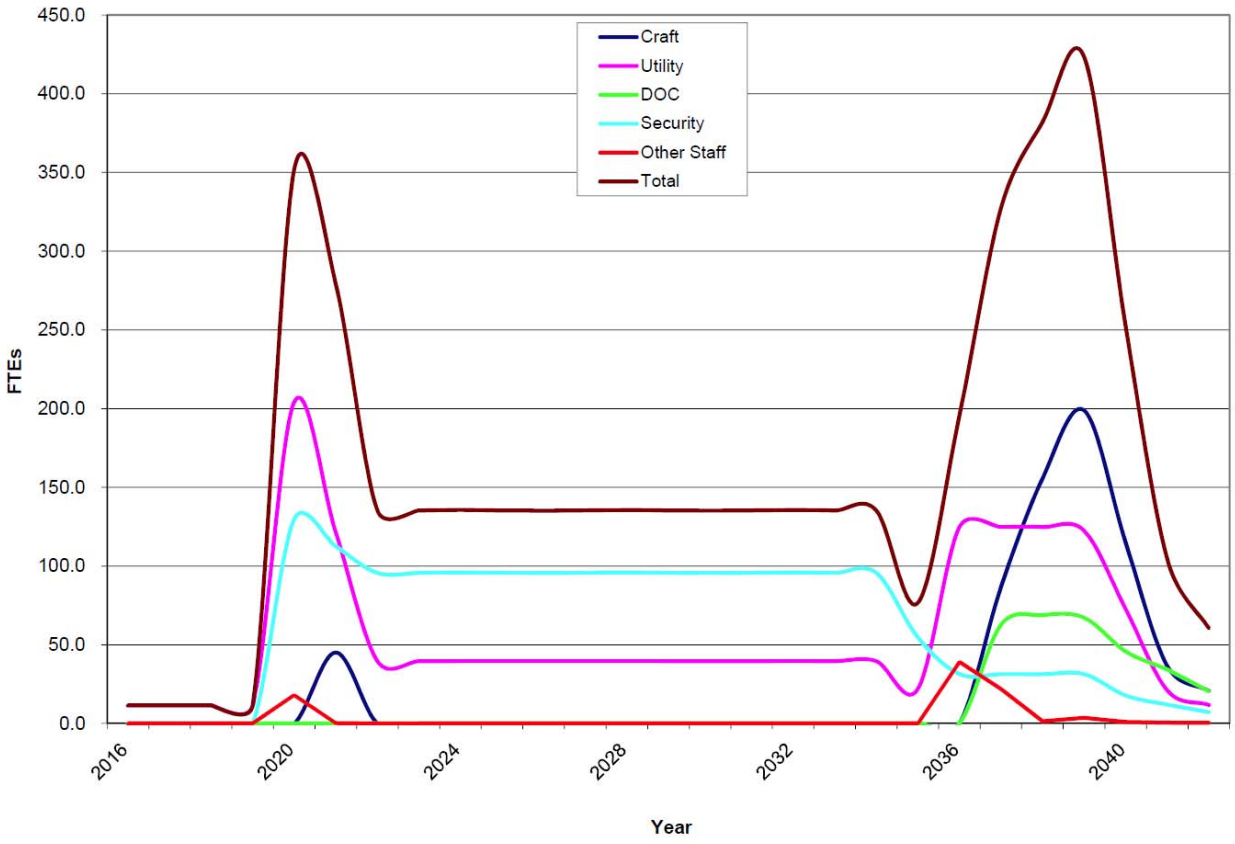
Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2078	84,629	17,220	1,554	26,167	16,561	146,132
2079	51,009	5,560	696	6,477	5,423	69,164
2080	20,960	12,378	208	0	1,776	35,322
2081	11,511	6,798	114	0	975	19,398
Total	869,809	202,386	23,190	87,479	227,619	1,410,484

FIGURE 3.1
DECON SCENARIO
MANPOWER LEVELS



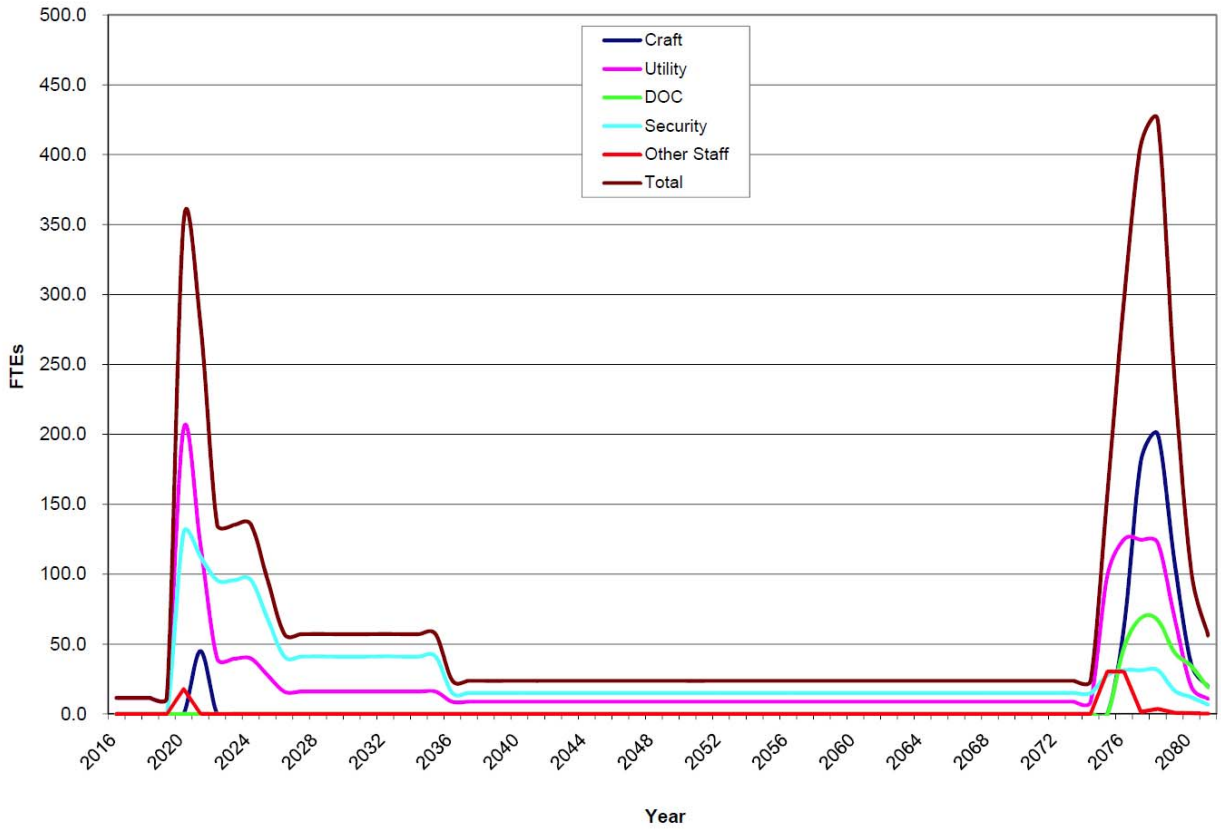
Note that the labor hour basis of this chart was taken from Appendix C; however not all line items in Appendix C have labor hour values available (e.g. spent fuel canister loading estimates from Exelon). Also note that the contingency against labor costs would necessarily result in additional labor hours; these contingency labor hours are not shown in this chart.

FIGURE 3.2
DELAYED DECON SCENARIO
MANPOWER LEVELS



Note that the labor hour basis of this chart was taken from Appendix D; however not all line items in Appendix D have labor hour values available (e.g. spent fuel canister loading estimates from Exelon). Also note that the contingency against labor costs would necessarily result in additional labor hours; these contingency labor hours are not shown in this chart.

FIGURE 3.3
SAFSTOR SCENARIO
MANPOWER LEVELS



Note that the labor hour basis of this chart was taken from Appendix E; however not all line items in Appendix E have labor hour values available (e.g. spent fuel canister loading estimates from Exelon). Also note that the contingency against labor costs would necessarily result in additional labor hours; these contingency labor hours are not shown in this chart.

4. SCHEDULE ESTIMATE

The schedules for the decommissioning scenarios considered in this study follow the sequence 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 plans described in Section 3.4.1.

A schedule or sequence of activities for the DECON alternative is presented in Figure 4.1. The schedule is also representative of the work activities identified in the delayed dismantling scenarios, absent any spent fuel constraints. The scheduling sequence is based on the fuel being removed from the spent fuel pool within the first five and one-half years after operations cease. The key activities listed in the schedule do not reflect a one-to-one correspondence with those activities in the cost tables, but reflect dividing some activities for clarity and combining others for convenience. The schedule was prepared using the "Microsoft Project Professional" computer software.[37]

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 reactor building is isolated until such time that all spent fuel has been discharged from the storage pool to the ISFSI. Decontamination and dismantling of the spent fuel storage pool is initiated once the transfer of spent fuel is complete (DECON option).
- All work (except vessel and internals removal) is performed during an 8-hour workday, 5 days per week, with no overtime. There are eleven paid holidays per year.
- 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.

- For plant systems removal, the systems with the longest removal durations in areas on the critical path are considered to determine the duration of the activity.

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 Oyster Creek. 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 also shown for the spent fuel cooling period, which determines the release of the reactor building for final decontamination.

Project timelines are provided in Figures 4.2 through 4.4, with milestone dates based on a December 31, 2019 shutdown date. The fuel pool is emptied approximately five and one half years after shutdown (DECON and SAFSTOR), while ISFSI operations continue until the DOE can complete the transfer of assemblies. Deferred decommissioning in the SAFSTOR scenario are assumed to commence so that the operating license is terminated within a 60-year period from the cessation of operations.

The start of decommissioning activities in the Delayed DECON scenario is concurrent with the end of the fuel transfer activity (i.e. to an off-site DOE facility).

FIGURE 4.1
DECON ACTIVITY SCHEDULE

ID	Task Name
1	Oyster Creek schedule
2	Period 0a Pre-shutdown Planning
3	Shutdown Unit 1
4	Period 1a Unit 1 - Shutdown through transition
5	Certificate of permanent cessation of operations submitted
6	Fuel storage pool operations
7	Dry fuel storage operations
8	Reconfigure plant
9	Prepare activity specifications
10	Perform site characterization
11	PSDAR submitted
12	Written certificate of permanent removal of fuel submitted
13	Site specific decommissioning cost estimate submitted
14	DOC staff mobilized
15	Period 1b Unit 1 - Decommissioning preparations
16	Fuel storage pool operations
17	Reconfigure plant (continued)

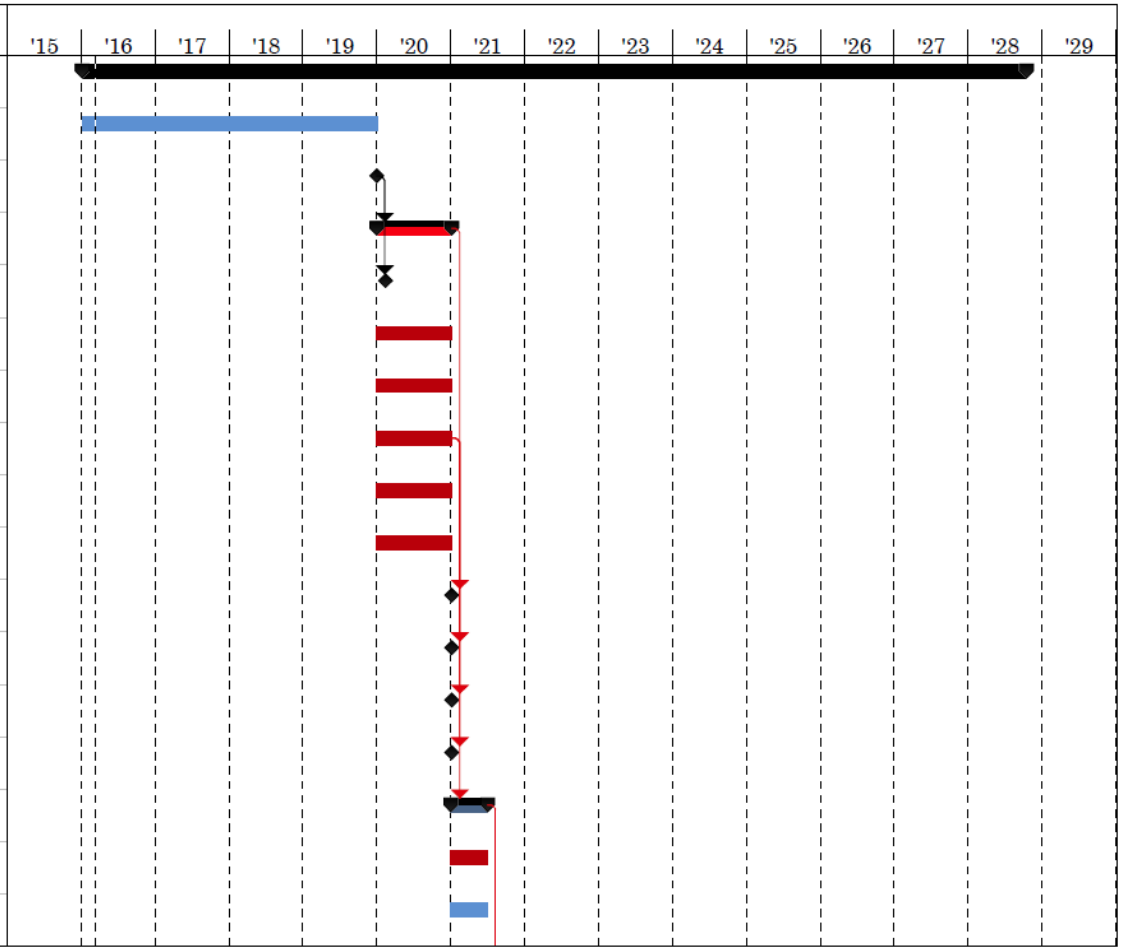


FIGURE 4.1
DECON ACTIVITY SCHEDULE
(continued)

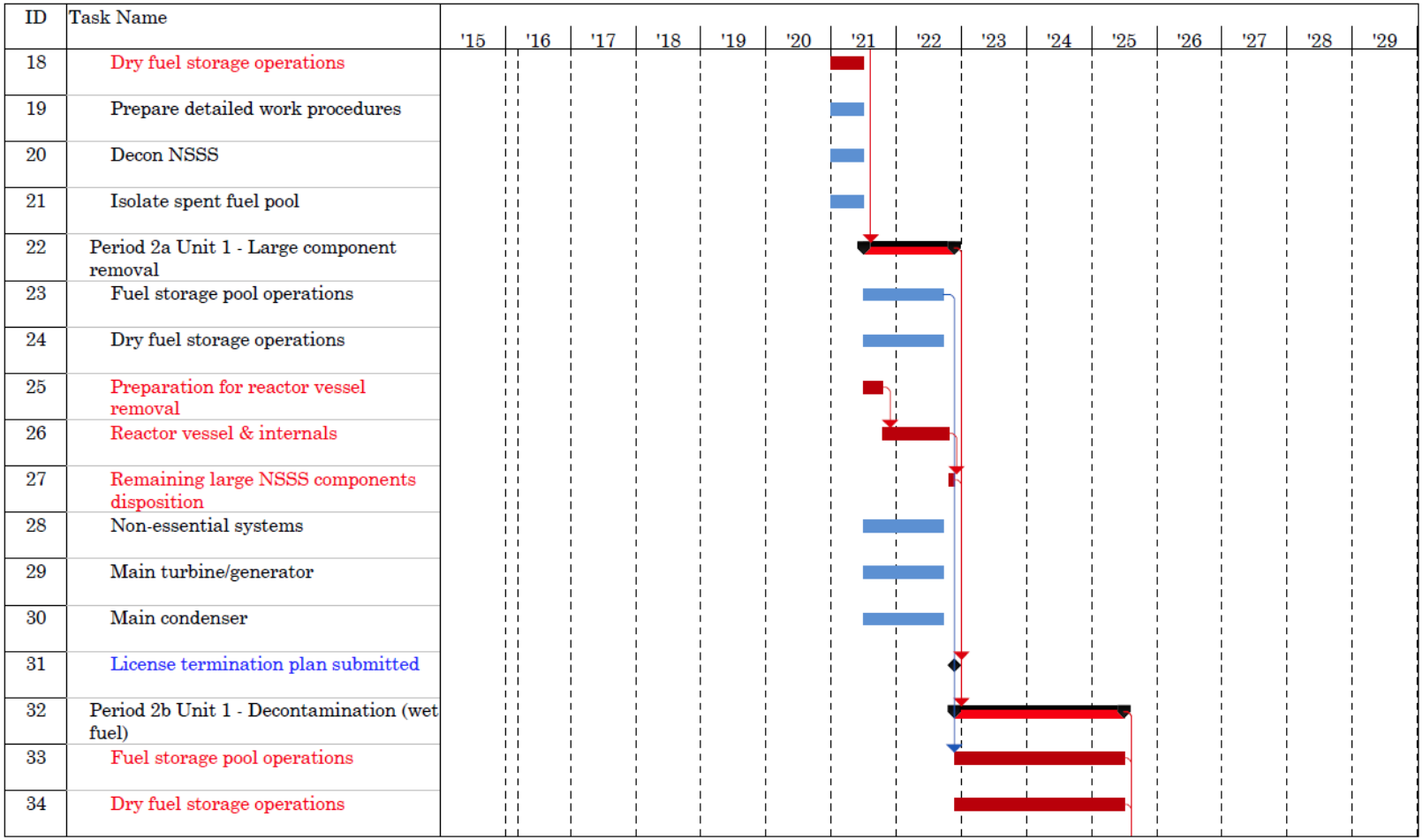
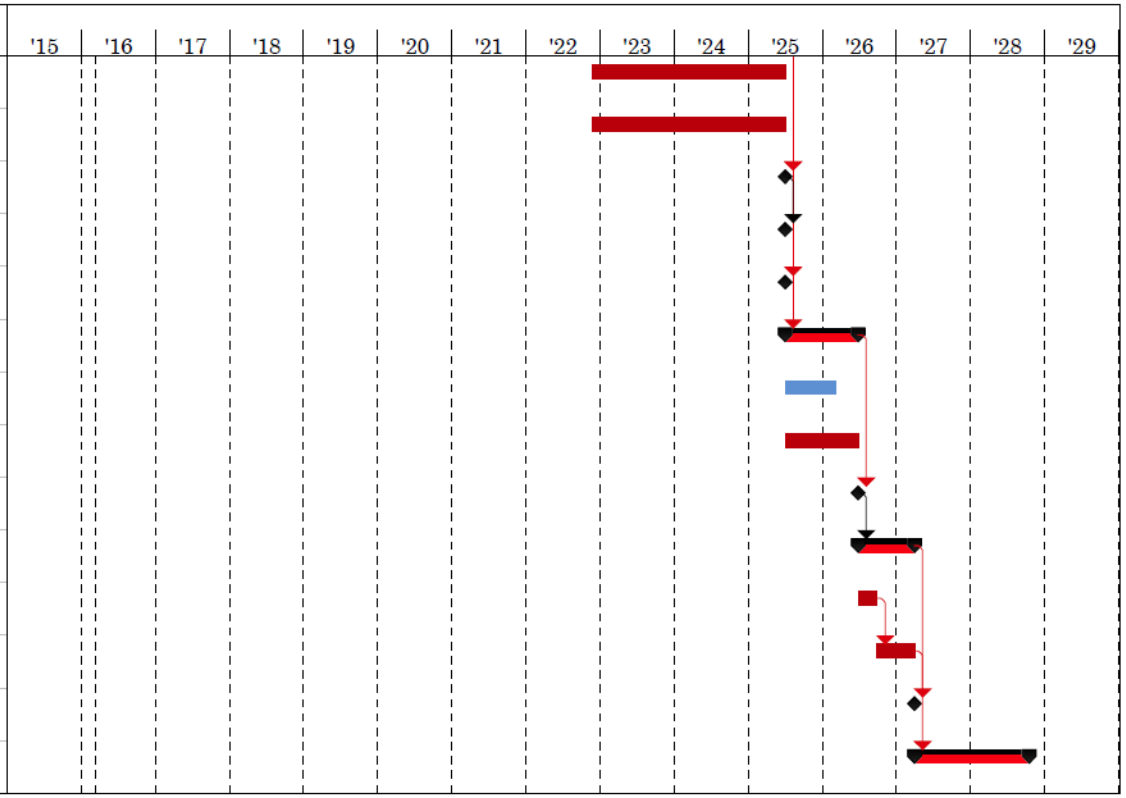


FIGURE 4.1
DECON ACTIVITY SCHEDULE
(continued)

ID	Task Name
35	Remove systems not supporting wet fuel storage
36	Decon buildings not supporting wet fuel storage
37	License termination plan approved
38	Fuel storage pool available for decommissioning
39	Period 2c Unit 1 - Spent Fuel Delay Prior to SFP Decon
40	Period 2d Unit 1 - Decontamination following wet fuel storage
41	Remove remaining systems
42	Decon wet fuel storage area
43	Period 2e Unit 1 - Delay before license termination
44	Period 2f Unit 1 - Plant license termination
45	Final Site Survey
46	NRC review & approval
47	Part 50 license terminated
48	Period 3b Unit 1 - Site restoration



LEGEND

1. Red scheduling bars indicate critical path activities
2. Blue scheduling bars associated with non-critical path activities
3. Diamond symbols indicate major milestones

FIGURE 4.2
DECOMMISSIONING TIMELINE
DECON
(not to scale)

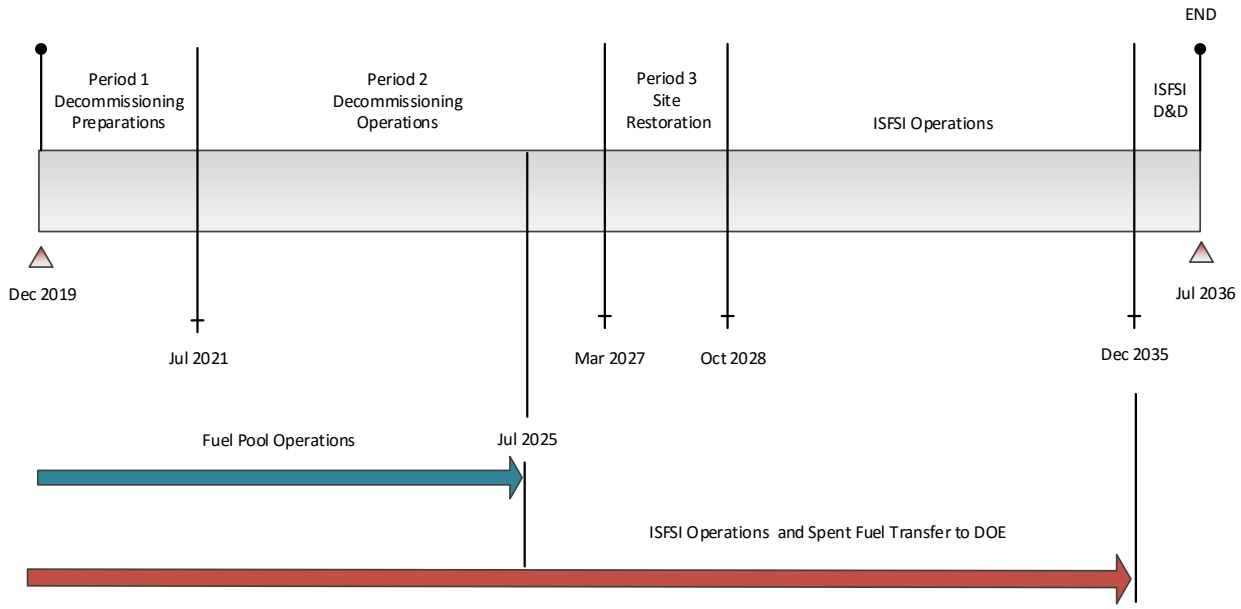


FIGURE 4.3
DECOMMISSIONING TIMELINE
DELAYED DECON
(not to scale)

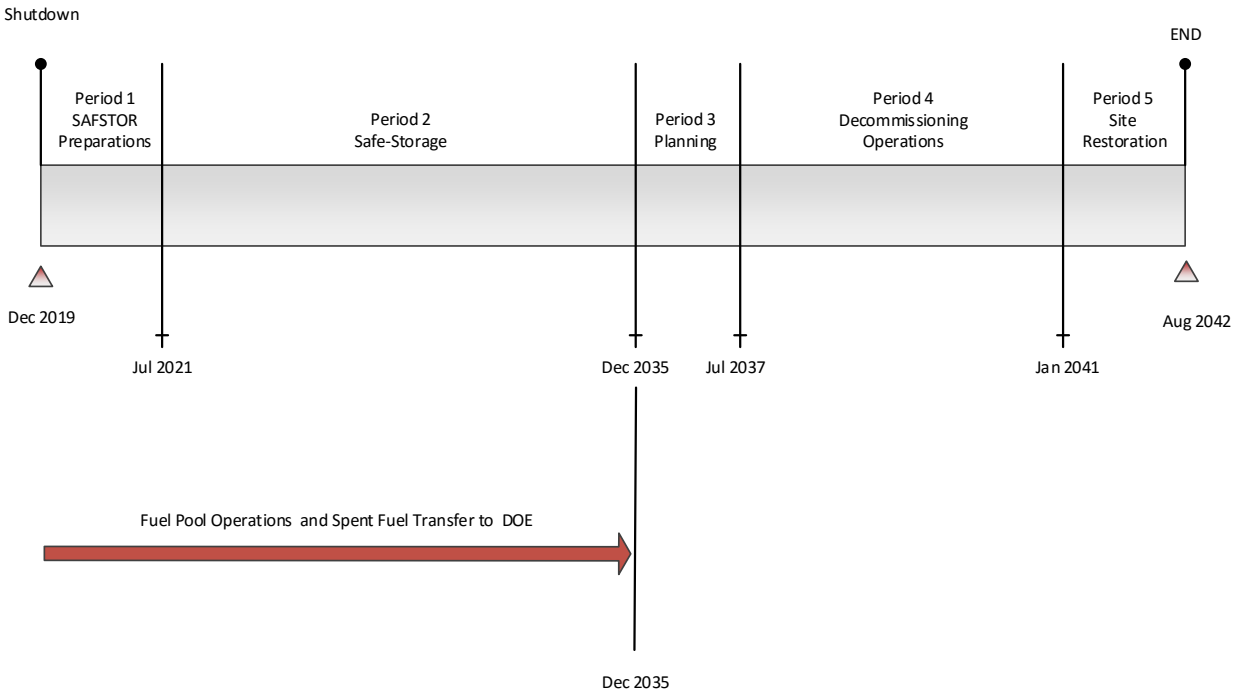
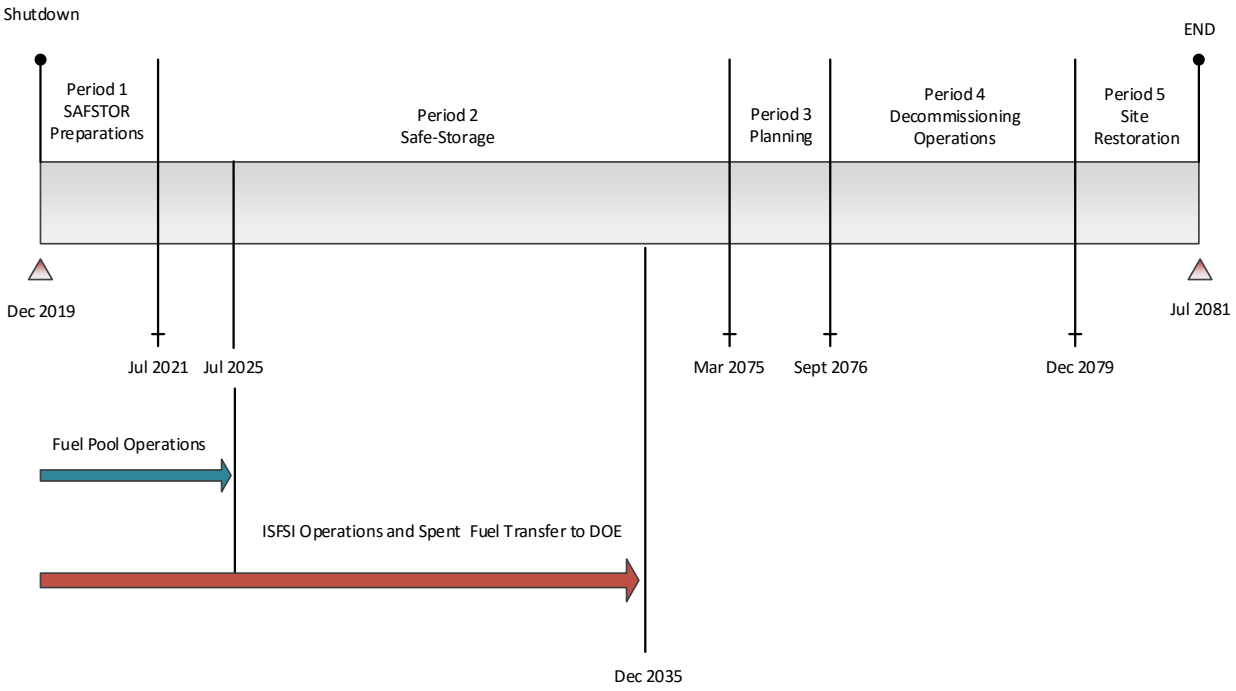


FIGURE 4.4
DECOMMISSIONING TIMELINE
SAFSTOR
(not to scale)



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,[38] 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 CRF Part 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 of radioactive waste generated during the various decommissioning activities at the site is shown on a line-item basis in Appendices C through F and summarized in Tables 5.1 through 5.3. The quantified waste volume summaries shown in these tables are consistent with §61 classifications. 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 ^{137}Cs will still control the disposition requirements.

The waste material generated in the decontamination and dismantling of Oyster Creek is primarily generated during Period 2 of the DECON alternative and Period 4 of the deferred alternatives. Material that is considered potentially contaminated when removed from the radiologically 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.

The majority of the material generated from the decontamination and dismantling activities (approximately 99% for the DECON alternative) is Class A waste. The disposal cost for this material is based upon Exelon's current agreement with Energy*Solutions* for its disposal facility in Clive, Utah.

Since the Energy*Solutions* facility is not able to accept the higher activity waste (Class B and C) generated in the decontamination of the reactor vessel and segmentation of the components closest to the core, the cost of disposal of this material (less than 1% of the total volume) was based upon rates provided by Exelon for the Barnwell facility.

A small quantity of material generated during the Oyster Creek decommissioning will not be considered suitable for near-surface disposal, and is assumed to be disposed of in a geologic repository, in a manner similar to that envisioned for spent fuel disposal. GTCC material is estimated to require four spent fuel storage canisters (or the equivalent) to dispose of the most radioactive portions of the reactor vessel internals. The volume and weight reported in Tables 5.1 through 5.3 represent the packaged weight and volume of the spent fuel storage canisters.

FIGURE 5.1
RADIOACTIVE WASTE DISPOSITION

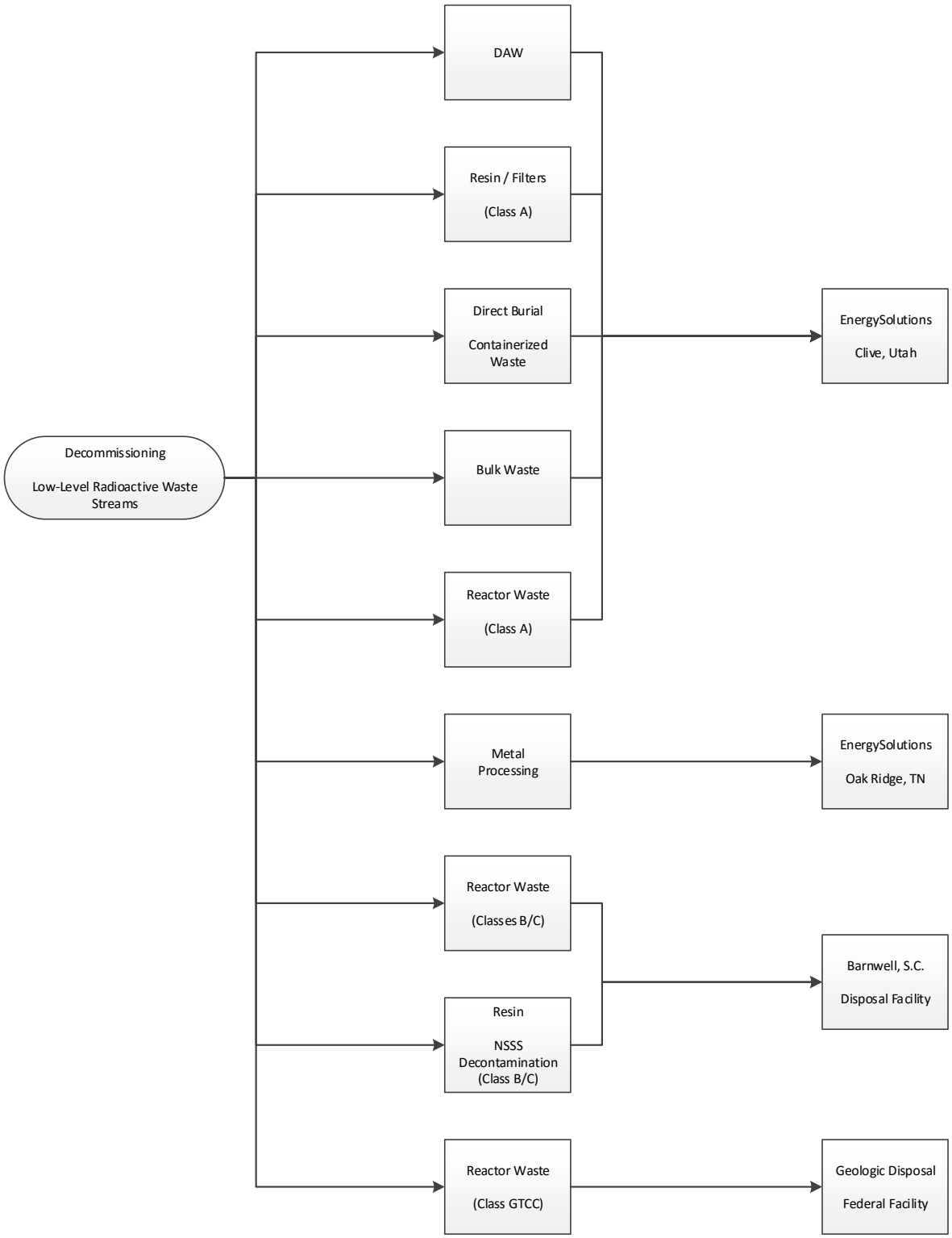
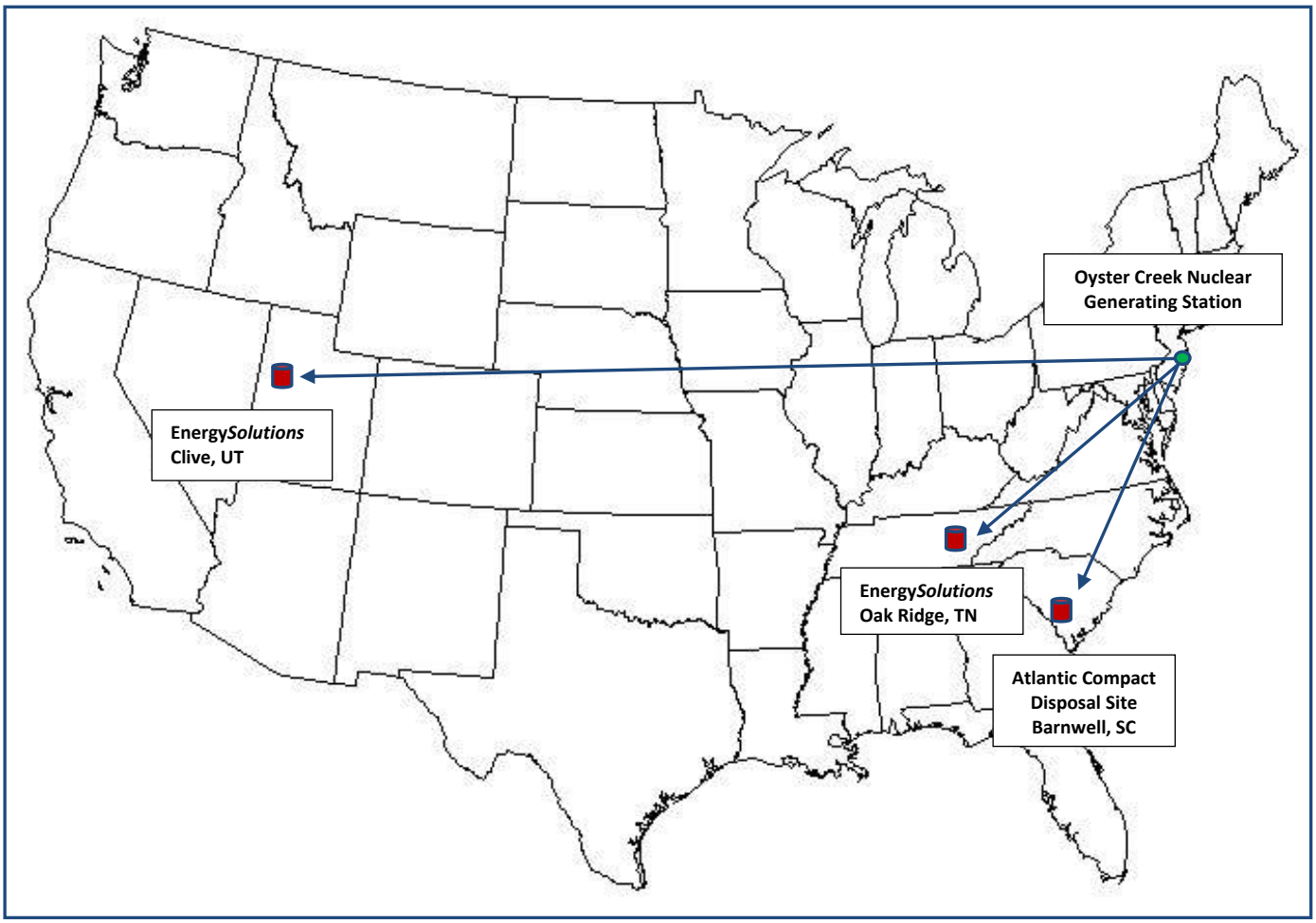


FIGURE 5.2
DECOMMISSIONING WASTE DESTINATIONS
RADIOLOGICAL



The figure indicates the destinations for the low-level radioactive waste designated for direct disposal (Barnwell, South Carolina and Clive, Utah) and processing/recovery (Oak Ridge, Tennessee).

Disposition of the Class B and C low-level radioactive waste will be at the Atlantic Compact's disposal facility in Barnwell, South Carolina.

Disposal options (and destinations) for GTCC are still being evaluated.

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)	Energy*Solutions* Clive, UT Containerized	A	166,977	9,505,467
	Energy*Solutions* Clive, UT Bulk	A	507,264	39,834,160
	Atlantic Compact Barnwell, SC	B	2,449	288,419
	Atlantic Compact Barnwell, SC	C	729	48,414
Greater than Class C (geologic repository)	Spent Fuel Equivalent	GTCC	1,547	308,304
Total [2]			678,966	49,984,765
Processed/Conditioned (off-site recycling center)	Recycling Vendors	A	419,416	17,795,000
Scrap Metal				47,074,000

[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
DELAYED DECON ALTERNATIVE
DECOMMISSIONING WASTE SUMMARY

Waste	Cost Basis	Class [1]	Waste Volume (cubic feet)	Mass (pounds)
Low-Level Radioactive Waste (near-surface disposal)	Energy*Solutions* Clive, UT Containerized	A	82,879	5,180,899
	Energy*Solutions* Clive, UT Bulk	A	485,649	37,984,640
	Atlantic Compact Barnwell, SC	B	1,420	128,056
	Atlantic Compact Barnwell, SC	C	350	41,228
Greater than Class C (geologic repository)	Spent Fuel Equivalent	GTCC	1,547	308,304
Total [2]			571,845	43,643,127
Processed/Conditioned (off-site recycling center)	Recycling Vendors	A	494,862	20,888,890
Scrap Metal				47,172,000

[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 5.3
SAFSTOR ALTERNATIVE
DECOMMISSIONING WASTE SUMMARY

Waste	Cost Basis	Class [1]	Waste Volume (cubic feet)	Mass (pounds)
Low-Level Radioactive Waste (near-surface disposal)	Energy*Solutions* Clive, UT Containerized	A	72,001	4,693,792
	Energy*Solutions* Clive, UT Bulk	A	491,684	38,339,750
	Atlantic Compact Barnwell, SC	B	1,546	138,156
	Atlantic Compact Barnwell, SC	C	224	31,128
Greater than Class C (geologic repository)	Spent Fuel Equivalent	GTCC	1,547	308,304
Total [2]			567,002	43,511,130
Processed/Conditioned (off-site recycling center)	Recycling Vendors	A	495,389	20,978,050
Scrap Metal				47,172,000

[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

This report presents estimates of the cost to decommission Oyster Creek for the selected decommissioning scenarios following the cessation of plant operations. The estimates 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. While not an engineering study, the estimates provide Exelon with sufficient information to assess their financial obligations, as they pertain to the eventual decommissioning of the nuclear station.

The decommissioning scenarios assume continued operation of the station's spent fuel pool for a minimum of five and one-half years following the cessation of operations for continued cooling of the assemblies. In the DECON and SAFSTOR scenarios, the existing ISFSI is expanded to accommodate the spent fuel, once sufficiently cooled, until such time that the DOE can complete the transfer of the assemblies to its repository. The spent fuel remains in the storage pool in the Delayed-DECON alternative.

The cost projected to promptly decommission the station, restore the site, and manage the spent fuel is estimated to be $1.163 billion (2016 dollars). The majority of this cost (approximately 76.4%) is associated with the physical decontamination and dismantling of the nuclear plant so that the operating license can be terminated. Another 18.7% is associated with the management, interim storage, and eventual transfer of the spent fuel. The remaining 4.9% is for the demolition of the designated structures and limited restoration of the site.

The cost to place the station in safe-storage with decommissioning deferred approximately 16 years, with the spent fuel pool remaining operational until spent fuel pickup by the DOE is complete (Delayed DECON) is estimated to be $1.226 billion (2016 dollars). The majority of this cost (approximately 67.1%) is associated with the physical decontamination and dismantling of the nuclear plant so that the operating license can be terminated. Another 28.2% 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 cost to place the station in safe-storage with decommissioning deferred approximately 50 years (SAFSTOR) is estimated to be $1.410 billion (2016 dollars). The majority of this cost (approximately 76.4%) is associated with the physical decontamination and dismantling of the nuclear plant so that the operating license

can be terminated. Another 19.5% is associated with the management, interim storage, and eventual transfer of the spent fuel. The remaining 4.1% is for the demolition of the designated structures and limited restoration of the site.

The primary cost contributors, identified in Tables 6.1 through 6.3, 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 Exelon will hire a contractor to manage the decommissioning labor force. The size and composition of the management organizations 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 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 transportable canisters for future loading into a DOE-provided transport cask or relocation to the ISFSI (DECON and SAFSTOR alternatives). The canisters will be stored in HSMs at the ISFSI until the DOE is able to receive them. Dry storage of the fuel provides additional flexibility in the event the DOE is not able to meet the current timetable for completing the transfer of assemblies to an off-site facility and minimizes the associated caretaking expenses.

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 Energy*Solutions* 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 moved overland by truck.

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.

Comparison of the 2011 and 2016 Estimates

For illustrative purposes, the estimates for the 2011 and 2016 DECON scenarios are compared, with the cost difference for the major cost elements shown in Table 6.4. The 2011 cost elements are inflated using the CPI, Services index to 2016 dollars to remove the effect of financial escalation from the comparison. The cost difference between the escalated 2011 estimate and the 2016 estimate is approximately $154 million. Unless otherwise noted, all cost values and percentages reflect 2011 estimate costs, without inflation. When unit rates are cited, they will be exclusive of any contingency that may be applied later in the calculation.

Radiological Status of Radwaste Buildings

Based upon input from Exelon, the 2011 inventories for the following structures were re-allocated from clean building inventory items to their contaminated counterparts (items already listed as contaminated were not changed, and are not included in the values below):

- New Radwaste Building (50% contaminated – Value $8.6 million)
- Old Radwaste Building (100% contaminated – Value $20.4 million)

The combined effect of these changes, including the removal of some or all of the demolition for those structures, was $29.1 million.

Decommissioning and Demolition

Plant systems and structural commodity "Removal" costs increased by $41.1 million, or 27.7%, primarily due to the revision to the radiological status of the Old Radwaste and New Radwaste structures as discussed above. The Removal costs also increased as a result of a 34% increase (not adjusted for inflation) in the labor rates of craft labor (used to perform physical plant dismantling) over the five year period. This increase also included a 15% average hourly rate increase in health physics personnel (used to support work crew activities, perform interim radiological assessments, and license termination surveys).

- Average craft labor rates increased approximately 34%
- TLG's UCF for concrete demolition were updated resulting in reduced concrete demolition costs (decreased by $7.6 million)
- TLG heavy equipment model was updated resulting in increase in costs (increased by $7.9 million).
- Addition of the FLEX Buildings (increased $0.22 million).

- Change in ORW Building Radiological Status (now designated as 100% contaminated) (see net impact of ORW changes in paragraph above).
- Change in NRW Building Radiological Status (now designated as 50% contaminated) (see net impact of NRW changes in paragraph above).

Spent Fuel Management (Direct Costs)

This cost category increased by approximately $49.2 million. The factors that resulted in this increase in cost are:

- The cost for the dry storage system increased from $983,000 ($2011) each to $1,705,000.
- The costs for emergency planning fees increased by $15.7 million since 2011; this was almost totally due to the inclusion of state emergency planning fees. The 2011 estimate only included fees from FEMA.
- This estimate assumes the use of six empty HSM / DSC pairs already present on the Oyster Creek site. This avoided capital cost results in a decrease of $11.8 million.

Security

Security costs increased approximately $68.4 million (73.7%) between the 2011 and 2016 estimates. Three factors contributed to the increase:

- The number of security force personnel increased in the TLG decommissioning model in consideration of recent decommissioning project experience and licensee feedback,
- The average cost of the security personnel increased 14% (not adjusted for inflation), between 2011 and 2016. This change reflects both labor cost changes and the composition of the security organization. There are more management and supervisory positions in the current estimate.

Program Management

Program management costs increased by $44.0 million. The 13.6% increase is a result of the increase in labor costs for the Program Management Staff and the addition of the "Site Organization (pre-shutdown)" and "Corporate Resources" cost elements.). Site Organization and Corporate Resource costs were provided by Exelon and are $4.7 and $7.9 million, respectively.

New Cost Items

The 2016 estimate contains eleven new cost items not present in the 2011 estimate. These were added due to changes in the TLG cost modeling, or due to requests from Exelon. The combined value for all eleven items is $35.47 million.

- Remedial Action Surveys – Additional health physics personnel to facilitate removal of clean materials and vehicles from the site. Value $8.789 million.
- Excavation of Underground Services – Removal of soil and any embedded piping, conduit, etc. from the top five feet of the soil surrounding the power block. Value $8.212 million.
- Corporate Resources – Support from off-site Exelon personnel. Value $7.875 million.
- Site Organization (Pre-Shutdown) – Pre-shutdown planning by Oyster Creek personnel. Value $4.709 million.
- Dredging – Clearing of the Oyster Creek intake and discharge canals. Value $4.025 million.
- Construction Debris – Price to haul and dispose of debris resulting from demolition of such structures as warehousing, offices, etc. Value $883 thousand.
- Independent Corporate Oversight Organization – Cost for holding an annual meeting for subject matter experts to advise Oyster Creek personnel. Value $460 thousand.
- Disposal of Spare Low-Pressure Turbine Rotor – Packaging, transportation and disposal costs of the spare LP turbine stored on site at Oyster Creek. Value $446 thousand.
- Barnwell Atlantic Compact Avoided Cost – This estimate accounts for an annual fee paid by Exelon to the Atlantic Compact, and a waste volume credit for participation in the Compact. This fee and credit is applied only when there is an economic benefit to shipping waste to Barnwell. There are two years in the decommissioning schedule where this benefit exists. The annual flat fee is $350,846; the disposal volume credit is 538 cubic feet. The net impact of this fee and credit is a reduction of $431 thousand.

- Operational Tools and Equipment – Cost for transportation and recycling of the contents of ten SeaLand storage containers in which Oyster Creek stored refueling and operational equipment. Value $281 thousand.

- FLEX Buildings – Cost for the demolition of the FLEX buildings. Value $222 thousand.

Low-Level Radioactive Waste Disposal

The disposal rates for low level radioactive waste increased modestly between 2011 and 2016. The waste density was adjusted (decreased) to achieve a target of 50 pounds per cubic foot packaged density.

There was a 41% increase in total disposal costs ($26.4 million). This increase is principally the result of an increase in disposal of contaminated concrete and steel in the Old and New Radwaste buildings (see discussion above for these two buildings). Overall, burial volumes for Class A waste increased 65.7%, from 406,975 cubic feet in the 2011 estimate to 674,241 cubic feet in the current estimate.

Reactor Vessel and Internals

The 2016 estimate revisited the disposition of the reactor vessel and internal components. As a result:

- The cost of vessel segmentation equipment was increased by approximately $2.75 million dollars to reflect industry experience and the addition of mockup training for the segmentation crews.
- The vessel internals weights were re-calculated since 2011; this resulted in a decreased weight of approximately 13,500 pounds. This weight decrease occurred primarily in the control blades.
- The cost of GTCC DSCs and HSMs (4 GTCC total) increased approximately 100% since 2011.

- Exelon provided fixed B and C waste disposal rates of $5,190 per cubic foot. The 2011 estimate calculated values using the 2011-2012 Barnwell Maximum Uniform Rate Schedule.

These changes collectively increased the costs for disposition of the reactor vessel and internals by $9.6 million.

Other

The Site O&M charges from the 2011 estimate, at $309 thousand per year (in 2011 dollars), have been eliminated from this estimate.

Energy costs decreased 4.9% percent since the 2011 estimate. This is commensurate with a slight decrease (not adjusted for inflation) in the purchase price of electricity used in the 2016 estimate.

The insurance premiums provided by Exelon increased 18.3% in the 2016 cost model.

The property taxes provided by Exelon decreased 12.7% in the 2016 cost model. Starting taxes decreased by 18%, taxes after 3 years remained constant at $1 million per year (no adjustment for inflation).

TABLE 6.1
DECON ALTERNATIVE
DECOMMISSIONING COST ELEMENTS
(thousands of 2016 dollars)

Cost Element	Cost	Percentage
Decontamination	26,905	2.3
Removal	189,632	16.3
Packaging	28,319	2.4
Transportation	27,935	2.4
Waste Disposal	90,821	7.8
Off-site Waste Processing	14,125	1.2
Program Management [1]	368,284	31.7
Security	161,086	13.9
Spent Fuel Pool Isolation	13,062	1.1
Spent Fuel Storage (Direct Costs) [2]	149,339	12.8
Insurance and Regulatory Fees	23,331	2.0
Energy	12,518	1.1
Characterization and Licensing Surveys	31,678	2.7
Property Taxes	18,525	1.6
Miscellaneous Equipment	7,391	0.6
Site O&M	0	0.0
Total [3]	1,162,949	100.0

Cost Element	Cost	Percentage
NRC License Termination	888,715	76.4
Spent Fuel Management	217,703	18.7
Site Restoration	56,531	4.9
Total [3]	1,162,949	100.0

[1] Includes engineering

[2] Includes costs for the dry storage system components, spent fuel loading and transfer, spent fuel pool O&M and EP fees, but excludes program management costs (staffing), security and other related costs

[3] Columns may not add due to rounding

TABLE 6.2
DELAYED DECON ALTERNATIVE
DECOMMISSIONING COST ELEMENTS
(thousands of 2016 dollars)

Cost Element	Cost	Percentage
Decontamination	28,626	2.3
Removal	173,223	14.1
Packaging	21,649	1.8
Transportation	23,098	1.9
Waste Disposal	78,321	6.4
Off-site Waste Processing	16,331	1.3
Program Management [1]	414,595	33.8
Security	259,588	21.2
Spent Fuel Pool Isolation	13,062	1.1
Spent Fuel Storage (Direct Costs) [2]	83,870	6.8
Insurance and Regulatory Fees	30,587	2.5
Energy	17,608	1.4
Characterization and Licensing Surveys	29,422	2.4
Property Taxes	25,189	2.1
Miscellaneous Equipment	11,033	0.9
Site O&M	0	0.0
Total [3]	1,226,200	100.0

Cost Element	Cost	Percentage
NRC License Termination	823,222	67.1
Spent Fuel Management	345,937	28.2
Site Restoration	57,042	4.7
Total [3]	1,226,200	100.0

[1] Includes engineering

[2] Includes costs for spent fuel loading and transfer, spent fuel pool O&M and EP fees, but excludes program management costs (staffing), security and other related costs

[3] Columns may not add due to rounding

TABLE 6.3
SAFSTOR ALTERNATIVE
DECOMMISSIONING COST ELEMENTS
(thousands of 2016 dollars)

Cost Element	Cost	Percentage
Decontamination	28,289	2.0
Removal	175,193	12.4
Packaging	20,337	1.4
Transportation	21,285	1.5
Waste Disposal	76,857	5.5
Off-site Waste Processing	16,394	1.2
Program Management [1]	427,716	30.3
Security	269,559	19.1
Spent Fuel Pool Isolation	13,062	0.9
Spent Fuel Storage (Direct Costs) [2]	147,508	10.5
Insurance and Regulatory Fees	73,990	5.3
Energy	23,190	1.6
Characterization and Licensing Surveys	28,948	2.1
Property Taxes	68,035	4.8
Miscellaneous Equipment	20,121	1.4
Site O&M	0	0.0
Total [3]	1,410,484	100.0

Cost Element	Cost	Percentage
NRC License Termination	1,077,728	76.4
Spent Fuel Management	274,794	19.5
Site Restoration	57,962	4.1
Total [3]	1,410,484	100.0

[1] Includes engineering

[2] Includes costs for the dry storage system components, spent fuel loading and transfer, spent fuel pool O&M and EP fees, but excludes program management costs (staffing), security and other related costs

[3] Columns may not add due to rounding

TABLE 6.4
SUMMARY COMPARISON
DECON ALTERNATIVE
(thousands of dollars)

Cost Element	2011 Estimate (dollars)	2011 Escalated to 2016 [1] (dollars)	2016 Estimate (dollars)	Delta [2]
Decontamination	22,297	25,001	26,905	1,904
Removal	148,522	166,529	189,632	23,103
Packaging	22,786	25,548	28,319	2,771
Transportation	17,598	19,732	27,935	8,203
Waste Disposal	64,400	72,208	90,821	18,613
Off-site Waste Processing	10,024	11,239	14,125	2,885
Program Management	324,312	363,631	368,284	4,652
Security	92,730	103,973	161,086	57,113
Spent Fuel Pool Isolation	11,822	13,255	13,062	-193
Spent Fuel Management (Direct Costs)	100,110	112,248	149,339	37,091
Insurance and Regulatory Fees	20,929	23,466	23,331	-135
Energy	13,156	14,751	12,518	-2,233
Characterization/Licensing Surveys	19,885	22,296	31,678	9,382
Property Taxes	21,212	23,783	18,525	-5,259
Miscellaneous Equipment	6,800	7,624	7,391	-233
Site O&M	3,127	3,506	0	-3,506
Total	899,710	1,008,791	1,162,949	154,159

NRC License Termination	665,975	746,718	888,715	141,997
Spent Fuel Management	177,146	198,623	217,703	19,080
Site Restoration	56,589	63,450	56,531	-6,918
Total	899,710	1,008,791	1,162,949	154,159

[1] Escalated by CPI, Services for comparative purposes

[2] "2016 Estimate" value minus "2011 Escalated to 2016" value

7. REFERENCES

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2. "Decommissioning Cost Analysis for the Oyster Creek Nuclear Generating Station," Document No. E16-1640-002, TLG Services, Inc., Rev. 4, December 2014

3. U.S. Code of Federal Regulations, Title 10, Parts 30, 40, 50, 51, 70 and 72, "General Requirements for Decommissioning Nuclear Facilities," Nuclear Regulatory Commission, 53 Fed. Reg. 24018, June 27, 1988

4. U.S. Nuclear Regulatory Commission, Regulatory Guide 1.159, "Assuring the Availability of Funds for Decommissioning Nuclear Reactors," Rev. 2, October 2011

5. U.S. Code of Federal Regulations, Title 10, Part 20, Subpart E, "Radiological Criteria for License Termination"

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14. United States Court of Appeals for the District of Columbia Circuit, In Re: Aiken County, Et Al., August 2013, http://www.cadc.uscourts.gov/internet/opinions.nsf/BAE0CF34F762EBD985257BC6004DEB18/$file/11-1271-1451347.pdf

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16. U.S. Code of Federal Regulations, Title 10, Part 72, Subpart K, "General License for Storage of Spent Fuel at Power Reactor Sites"

17. "Low-Level Radioactive Waste Policy," Public Law 96-573, 1980

18. "Low-Level Radioactive Waste Policy Amendments Act of 1985," Public Law 99-240, January 15, 1986

19. U.S. Code of Federal Regulations, Title 10, Part 61, "Licensing Requirements for Land Disposal of Radioactive Waste"

20. U.S. Code of Federal Regulations, Title 10, Part 20, Subpart E, "Radiological Criteria for License Termination," Federal Register, Volume 62, Number 139 (p 39058 et seq.), July 21, 1997

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26. W.J. Manion and T.S. LaGuardia, "Decommissioning Handbook," U.S. Department of Energy, DOE/EV/10128-1, November 1980

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38. "Atomic Energy Act of 1954," (68 Stat. 919)

APPENDIX A

UNIT COST FACTOR DEVELOPMENT

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	60	60
	Totals (Activity/Critical)	355	255
	Duration adjustment(s):		
	+ Respiratory protection adjustment (25% of critical duration)		64
	+ Radiation/ALARA adjustment (30% of critical duration)		77
	Adjusted work duration		396
	+ Protective clothing adjustment (30% of adjusted duration)		119
	Productive work duration		515
	+ Work break adjustment (8.33 % of productive duration)		43
	Total work duration (minutes)		558

***** Total duration = 9.300 hr *****

* Alpha designators indicate activities that can be performed in parallel

APPENDIX A
(Continued)

3. LABOR REQUIRED

Crew	Number	Duration (Hours)	Rate ($/hr)	Cost
Laborers	3.00	9.300	65.56	1,829.12
Craftsmen	2.00	9.300	89.32	1,661.35
Foreman	1.00	9.300	96.08	893.54
General Foreman	0.25	9.300	102.67	238.71
Fire Watch	0.05	9.300	65.56	30.49
Health Physics Technician	1.00	9.300	65.33	607.57
Total labor cost				$5,260.79

4. EQUIPMENT & CONSUMABLES COSTS

Equipment Costs	none
Consumables/Materials Costs	
• Blotting paper 50 @ $0.69/sq ft [1]	$34.50
• Tarpaulin, oil resistant, fire retardant 50 @ $0.47/sq ft [2]	$23.50
• Gas torch consumables 1 @ $22.95 x 1 /hr [3]	$22.95
Subtotal cost of equipment and materials	$80.95
Overhead & profit on equipment and materials @ 17.00 %	$13.76
Total costs, equipment & material	$94.71

TOTAL COST:

Removal of contaminated heat exchanger <3000 pounds:	$5,355.49
Total labor cost:	$5,260.78
Total equipment/material costs:	$94.71
Total craft labor man-hours required per unit:	67.89

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 (2016) Division 01 56, Section 13.60-0600, page 22
    3. R.S. Means (2016) Division 01 54 33, Section 40-6360, page 710

- Material and consumable costs were adjusted using the regional indices for Forked River, New Jersey.

APPENDIX B

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

APPENDIX B

UNIT COST FACTOR LISTING
(Power Block Structures Only)

Unit Cost Factor	Cost/Unit
Removal of clean instrument and sampling tubing, $/linear foot	0.74
Removal of clean pipe 0.25 to 2 inches diameter, $/linear foot	7.79
Removal of clean pipe >2 to 4 inches diameter, $/linear foot	11.21
Removal of clean pipe >4 to 8 inches diameter, $/linear foot	22.01
Removal of clean pipe >8 to 14 inches diameter, $/linear foot	42.24
Removal of clean pipe >14 to 20 inches diameter, $/linear foot	54.94
Removal of clean pipe >20 to 36 inches diameter, $/linear foot	80.83
Removal of clean pipe >36 inches diameter, $/linear foot	96.03
Removal of clean valve >2 to 4 inches	146.59
Removal of clean valve >4 to 8 inches	220.08
Removal of clean valve >8 to 14 inches	422.40
Removal of clean valve >14 to 20 inches	549.45
Removal of clean valve >20 to 36 inches	808.34
Removal of clean valve >36 inches	960.30
Removal of clean pipe hanger for small bore piping	49.71
Removal of clean pipe hanger for large bore piping	175.46
Removal of clean pump, <300 pound	371.78
Removal of clean pump, 300-1000 pound	1,033.82
Removal of clean pump, 1000-10,000 pound	4,078.11
Removal of clean pump, >10,000 pound	7,888.87
Removal of clean pump motor, 300-1000 pound	432.53
Removal of clean pump motor, 1000-10,000 pound	1,695.07
Removal of clean pump motor, >10,000 pound	3,813.89
Removal of clean heat exchanger <3000 pound	2,194.84
Removal of clean heat exchanger >3000 pound	5,527.65
Removal of clean feedwater heater/deaerator	15,547.09
Removal of clean moisture separator/reheater	31,916.33
Removal of clean tank, <300 gallons	478.17
Removal of clean tank, 300-3000 gallon	1,506.73
Removal of clean tank, >3000 gallons, $/square foot surface area	12.69

APPENDIX B

UNIT COST FACTOR LISTING
(Power Block Structures Only)

Unit Cost Factor	Cost/Unit
Removal of clean electrical equipment, <300 pound	201.69
Removal of clean electrical equipment, 300-1000 pound	704.21
Removal of clean electrical equipment, 1000-10,000 pound	1,408.41
Removal of clean electrical equipment, >10,000 pound	3,365.76
Removal of clean electrical transformer < 30 tons	2,337.48
Removal of clean electrical transformer > 30 tons	6,731.51
Removal of clean standby diesel generator, <100 kW	2,387.54
Removal of clean standby diesel generator, 100 kW to 1 MW	5,329.11
Removal of clean standby diesel generator, >1 MW	11,032.35
Removal of clean electrical cable tray, $/linear foot	18.95
Removal of clean electrical conduit, $/linear foot	8.28
Removal of clean mechanical equipment, <300 pound	201.69
Removal of clean mechanical equipment, 300-1000 pound	704.21
Removal of clean mechanical equipment, 1000-10,000 pound	1,408.41
Removal of clean mechanical equipment, >10,000 pound	3,365.76
Removal of clean HVAC equipment, <300 pound	243.90
Removal of clean HVAC equipment, 300-1000 pound	846.17
Removal of clean HVAC equipment, 1000-10,000 pound	1,686.38
Removal of clean HVAC equipment, >10,000 pound	3,365.76
Removal of clean HVAC ductwork, $/pound	0.78
Removal of contaminated instrument and sampling tubing, $/linear foot	1.89
Removal of contaminated pipe 0.25 to 2 inches diameter, $/linear foot	27.28
Removal of contaminated pipe >2 to 4 inches diameter, $/linear foot	46.06
Removal of contaminated pipe >4 to 8 inches diameter, $/linear foot	73.67
Removal of contaminated pipe >8 to 14 inches diameter, $/linear foot	142.59
Removal of contaminated pipe >14 to 20 inches diameter, $/linear foot	170.76
Removal of contaminated pipe >20 to 36 inches diameter, $/linear foot	236.04
Removal of contaminated pipe >36 inches diameter, $/linear foot	280.38
Removal of contaminated valve >2 to 4 inches	560.25
Removal of contaminated valve >4 to 8 inches	659.64

APPENDIX B

UNIT COST FACTOR LISTING
(Power Block Structures Only)

Unit Cost Factor	Cost/Unit
Removal of contaminated valve >8 to 14 inches	1,358.06
Removal of contaminated valve >14 to 20 inches	1,722.78
Removal of contaminated valve >20 to 36 inches	2,292.55
Removal of contaminated valve >36 inches	2,735.89
Removal of contaminated pipe hanger for small bore piping	180.44
Removal of contaminated pipe hanger for large bore piping	595.15
Removal of contaminated pump, <300 pound	1,163.80
Removal of contaminated pump, 300-1000 pound	2,708.70
Removal of contaminated pump, 1000-10,000 pound	9,049.18
Removal of contaminated pump, >10,000 pound	21,978.81
Removal of contaminated pump motor, 300-1000 pound	1,167.65
Removal of contaminated pump motor, 1000-10,000 pound	3,674.05
Removal of contaminated pump motor, >10,000 pound	8,267.15
Removal of contaminated heat exchanger <3000 pound	5,355.49
Removal of contaminated heat exchanger >3000 pound	15,533.24
Removal of contaminated feedwater heater/deaerator	38,901.33
Removal of contaminated moisture separator/reheater	85,029.69
Removal of contaminated tank, <300 gallons	1,933.74
Removal of contaminated tank, >300 gallons, $/square foot	39.06
Removal of contaminated electrical equipment, <300 pound	903.58
Removal of contaminated electrical equipment, 300-1000 pound	2,205.59
Removal of contaminated electrical equipment, 1000-10,000 pound	4,237.24
Removal of contaminated electrical equipment, >10,000 pound	8,547.29
Removal of contaminated electrical cable tray, $/linear foot	44.27
Removal of contaminated electrical conduit, $/linear foot	22.22
Removal of contaminated mechanical equipment, <300 pound	1,013.13
Removal of contaminated mechanical equipment, 300-1000 pound	2,482.01
Removal of contaminated mechanical equipment, 1000-10,000 pound	4,767.37
Removal of contaminated mechanical equipment, >10,000 pound	8,547.29
Removal of contaminated HVAC equipment, <300 pound	1,013.13

APPENDIX B

UNIT COST FACTOR LISTING
(Power Block Structures Only)

Unit Cost Factor	Cost/Unit
Removal of contaminated HVAC equipment, 300-1000 pound	2,482.01
Removal of contaminated HVAC equipment, 1000-10,000 pound	4,767.37
Removal of contaminated HVAC equipment, >10,000 pound	8,547.29
Removal of contaminated HVAC ductwork, $/pound	2.59
Removal/plasma arc cut of contaminated thin metal components, $/linear in.	4.98
Additional decontamination of surface by washing, $/square foot	10.10
Additional decontamination of surfaces by hydrolasing, $/square foot	45.12
Decontamination rig hook up and flush, $/ 250 foot length	8,544.77
Chemical flush of components/systems, $/gallon	22.86
Removal of clean standard reinforced concrete, $/cubic yard	90.53
Removal of grade slab concrete, $/cubic yard	103.00
Removal of clean concrete floors, $/cubic yard	522.55
Removal of sections of clean concrete floors, $/cubic yard	1,575.51
Removal of clean heavily rein concrete w/#9 rebar, $/cubic yard	130.83
Removal of contaminated heavily rein concrete w/#9 rebar, $/cubic yard	2,646.56
Removal of clean heavily rein concrete w/#18 rebar, $/cubic yard	177.37
Removal of contaminated heavily rein concrete w/#18 rebar, $/cubic yard	3,492.53
Removal heavily rein concrete w/#18 rebar & steel embedments, $/cubic yard	650.32
Removal of below-grade suspended floors, $/cubic yard	248.81
Removal of clean monolithic concrete structures, $/cubic yard	1,330.35
Removal of contaminated monolithic concrete structures, $/cubic yard	2,633.09
Removal of clean foundation concrete, $/cubic yard	1,044.52
Removal of contaminated foundation concrete, $/cubic yard	2,450.28
Explosive demolition of bulk concrete, $/cubic yard	70.64
Removal of clean hollow masonry block wall, $/cubic yard	32.31
Removal of contaminated hollow masonry block wall, $/cubic yard	69.84
Removal of clean solid masonry block wall, $/cubic yard	32.31
Removal of contaminated solid masonry block wall, $/cubic yard	69.84
Backfill of below-grade voids, $/cubic yard	39.82
Removal of subterranean tunnels/voids, $/linear foot	163.45

APPENDIX B

UNIT COST FACTOR LISTING
(Power Block Structures Only)

Unit Cost Factor	Cost/Unit
Placement of concrete for below-grade voids, $/cubic yard	158.80
Excavation of clean material, $/cubic yard	4.12
Excavation of contaminated material, $/cubic yard	47.89
Removal of clean concrete rubble (tipping fee included), $/cubic yard	32.14
Removal of contaminated concrete rubble, $/cubic yard	35.22
Removal of building by volume, $/cubic foot	0.43
Removal of clean building metal siding, $/square foot	1.91
Removal of contaminated building metal siding, $/square foot	5.17
Removal of standard asphalt roofing, $/square foot	3.45
Removal of transite panels, $/square foot	3.08
Scarifying contaminated concrete surfaces (drill & spall), $/square foot	14.73
Scabbling contaminated concrete floors, $/square foot	9.18
Scabbling contaminated concrete walls, $/square foot	24.92
Scabbling contaminated ceilings, $/square foot	85.67
Scabbling structural steel, $/square foot	7.56
Removal of clean overhead crane/monorail < 10 ton capacity	991.49
Removal of contaminated overhead crane/monorail < 10 ton capacity	2,290.21
Removal of clean overhead crane/monorail >10-50 ton capacity	2,379.57
Removal of contaminated overhead crane/monorail >10-50 ton capacity	5,475.68
Removal of polar crane > 50 ton capacity	9,990.36
Removal of gantry crane > 50 ton capacity	42,071.98
Removal of structural steel, $/pound	0.30
Removal of clean steel floor grating, $/square foot	7.24
Removal of contaminated steel floor grating, $/square foot	16.88
Removal of clean free standing steel liner, $/square foot	19.03
Removal of contaminated free standing steel liner, $/square foot	45.18
Removal of clean concrete-anchored steel liner, $/square foot	9.52
Removal of contaminated concrete-anchored steel liner, $/square foot	52.59
Placement of scaffolding in clean areas, $/square foot	20.80
Placement of scaffolding in contaminated areas, $/square foot	31.71

APPENDIX B

UNIT COST FACTOR LISTING
(Power Block Structures Only)

Unit Cost Factor	Cost/Unit
Landscaping with topsoil, $/acre	27,635.51
Cost of CPC B-88 LSA box & preparation for use	2,354.58
Cost of CPC B-25 LSA box & preparation for use	2,220.31
Cost of CPC B-12V 12 gauge LSA box & preparation for use	1,775.92
Cost of CPC B-144 LSA box & preparation for use	11,753.83
Cost of LSA drum & preparation for use	254.74
Cost of cask liner for CNSI 8 120A cask (resins)	14,196.87
Cost of cask liner for CNSI 8 120A cask (filters)	10,329.75
Decontamination of surfaces with vacuuming, $/square foot	1.14

APPENDIX C

DETAILED COST ANALYSIS

DECON

Table C
Oyster Creek Nuclear Generating Station
DECON Decommissioning Cost Estimate
(thousands of 2016 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 Direct Decommissioning Activities																					
Period 0a Additional Costs																					
0a.2.1	Site Organization	-	-	-	-	-	-	4,095	614	4,709	4,709	-	-	-	-	-	-	-	-	-	37,440
0a.2.2	Corporate Resources	-	-	-	-	-	-	6,856	1,028	7,885	7,885	-	-	-	-	-	-	-	-	-	58,240
0a.2	Subtotal Period 0a Additional Costs	-	-	-	-	-	-	10,951	1,643	12,593	12,593	-	-	-	-	-	-	-	-	-	95,680
0a.0	TOTAL PERIOD 0a COST	-	-	-	-	-	-	10,951	1,643	12,593	12,593	-	-	-	-	-	-	-	-	-	95,680
PERIOD 1a - Shutdown through Transition																					
Period 1a Direct Decommissioning Activities																					
1a.1.1	Prepare preliminary decommissioning cost	-	-	-	-	-	-	172	26	198	198	-	-	-	-	-	-	-	-	-	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	-	-	-	-	-	-	265	40	305	305	-	-	-	-	-	-	-	-	-	2,000
1a.1.7	Review plant dwgs & specs.	-	-	-	-	-	-	610	91	701	701	-	-	-	-	-	-	-	-	-	4,600
1a.1.8	Perform detailed rad survey									a											
1a.1.9	Estimate by-product inventory	-	-	-	-	-	-	133	20	152	152	-	-	-	-	-	-	-	-	-	1,000
1a.1.10	End product description	-	-	-	-	-	-	133	20	152	152	-	-	-	-	-	-	-	-	-	1,000
1a.1.11	Detailed by-product inventory	-	-	-	-	-	-	172	26	198	198	-	-	-	-	-	-	-	-	-	1,300
1a.1.12	Define major work sequence	-	-	-	-	-	-	994	149	1,143	1,143	-	-	-	-	-	-	-	-	-	7,500
1a.1.13	Perform SER and EA	-	-	-	-	-	-	411	62	473	473	-	-	-	-	-	-	-	-	-	3,100
1a.1.14	Perform Site-Specific Cost Study	-	-	-	-	-	-	663	99	762	762	-	-	-	-	-	-	-	-	-	5,000
1a.1.15	Prepare/submit License Termination Plan	-	-	-	-	-	-	543	81	624	624	-	-	-	-	-	-	-	-	-	4,096
1a.1.16	Receive NRC approval of termination plan									a											
Activity Specifications																					
1a.1.17.1	Plant & temporary facilities	-	-	-	-	-	-	652	98	750	675	-	75	-	-	-	-	-	-	-	4,920
1a.1.17.2	Plant systems	-	-	-	-	-	-	552	83	635	572	-	64	-	-	-	-	-	-	-	4,167
1a.1.17.3	NSSS Decontamination Flush	-	-	-	-	-	-	66	10	76	76	-	-	-	-	-	-	-	-	-	500
1a.1.17.4	Reactor internals	-	-	-	-	-	-	941	141	1,082	1,082	-	-	-	-	-	-	-	-	-	7,100
1a.1.17.5	Reactor vessel	-	-	-	-	-	-	862	129	991	991	-	-	-	-	-	-	-	-	-	6,500
1a.1.17.6	Sacrificial shield	-	-	-	-	-	-	66	10	76	76	-	-	-	-	-	-	-	-	-	500
1a.1.17.7	Moisture separators/reheaters	-	-	-	-	-	-	133	20	152	152	-	-	-	-	-	-	-	-	-	1,000
1a.1.17.8	Reinforced concrete	-	-	-	-	-	-	212	32	244	122	-	122	-	-	-	-	-	-	-	1,600
1a.1.17.9	Main Turbine	-	-	-	-	-	-	277	42	318	318	-	-	-	-	-	-	-	-	-	2,088
1a.1.17.10	Main Condensers	-	-	-	-	-	-	277	42	318	318	-	-	-	-	-	-	-	-	-	2,088
1a.1.17.11	Pressure suppression structure	-	-	-	-	-	-	265	40	305	305	-	-	-	-	-	-	-	-	-	2,000
1a.1.17.12	Drywell	-	-	-	-	-	-	212	32	244	244	-	-	-	-	-	-	-	-	-	1,600
1a.1.17.13	Plant structures & buildings	-	-	-	-	-	-	414	62	476	238	-	238	-	-	-	-	-	-	-	3,120
1a.1.17.14	Waste management	-	-	-	-	-	-	610	91	701	701	-	-	-	-	-	-	-	-	-	4,600
1a.1.17.15	Facility & site closeout	-	-	-	-	-	-	119	18	137	69	-	69	-	-	-	-	-	-	-	900
1a.1.17	Total	-	-	-	-	-	-	5,658	849	6,506	5,939	-	567	-	-	-	-	-	-	-	42,683
Planning & Site Preparations																					
1a.1.18	Prepare dismantling sequence	-	-	-	-	-	-	318	48	366	366	-	-	-	-	-	-	-	-	-	2,400
1a.1.19	Plant prep. & temp. svces	-	-	-	-	-	-	3,200	480	3,680	3,680	-	-	-	-	-	-	-	-	-	-
1a.1.20	Design water clean-up system	-	-	-	-	-	-	186	28	213	213	-	-	-	-	-	-	-	-	-	1,400
1a.1.21	Rigging/Cont. Cntrl Envlps/tooling/etc.	-	-	-	-	-	-	2,300	345	2,645	2,645	-	-	-	-	-	-	-	-	-	-
1a.1.22	Procure casks/liners & containers	-	-	-	-	-	-	163	24	187	187	-	-	-	-	-	-	-	-	-	1,230
1a.1	Subtotal Period 1a Activity Costs	-	-	-	-	-	-	15,920	2,388	18,308	17,741	-	567	-	-	-	-	-	-	-	78,609
Period 1a Additional Costs																					
1a.2.1	ISFSI Expansion	-	-	-	-	-	-	8,000	1,200	9,200	-	9,200	-	-	-	-	-	-	-	-	-
1a.2.2	Dredging	-	-	-	-	-	-	3,500	525	4,025	4,025	-	-	-	-	-	-	-	-	-	-
1a.2	Subtotal Period 1a Additional Costs	-	-	-	-	-	-	11,500	1,725	13,225	4,025	9,200	-	-	-	-	-	-	-	-	-
Period 1a Collateral Costs																					
1a.3.1	Spent Fuel Capital and Transfer	-	-	-	-	-	-	8,166	1,225	9,391	-	9,391	-	-	-	-	-	-	-	-	-
1a.3	Subtotal Period 1a Collateral Costs	-	-	-	-	-	-	8,166	1,225	9,391	-	9,391	-	-	-	-	-	-	-	-	-

Table C
Oyster Creek Nuclear Generating Station
DECON Decommissioning Cost Estimate
(thousands of 2016 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 Period-Dependent Costs																					
1a.4.1	Insurance	-	-	-	-	-	-	2,763	276	3,040	3,040	-	-	-	-	-	-	-	-	-	-
1a.4.2	Property taxes	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1a.4.3	Health physics supplies	-	563	-	-	-	-	-	141	704	704	-	-	-	-	-	-	-	-	-	-
1a.4.4	Heavy equipment rental	-	780	-	-	-	-	-	117	897	897	-	-	-	-	-	-	-	-	-	-
1a.4.5	Disposal of DAW generated	-	-	15	3	-	35	-	11	63	63	-	-	-	611	-	-	-	12,224	20	-
1a.4.6	Plant energy budget	-	-	-	-	-	-	1,807	271	2,078	2,078	-	-	-	-	-	-	-	-	-	-
1a.4.7	NRC Fees	-	-	-	-	-	-	1,145	115	1,260	1,260	-	-	-	-	-	-	-	-	-	-
1a.4.8	Emergency Planning Fees	-	-	-	-	-	-	3,245	324	3,569	-	3,569	-	-	-	-	-	-	-	-	-
1a.4.9	Spent Fuel Pool O&M	-	-	-	-	-	-	803	120	924	-	924	-	-	-	-	-	-	-	-	-
1a.4.10	ISFSI Operating Costs	-	-	-	-	-	-	101	15	116	-	116	-	-	-	-	-	-	-	-	-
1a.4.11	Independent Corporate Oversight Organization	-	-	-	-	-	-	25	4	29	29	-	-	-	-	-	-	-	-	-	-
1a.4.12	Security Staff Cost	-	-	-	-	-	-	16,976	2,546	19,522	19,522	-	-	-	-	-	-	-	-	-	269,794
1a.4.13	Utility Staff Cost	-	-	-	-	-	-	37,517	5,628	43,145	43,145	-	-	-	-	-	-	-	-	-	424,560
1a.4	Subtotal Period 1a Period-Dependent Costs	-	1,344	15	3	-	35	64,382	9,568	75,347	70,738	4,609	-	-	611	-	-	-	12,224	20	694,354
1a.0	TOTAL PERIOD 1a COST	-	1,344	15	3	-	35	99,968	14,906	116,270	92,504	23,199	567	-	611	-	-	-	12,224	20	772,963
PERIOD 1b - Decommissioning Preparations																					
Period 1b Direct Decommissioning Activities																					
Detailed Work Procedures																					
1b.1.1.1	Plant systems	-	-	-	-	-	-	627	94	721	649	-	72	-	-	-	-	-	-	-	4,733
1b.1.1.2	NSSS Decontamination Flush	-	-	-	-	-	-	133	20	152	152	-	-	-	-	-	-	-	-	-	1,000
1b.1.1.3	Reactor internals	-	-	-	-	-	-	530	80	610	610	-	-	-	-	-	-	-	-	-	4,000
1b.1.1.4	Remaining buildings	-	-	-	-	-	-	179	27	206	51	-	154	-	-	-	-	-	-	-	1,350
1b.1.1.5	CRD housings & NIs	-	-	-	-	-	-	133	20	152	152	-	-	-	-	-	-	-	-	-	1,000
1b.1.1.6	Incore instrumentation	-	-	-	-	-	-	133	20	152	152	-	-	-	-	-	-	-	-	-	1,000
1b.1.1.7	Removal primary containment	-	-	-	-	-	-	265	40	305	305	-	-	-	-	-	-	-	-	-	2,000
1b.1.1.8	Reactor vessel	-	-	-	-	-	-	481	72	553	553	-	-	-	-	-	-	-	-	-	3,630
1b.1.1.9	Facility closeout	-	-	-	-	-	-	159	24	183	91	-	91	-	-	-	-	-	-	-	1,200
1b.1.1.10	Sacrificial shield	-	-	-	-	-	-	159	24	183	183	-	-	-	-	-	-	-	-	-	1,200
1b.1.1.11	Reinforced concrete	-	-	-	-	-	-	133	20	152	76	-	76	-	-	-	-	-	-	-	1,000
1b.1.1.12	Main Turbine	-	-	-	-	-	-	276	41	317	317	-	-	-	-	-	-	-	-	-	2,080
1b.1.1.13	Main Condensers	-	-	-	-	-	-	277	42	318	318	-	-	-	-	-	-	-	-	-	2,088
1b.1.1.14	Moisture separators & reheaters	-	-	-	-	-	-	265	40	305	305	-	-	-	-	-	-	-	-	-	2,000
1b.1.1.15	Radwaste building	-	-	-	-	-	-	362	54	416	375	-	42	-	-	-	-	-	-	-	2,730
1b.1.1.16	Reactor building	-	-	-	-	-	-	362	54	416	375	-	42	-	-	-	-	-	-	-	2,730
1b.1.1	Total	-	-	-	-	-	-	4,472	671	5,143	4,666	-	477	-	-	-	-	-	-	-	33,741
1b.1.2	Decon NSSS	1,356	-	-	-	-	-	-	678	2,034	2,034	-	-	-	-	-	-	-	-	1,067	-
1b.1	Subtotal Period 1b Activity Costs	1,356	-	-	-	-	-	4,472	1,349	7,178	6,700	-	477	-	-	-	-	-	-	1,067	33,741
Period 1b Additional Costs																					
1b.2.1	Spent Fuel Pool Isolation	-	-	-	-	-	-	11,358	1,704	13,062	13,062	-	-	-	-	-	-	-	-	-	-
1b.2.2	Site Characterization	-	-	-	-	-	-	5,626	1,688	7,314	7,314	-	-	-	-	-	-	-	-	27,140	9,952
1b.2.3	Disposition of Liquid RCRA Waste (not Lead)	-	-	-	17	593	-	-	91	701	701	-	-	2,019	-	-	-	-	115,076	-	-
1b.2.4	Disposition of PCB Soil RCRA Waste (not Lead)	-	-	-	1,349	-	14,876	-	3,921	20,146	20,146	-	-	-	63,779	-	-	-	3,240,000	-	-
1b.2.5	Disposition of Lead Inventory	-	-	-	26	873	-	-	135	1,033	1,033	-	-	328	-	-	-	-	232,673	-	-
1b.2.6	Asbestos Remediation	-	12,982	3	277	-	1,084	-	3,558	17,905	17,905	-	-	-	19,193	-	-	-	249,515	150,230	-
1b.2.7	Barnwell AC Avoided Cost	-	-	-	-	-	(292)	-	-	(292)	(292)	-	-	-	-	-	-	-	-	-	-
1b.2	Subtotal Period 1b Additional Costs	-	12,982	3	1,668	1,465	15,669	16,984	11,097	59,868	59,868	-	-	2,347	82,973	-	-	-	3,837,264	177,370	9,952
Period 1b Collateral Costs																					
1b.3.1	Decon equipment	1,033	-	-	-	-	-	-	155	1,188	1,188	-	-	-	-	-	-	-	-	-	-
1b.3.2	DOC staff relocation expenses	-	-	-	-	-	-	1,308	196	1,504	1,504	-	-	-	-	-	-	-	-	-	-
1b.3.3	Process decommissioning water waste	71	-	53	84	-	148	-	90	446	446	-	-	-	449	-	-	-	26,932	88	-
1b.3.4	Process decommissioning chemical flush waste	4	-	170	436	-	3,491	-	957	5,058	5,058	-	-	-	-	1,495	-	-	159,317	280	-
1b.3.5	Small tool allowance	-	202	-	-	-	-	-	30	232	232	-	-	-	-	-	-	-	-	-	-
1b.3.6	Pipe cutting equipment	-	1,200	-	-	-	-	-	180	1,380	1,380	-	-	-	-	-	-	-	-	-	-
1b.3.7	Decon rig	1,600	-	-	-	-	-	-	240	1,840	1,840	-	-	-	-	-	-	-	-	-	-
1b.3.8	Spent Fuel Capital and Transfer	-	-	-	-	-	-	7,941	1,191	9,132	-	9,132	-	-	-	-	-	-	-	-	-
1b.3	Subtotal Period 1b Collateral Costs	2,708	1,402	223	520	-	3,638	9,249	3,040	20,780	11,648	9,132	-	-	449	1,495	-	-	186,249	367	-
Period 1b Period-Dependent Costs																					
1b.4.1	Decon supplies	32	-	-	-	-	-	-	8	40	40	-	-	-	-	-	-	-	-	-	-
1b.4.2	Insurance	-	-	-	-	-	-	1,061	106	1,167	1,167	-	-	-	-	-	-	-	-	-	-

Table C
Oyster Creek Nuclear Generating Station
DECON Decommissioning Cost Estimate
(thousands of 2016 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.4.3	Property taxes	-	-	-	-	-	-	1,001	100	1,101	1,101	-	-	-	-	-	-	-	-	-	-
1b.4.4	Health physics supplies	-	1,102	-	-	-	-	-	276	1,378	1,378	-	-	-	-	-	-	-	-	-	-
1b.4.5	Heavy equipment rental	-	394	-	-	-	-	-	59	454	454	-	-	-	-	-	-	-	-	-	-
1b.4.6	Disposal of DAW generated	-	-	9	2	-	20	-	6	37	37	-	-	-	362	-	-	-	7,234	12	-
1b.4.7	Plant energy budget	-	-	-	-	-	-	1,827	274	2,101	2,101	-	-	-	-	-	-	-	-	-	-
1b.4.8	NRC Fees	-	-	-	-	-	-	340	34	374	374	-	-	-	-	-	-	-	-	-	-
1b.4.9	Emergency Planning Fees	-	-	-	-	-	-	1,640	164	1,804	-	1,804	-	-	-	-	-	-	-	-	-
1b.4.10	Barnwell Annual Flat Fee	-	-	-	-	-	178	-	-	178	178	-	-	-	-	-	-	-	-	-	-
1b.4.11	Spent Fuel Pool O&M	-	-	-	-	-	-	406	61	467	-	467	-	-	-	-	-	-	-	-	-
1b.4.12	ISFSI Operating Costs	-	-	-	-	-	-	51	8	58	-	58	-	-	-	-	-	-	-	-	-
1b.4.13	Independent Corporate Oversight Organization	-	-	-	-	-	-	13	2	15	15	-	-	-	-	-	-	-	-	-	-
1b.4.14	Security Staff Cost	-	-	-	-	-	-	8,581	1,287	9,868	9,868	-	-	-	-	-	-	-	-	-	136,371
1b.4.15	DOC Staff Cost	-	-	-	-	-	-	5,905	886	6,790	6,790	-	-	-	-	-	-	-	-	-	64,486
1b.4.16	Utility Staff Cost	-	-	-	-	-	-	19,057	2,859	21,915	21,915	-	-	-	-	-	-	-	-	-	215,657
1b.4	Subtotal Period 1b Period-Dependent Costs	32	1,497	9	2	-	198	39,881	6,129	47,747	45,418	2,330	-	-	362	-	-	-	7,234	12	416,514
1b.0	TOTAL PERIOD 1b COST	4,096	15,881	235	2,190	1,465	19,505	70,586	21,615	135,574	123,634	11,462	477	2,347	83,783	1,495	-	-	4,030,747	178,816	460,207
PERIOD 1 TOTALS		4,096	17,224	250	2,193	1,465	19,540	170,554	36,521	251,844	216,138	34,661	1,044	2,347	84,395	1,495	-	-	4,042,971	178,836	1,233,170
PERIOD 2a - Large Component Removal																					
Period 2a Direct Decommissioning Activities																					
Nuclear Steam Supply System Removal																					
2a.1.1.2	Recirculation Pumps & Motors	63	151	47	140	11	210	-	149	772	772	-	-	107	1,053	-	-	-	196,350	2,938	-
2a.1.1.3	CRDMs & NIs Removal	242	1,450	537	181	-	293	-	638	3,340	3,340	-	-	-	5,179	-	-	-	248,300	21,381	-
2a.1.1.4	Reactor Vessel Internals	189	5,567	10,837	2,459	-	9,140	348	12,216	40,758	40,758	-	-	-	1,252	954	729	-	295,716	30,503	1,379
2a.1.1.5	Reactor Vessel	157	8,323	2,632	2,084	-	2,582	348	8,843	24,968	24,968	-	-	-	16,378	-	-	-	1,683,851	30,503	1,379
2a.1.1	Totals	652	15,491	14,053	4,864	11	12,226	696	21,846	69,838	69,838	-	-	107	23,863	954	729	-	2,424,218	85,324	2,757
Removal of Major Equipment																					
2a.1.2	Main Turbine/Generator	-	463	2,011	449	2,139	262	-	770	6,094	6,094	-	-	76,676	4,270	-	-	-	3,672,096	5,691	-
2a.1.3	Main Condensers	-	1,398	1,396	311	1,484	182	-	804	5,574	5,574	-	-	53,200	2,963	-	-	-	2,547,820	17,138	-
Disposal of Plant Systems																					
New Radwaste Building System Components																					
2a.1.7.1	7EB	141	230	15	11	5	32	-	139	572	572	-	-	215	513	-	-	-	35,432	4,353	-
2a.1.7.2	N2G	-	16	0	0	1	1	-	4	22	22	-	-	40	9	-	-	-	2,100	202	-
2a.1.7.3	N2P	-	34	1	2	8	1	-	10	56	56	-	-	324	16	-	-	-	13,979	411	-
2a.1.7.4	N3A	-	95	6	4	6	10	-	28	148	148	-	-	237	156	-	-	-	17,815	1,161	-
2a.1.7.5	N3D	-	112	4	3	11	5	-	32	167	167	-	-	419	80	-	-	-	21,196	1,440	-
2a.1.7.6	N3I	-	24	0	0	0	1	-	6	32	32	-	-	19	13	-	-	-	1,474	308	-
2a.1.7.7	N3N	-	140	5	4	7	9	-	40	206	206	-	-	288	153	-	-	-	19,697	1,745	-
2a.1.7.8	N3P	-	36	2	2	3	4	-	11	56	56	-	-	118	58	-	-	-	7,850	440	-
2a.1.7.9	N3Q	-	24	1	1	2	1	-	7	35	35	-	-	67	13	-	-	-	3,394	309	-
2a.1.7.10	N3R	-	24	1	1	2	2	-	7	37	37	-	-	62	33	-	-	-	4,276	299	-
2a.1.7.11	N3S	-	35	1	1	4	2	-	10	54	54	-	-	158	28	-	-	-	7,855	454	-
2a.1.7.12	N3T	-	22	1	0	1	1	-	6	31	31	-	-	42	15	-	-	-	2,517	277	-
2a.1.7.13	N3U	-	156	24	18	8	54	-	59	319	319	-	-	317	890	-	-	-	59,012	1,961	-
2a.1.7.14	N3W	-	161	26	20	8	59	-	62	336	336	-	-	333	968	-	-	-	63,763	2,031	-
2a.1.7.15	N3Y	-	291	26	25	56	49	-	100	547	547	-	-	2,216	804	-	-	-	131,783	3,651	-
2a.1.7.16	N51	27	40	1	1	5	2	-	25	102	102	-	-	213	25	-	-	-	9,942	832	-
2a.1.7.17	N52	19	32	3	2	2	6	-	20	83	83	-	-	68	97	-	-	-	7,723	641	-
2a.1.7.18	N53	27	50	5	4	4	11	-	31	132	132	-	-	144	183	-	-	-	15,101	963	-
2a.1.7.19	N54	6	24	1	1	1	3	-	10	46	46	-	-	27	49	-	-	-	3,600	368	-
2a.1.7.20	N55	-	102	3	3	8	5	-	29	150	150	-	-	336	75	-	-	-	17,579	1,301	-
2a.1.7.21	N56	-	134	8	7	12	15	-	41	217	217	-	-	481	245	-	-	-	32,296	1,599	-
2a.1.7.22	N5A	47	60	3	3	6	5	-	41	164	164	-	-	226	90	-	-	-	13,678	1,321	-
2a.1.7.23	N5B	34	56	1	2	7	1	-	33	134	134	-	-	286	20	-	-	-	12,648	1,110	-
2a.1.7.24	N5C	-	25	2	1	1	3	-	8	40	40	-	-	49	55	-	-	-	4,844	305	-
2a.1.7.25	N5D	-	39	3	2	2	5	-	12	61	61	-	-	75	75	-	-	-	6,954	485	-
2a.1.7.26	N5E	-	26	2	1	1	4	-	8	42	42	-	-	49	58	-	-	-	5,041	317	-
2a.1.7.27	N5F	-	38	3	2	1	5	-	12	61	61	-	-	51	89	-	-	-	6,732	464	-
2a.1.7.28	N5G	1	19	1	0	1	1	-	6	28	28	-	-	23	16	-	-	-	1,814	243	-
2a.1.7.29	N5H	-	15	1	1	0	2	-	5	24	24	-	-	1	32	-	-	-	1,738	195	-

Table C
Oyster Creek Nuclear Generating Station
DECON Decommissioning Cost Estimate
(thousands of 2016 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)																					
2a.1.7.30	N5I	13	22	1	1	1	2	-	13	52	52	-	-	26	25	-	-	-	2,347	442	-
2a.1.7.31	N5J	-	16	1	1	2	2	-	5	28	28	-	-	99	31	-	-	-	5,629	212	-
2a.1.7.32	N5K	-	21	1	1	1	1	-	6	30	30	-	-	56	18	-	-	-	3,243	256	-
2a.1.7.33	N5N	-	39	1	1	3	1	-	11	55	55	-	-	125	17	-	-	-	5,963	494	-
2a.1.7.34	N5O	-	101	4	4	15	5	-	30	159	159	-	-	579	89	-	-	-	28,133	1,264	-
2a.1.7.35	N5P	-	38	3	3	3	8	-	13	67	67	-	-	121	128	-	-	-	11,280	488	-
2a.1.7.36	N5Q	-	37	3	3	3	7	-	12	66	66	-	-	121	126	-	-	-	11,171	481	-
2a.1.7.37	N5S	-	90	9	12	51	11	-	36	208	208	-	-	2,012	177	-	-	-	90,928	1,168	-
2a.1.7.38	N5T	79	85	5	5	12	10	-	66	262	262	-	-	482	162	-	-	-	27,689	2,005	-
2a.1.7.39	N5U	79	86	5	5	12	10	-	67	263	263	-	-	483	163	-	-	-	27,751	2,019	-
2a.1.7.40	N5Y	19	33	2	1	3	3	-	19	81	81	-	-	124	49	-	-	-	7,547	653	-
2a.1.7.41	N5Z	19	33	2	1	3	3	-	19	81	81	-	-	124	49	-	-	-	7,547	653	-
2a.1.7.42	PPA	-	105	4	4	12	6	-	31	161	161	-	-	468	101	-	-	-	24,251	1,308	-
2a.1.7	Totals	512	2,761	190	164	295	366	-	1,125	5,412	5,412	-	-	11,707	5,995	-	-	-	785,310	40,628	-
Old Radwaste Building System Components																					
2a.1.8.1	7BA	-	114	5	4	8	10	-	33	174	174	-	-	317	155	-	-	-	20,957	1,437	-
2a.1.8.2	7DA	-	67	8	6	1	18	-	23	123	123	-	-	56	292	-	-	-	17,462	838	-
2a.1.8.3	7FA	2	32	3	3	4	6	-	12	61	61	-	-	148	103	-	-	-	11,376	415	-
2a.1.8.4	PBA	140	212	21	17	14	46	-	141	590	590	-	-	544	764	-	-	-	61,080	4,297	-
2a.1.8.5	PDA	15	74	3	3	7	6	-	29	136	136	-	-	277	92	-	-	-	16,025	1,107	-
2a.1.8.6	PMA	-	17	1	1	1	1	-	5	25	25	-	-	32	20	-	-	-	2,369	217	-
2a.1.8.7	PRA	-	114	4	5	19	5	-	34	181	181	-	-	763	87	-	-	-	35,485	1,456	-
2a.1.8.8	PTK / PTP	-	18	0	0	1	0	-	5	24	24	-	-	28	1	-	-	-	1,212	232	-
2a.1.8	Totals	157	648	43	38	55	92	-	281	1,314	1,314	-	-	2,166	1,516	-	-	-	165,967	9,998	-
Turbine Building System Components																					
2a.1.9.1	7CA	225	369	40	30	29	80	-	238	1,011	1,011	-	-	1,163	1,305	-	-	-	115,259	6,310	-
2a.1.9.2	TB2	-	1,338	97	93	225	176	-	436	2,364	2,364	-	-	8,921	2,866	-	-	-	511,412	16,724	-
2a.1.9.3	TB23	-	6	0	0	1	0	-	2	10	10	-	-	40	1	-	-	-	1,712	83	-
2a.1.9.4	TB38	-	20	1	1	2	3	-	6	34	34	-	-	75	47	-	-	-	5,473	230	-
2a.1.9.5	TC2	-	2,173	443	401	691	914	-	980	5,601	5,601	-	-	27,433	14,887	-	-	-	1,888,270	27,727	-
2a.1.9.6	TE2	-	232	20	23	79	30	-	83	467	467	-	-	3,141	483	-	-	-	152,717	2,861	-
2a.1.9.7	TEE	-	449	15	22	96	19	-	136	738	738	-	-	3,794	308	-	-	-	170,074	5,612	-
2a.1.9.8	TEG	-	32	2	1	2	3	-	9	49	49	-	-	89	48	-	-	-	6,127	382	-
2a.1.9.9	TP2	-	347	28	28	75	48	-	117	644	644	-	-	2,987	789	-	-	-	162,391	4,370	-
2a.1.9.10	TP3	-	157	17	14	14	37	-	54	293	293	-	-	546	623	-	-	-	53,588	2,032	-
2a.1.9.11	TPE	-	142	18	13	10	36	-	50	269	269	-	-	408	601	-	-	-	47,152	1,792	-
2a.1.9	Totals	225	5,266	680	626	1,224	1,346	-	2,111	11,478	11,478	-	-	48,598	21,958	-	-	-	3,114,174	68,124	-
2a.1.12	Scaffolding in support of decommissioning	-	1,269	30	7	29	8	-	328	1,670	1,670	-	-	1,057	124	-	-	-	54,018	18,185	-
2a.1	Subtotal Period 2a Activity Costs	1,545	27,295	18,403	6,458	5,237	14,480	696	27,266	101,380	101,380	-	-	193,511	60,688	954	729	-	12,763,600	245,088	2,757
Period 2a Additional Costs																					
2a.2.1	Remedial Action Surveys	-	-	-	-	-	-	1,879	564	2,443	2,443	-	-	-	-	-	-	-	-	28,759	-
2a.2.2	Disposal of Spare LP Turbine Rotor	-	40	135	30	185	-	-	56	446	446	-	-	5,607	-	-	-	-	298,595	469	-
2a.2.3	Barnwell AC Avoided Cost	-	-	-	-	-	(902)	-	-	(902)	(902)	-	-	-	-	-	-	-	-	-	-
2a.2	Subtotal Period 2a Additional Costs	-	40	135	30	185	(902)	1,879	619	1,987	1,987	-	-	5,607	-	-	-	-	298,595	29,228	-
Period 2a Collateral Costs																					
2a.3.1	Process decommissioning water waste	160	-	122	192	-	338	-	206	1,018	1,018	-	-	-	1,027	-	-	-	61,648	200	-
2a.3.2	Process decommissioning chemical flush waste	1	-	44	113	-	227	-	79	463	463	-	-	-	388	-	-	-	41,295	73	-
2a.3.3	Small tool allowance	-	371	-	-	-	-	-	56	427	384	-	43	-	-	-	-	-	-	-	-
2a.3.4	Spent Fuel Capital and Transfer	-	-	-	-	-	-	23,824	3,574	27,397	-	27,397	-	-	-	-	-	-	-	-	-
2a.3	Subtotal Period 2a Collateral Costs	161	371	166	305	-	565	23,824	3,913	29,305	1,865	27,397	43	-	1,415	-	-	-	102,943	273	-
Period 2a Period-Dependent Costs																					
2a.4.1	Decon supplies	87	-	-	-	-	-	-	22	109	109	-	-	-	-	-	-	-	-	-	-
2a.4.2	Insurance	-	-	-	-	-	-	2,302	230	2,532	2,532	-	-	-	-	-	-	-	-	-	-
2a.4.3	Property taxes	-	-	-	-	-	-	2,153	215	2,368	2,131	-	237	-	-	-	-	-	-	-	-
2a.4.4	Health physics supplies	-	2,225	-	-	-	-	-	556	2,781	2,781	-	-	-	-	-	-	-	-	-	-
2a.4.5	Heavy equipment rental	-	3,926	-	-	-	-	-	589	4,515	4,515	-	-	-	-	-	-	-	-	-	-
2a.4.6	Disposal of DAW generated	-	-	135	26	-	310	-	95	565	565	-	-	-	5,469	-	-	-	109,376	178	-
2a.4.7	Plant energy budget	-	-	-	-	-	-	2,369	355	2,724	2,724	-	-	-	-	-	-	-	-	-	-
2a.4.8	NRC Fees	-	-	-	-	-	-	843	84	927	927	-	-	-	-	-	-	-	-	-	-
2a.4.9	Emergency Planning Fees	-	-	-	-	-	-	3,552	355	3,908	-	3,908	-	-	-	-	-	-	-	-	-

Table C
Oyster Creek Nuclear Generating Station
DECON Decommissioning Cost Estimate
(thousands of 2016 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.4.10	Barnwell Annual Flat Fee	-	-	-	-	-	485	-	-	485	485	-	-	-	-	-	-	-	-	-	-
2a.4.11	Spent Fuel Pool O&M	-	-	-	-	-	-	1,108	166	1,274	-	1,274	-	-	-	-	-	-	-	-	-
2a.4.12	ISFSI Operating Costs	-	-	-	-	-	-	139	21	160	-	160	-	-	-	-	-	-	-	-	-
2a.4.13	Independent Corporate Oversight Organization	-	-	-	-	-	-	35	5	40	40	-	-	-	-	-	-	-	-	-	-
2a.4.14	Security Staff Cost	-	-	-	-	-	-	23,423	3,513	26,936	26,936	-	-	-	-	-	-	-	-	-	372,257
2a.4.15	DOC Staff Cost	-	-	-	-	-	-	19,991	2,999	22,990	22,990	-	-	-	-	-	-	-	-	-	219,314
2a.4.16	Utility Staff Cost	-	-	-	-	-	-	36,386	5,458	41,844	41,844	-	-	-	-	-	-	-	-	-	408,329
2a.4	Subtotal Period 2a Period-Dependent Costs	87	6,150	135	26	-	795	92,299	14,664	114,157	108,578	5,341	237	-	5,469	-	-	-	109,376	178	999,900
2a.0	TOTAL PERIOD 2a COST	1,794	33,857	18,839	6,819	5,422	14,938	118,698	46,463	246,829	213,811	32,739	279	199,117	67,572	954	729	-	13,274,520	274,768	1,002,657
PERIOD 2b - Site Decontamination																					
Period 2b Direct Decommissioning Activities																					
Disposal of Plant Systems																					
New Radwaste Building System Components																					
2b.1.3.1	N38	-	239	14	11	25	23	-	72	385	385	-	-	1,005	374	-	-	-	60,348	2,946	-
2b.1.3.2	N48	-	122	5	4	10	7	-	35	183	183	-	-	406	119	-	-	-	22,722	1,508	-
2b.1.3.3	N4A	18	42	4	3	3	9	-	23	101	101	-	-	109	141	-	-	-	11,614	702	-
2b.1.3.4	N4B	15	40	3	3	2	7	-	20	91	91	-	-	98	121	-	-	-	10,112	670	-
2b.1.3.5	N4D	-	125	8	5	5	15	-	37	196	196	-	-	210	241	-	-	-	21,063	1,540	-
2b.1.3.6	N4E	-	9	0	0	0	0	-	3	13	13	-	-	11	5	-	-	-	741	121	-
2b.1.3.7	N4F	-	27	2	1	1	3	-	8	41	41	-	-	51	45	-	-	-	4,464	330	-
2b.1.3.8	N4H	-	31	2	2	5	3	-	10	53	53	-	-	187	54	-	-	-	10,440	418	-
2b.1.3.9	N4K	-	33	2	1	3	3	-	10	52	52	-	-	129	45	-	-	-	7,612	418	-
2b.1.3.10	N4L	-	49	1	1	3	3	-	14	72	72	-	-	135	41	-	-	-	7,605	628	-
2b.1.3.11	N5R	-	108	3	5	24	4	-	33	177	177	-	-	967	59	-	-	-	42,340	1,365	-
2b.1.3.12	N5V	79	85	9	7	8	19	-	69	275	275	-	-	309	327	-	-	-	28,863	2,011	-
2b.1.3.13	N5W	-	13	0	0	0	0	-	3	17	17	-	-	9	0	-	-	-	406	169	-
2b.1.3.14	N5X	103	105	3	4	20	3	-	83	321	321	-	-	786	53	-	-	-	34,607	2,536	-
2b.1.3	Totals	215	1,029	55	50	111	99	-	419	1,978	1,978	-	-	4,412	1,628	-	-	-	262,937	15,361	-
Old Radwaste Building System Components																					
2b.1.4.1	ORW Pre D&D Desludge and Decon	-	278	-	-	-	-	-	42	320	320	-	-	-	-	-	-	-	-	3,197	-
2b.1.4.2	PRD	-	21	0	1	4	0	-	6	33	33	-	-	143	7	-	-	-	6,161	274	-
2b.1.4.3	PSB	-	194	8	9	24	15	-	58	308	308	-	-	950	238	-	-	-	50,919	2,442	-
2b.1.4.4	PTA	-	54	3	3	7	6	-	17	89	89	-	-	276	92	-	-	-	15,967	686	-
2b.1.4.5	PUA	-	288	18	13	22	31	-	87	459	459	-	-	860	510	-	-	-	61,577	3,602	-
2b.1.4.6	PUU	-	195	14	14	36	27	-	64	351	351	-	-	1,441	458	-	-	-	81,145	2,506	-
2b.1.4.7	PVA	-	12	0	0	0	0	-	3	15	15	-	-	12	1	-	-	-	524	148	-
2b.1.4.8	UAB	-	419	9	13	54	12	-	119	627	627	-	-	2,148	209	-	-	-	97,826	5,226	-
2b.1.4.9	UAS	-	288	8	12	54	8	-	85	454	454	-	-	2,128	142	-	-	-	93,554	3,623	-
2b.1.4	Totals	-	1,749	60	65	200	100	-	480	2,655	2,655	-	-	7,959	1,656	-	-	-	407,673	21,705	-
Turbine Building System Components																					
2b.1.5.1	TD2	-	83	5	4	6	9	-	25	132	132	-	-	241	145	-	-	-	17,325	1,005	-
2b.1.5.2	TF2	-	450	60	64	203	95	-	182	1,054	1,054	-	-	8,047	1,538	-	-	-	406,940	5,638	-
2b.1.5.3	TFG	-	33	1	1	3	1	-	9	48	48	-	-	134	16	-	-	-	6,267	414	-
2b.1.5.4	TG2	-	329	50	55	150	94	-	141	819	819	-	-	5,957	1,537	-	-	-	321,754	4,206	-
2b.1.5.5	TH2	-	640	143	131	182	322	-	302	1,720	1,720	-	-	7,240	5,255	-	-	-	566,964	8,190	-
2b.1.5.6	TKA	-	29	1	1	1	2	-	8	42	42	-	-	47	26	-	-	-	3,281	350	-
2b.1.5.7	TL2	-	138	12	9	9	23	-	44	236	236	-	-	358	382	-	-	-	34,422	1,694	-
2b.1.5.8	TMA	-	84	7	7	17	12	-	28	156	156	-	-	690	198	-	-	-	38,320	1,052	-
2b.1.5.9	TN2	-	445	37	36	82	70	-	150	819	819	-	-	3,260	1,137	-	-	-	191,471	5,581	-
2b.1.5.10	TO2	-	241	-	-	-	-	-	36	278	-	-	278	-	-	-	-	-	-	3,221	-
2b.1.5.11	TOA	-	122	5	6	23	6	-	37	197	197	-	-	917	93	-	-	-	42,111	1,498	-
2b.1.5.12	TOCR	-	90	6	9	40	6	-	32	183	183	-	-	1,590	97	-	-	-	69,629	1,063	-
2b.1.5.13	TOR	-	90	7	7	18	13	-	30	165	165	-	-	717	205	-	-	-	39,817	1,140	-
2b.1.5.14	TOV	-	24	0	1	2	0	-	7	34	34	-	-	90	7	-	-	-	4,049	293	-
2b.1.5.15	TOW	-	142	9	14	59	12	-	51	288	288	-	-	2,346	202	-	-	-	105,759	1,766	-
2b.1.5.16	TOX / TOY	-	40	1	1	3	1	-	11	56	56	-	-	106	18	-	-	-	5,234	488	-
2b.1.5.17	TS2	-	278	34	33	68	69	-	105	587	587	-	-	2,704	1,121	-	-	-	168,107	3,444	-
2b.1.5.18	TTA	-	84	7	7	17	13	-	29	157	157	-	-	675	215	-	-	-	38,599	1,086	-
2b.1.5.19	TU2	-	260	10	13	46	16	-	79	423	423	-	-	1,825	259	-	-	-	87,617	3,271	-
2b.1.5	Totals	-	3,601	396	396	930	764	-	1,305	7,392	7,114	-	278	36,944	12,451	-	-	-	2,147,665	45,401	-

Table C
Oyster Creek Nuclear Generating Station
DECON Decommissioning Cost Estimate
(thousands of 2016 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			
Augmented Offgas System Components																					
2b.1.6.1	AY8	-	199	16	15	26	32	-	66	354	354	-	-	1,044	528	-	-	-	69,894	2,488	-
2b.1.6.2	AYA	-	42	4	4	10	7	-	15	82	82	-	-	384	122	-	-	-	21,933	527	-
2b.1.6.3	AYB	-	40	2	2	5	3	-	12	65	65	-	-	208	57	-	-	-	11,409	505	-
2b.1.6.4	AYC	-	101	4	6	23	6	-	32	172	172	-	-	899	108	-	-	-	42,004	1,280	-
2b.1.6.5	AYE	-	35	2	1	1	4	-	10	53	53	-	-	43	58	-	-	-	4,816	429	-
2b.1.6.6	AZ8	-	75	4	4	12	7	-	24	127	127	-	-	492	114	-	-	-	25,947	942	-
2b.1.6.7	AZA	-	17	1	0	1	1	-	5	25	25	-	-	24	16	-	-	-	1,814	215	-
2b.1.6.8	AZC	-	144	5	6	26	6	-	43	230	230	-	-	1,046	96	-	-	-	47,438	1,792	-
2b.1.6.9	AZD	-	24	1	1	1	2	-	7	37	37	-	-	40	35	-	-	-	3,439	308	-
2b.1.6.10	AZE	-	23	1	1	1	2	-	7	35	35	-	-	39	30	-	-	-	3,184	295	-
2b.1.6.11	AZF	-	22	1	1	2	2	-	6	33	33	-	-	65	25	-	-	-	3,941	274	-
2b.1.6.12	AZI	-	41	1	2	8	1	-	12	66	66	-	-	322	21	-	-	-	14,133	526	-
2b.1.6	Totals	-	764	43	43	116	74	-	238	1,277	1,277	-	-	4,607	1,209	-	-	-	249,952	9,580	-
Miscellaneous System Components																					
2b.1.7.1	BAA	-	364	22	23	66	37	-	116	629	629	-	-	2,608	608	-	-	-	137,561	4,559	-
2b.1.7.2	BBA	-	123	8	11	51	8	-	43	245	245	-	-	2,039	138	-	-	-	89,984	1,559	-
2b.1.7.3	BDA	-	15	0	0	1	0	-	4	20	20	-	-	21	5	-	-	-	1,138	190	-
2b.1.7.4	CAA	-	860	32	52	244	32	-	270	1,490	1,490	-	-	9,683	543	-	-	-	420,268	10,904	-
2b.1.7.5	DAA	-	89	3	3	7	6	-	26	134	134	-	-	277	96	-	-	-	16,212	1,145	-
2b.1.7.6	DAC	-	213	6	7	28	8	-	61	322	322	-	-	1,094	130	-	-	-	51,191	2,672	-
2b.1.7.7	DGB	-	102	-	-	-	-	-	15	118	-	-	118	-	-	-	-	-	-	1,336	-
2b.1.7.8	DOT	-	18	-	-	-	-	-	3	20	-	-	20	-	-	-	-	-	-	223	-
2b.1.7.9	DPH	-	118	-	-	-	-	-	18	135	-	-	135	-	-	-	-	-	-	1,527	-
2b.1.7.10	DWF	-	27	-	-	-	-	-	4	32	-	-	32	-	-	-	-	-	-	360	-
2b.1.7.11	FWP	-	159	-	-	-	-	-	24	182	-	-	182	-	-	-	-	-	-	2,018	-
2b.1.7.12	INTAKE STRUCTURE	-	248	-	-	-	-	-	37	285	-	-	285	-	-	-	-	-	-	3,218	-
2b.1.7.13	MAA	-	175	13	13	26	27	-	57	310	310	-	-	1,013	436	-	-	-	63,784	2,194	-
2b.1.7.14	MBA	-	63	4	4	7	7	-	20	105	105	-	-	290	119	-	-	-	17,929	770	-
2b.1.7.15	MBS / MBT	-	46	1	1	2	2	-	13	65	65	-	-	71	35	-	-	-	4,738	578	-
2b.1.7.16	MS	-	50	-	-	-	-	-	8	58	-	-	58	-	-	-	-	-	-	676	-
2b.1.7.17	NMB ROOF	-	24	-	-	-	-	-	4	28	-	-	28	-	-	-	-	-	-	312	-
2b.1.7.18	OB	-	364	-	-	-	-	-	55	418	-	-	418	-	-	-	-	-	-	4,806	-
2b.1.7.19	PTB	-	53	-	-	-	-	-	8	61	-	-	61	-	-	-	-	-	-	688	-
2b.1.7.20	RSF ROOF	-	36	1	1	4	1	-	10	52	52	-	-	166	8	-	-	-	7,175	452	-
2b.1.7.21	UYARD	-	2,084	54	52	107	109	-	577	2,983	2,983	-	-	4,250	1,828	-	-	-	264,793	21,803	-
2b.1.7.22	WAA	-	205	10	10	22	19	-	62	327	327	-	-	878	306	-	-	-	51,564	2,493	-
2b.1.7.23	WHS	-	24	-	-	-	-	-	4	28	-	-	28	-	-	-	-	-	-	318	-
2b.1.7.24	YARD AREAS	-	438	-	-	-	-	-	66	503	-	-	503	-	-	-	-	-	-	5,688	-
2b.1.7.25	YDA / YFA / YLA	-	2	0	0	0	0	-	1	4	4	-	-	18	2	-	-	-	798	30	-
2b.1.7	Totals	-	5,901	153	176	564	256	-	1,503	8,554	6,685	-	1,869	22,409	4,252	-	-	-	1,127,133	70,519	-
2b.1.8	Scaffolding in support of decommissioning	-	1,586	37	9	37	10	-	409	2,088	2,088	-	-	1,321	155	-	-	-	67,523	22,731	-
Decontamination of Site Buildings																					
2b.1.9.1	New Radwaste Building - Systems Removal	0	73	14	156	0	244	-	104	592	592	-	-	6	4,408	-	-	-	382,187	581	-
2b.1.9.2	Old Radwaste Building - Systems Removal	0	5	2	17	0	26	-	11	60	60	-	-	6	468	-	-	-	40,787	55	-
2b.1.9.3	Turbine Building - Systems Removal	-	586	34	376	-	588	-	354	1,938	1,938	-	-	-	10,610	-	-	-	919,350	5,776	-
2b.1.9.4	Augmented Off Gas - Decon	50	320	4	45	1	71	-	130	621	621	-	-	45	1,276	-	-	-	112,342	4,273	-
2b.1.9.5	LLRW Storage - Decon	28	102	2	27	-	43	-	55	257	257	-	-	-	769	-	-	-	66,660	1,460	-
2b.1.9.6	Miscellaneous Buildings - Decon	28	135	2	27	-	42	-	62	297	297	-	-	-	757	-	-	-	65,556	1,857	-
2b.1.9.7	New Radwaste Building - Decon	129	1,215	16	175	6	272	-	465	2,278	2,278	-	-	235	4,905	-	-	-	434,136	15,450	-
2b.1.9.8	Old Radwaste Building - Decon	-	1,087	65	718	4	1,122	-	667	3,663	3,663	-	-	152	20,234	-	-	-	1,759,176	10,110	-
2b.1.9.9	Stack/Exhaust Tunnels - Remove & Decon	209	1,375	10	110	-	171	-	509	2,384	2,384	-	-	-	3,090	-	-	-	267,756	18,707	-
2b.1.9.10	Turbine Building 0ft - Decon	184	1,394	19	171	29	263	-	538	2,598	2,598	-	-	1,144	4,738	-	-	-	454,844	18,266	-
2b.1.9.11	Turbine Building 23ft - Decon	129	989	15	130	28	199	-	387	1,877	1,877	-	-	1,109	3,587	-	-	-	353,756	12,886	-
2b.1.9.12	Turbine Building 46ft - Decon	79	340	7	77	-	121	-	167	792	792	-	-	-	2,179	-	-	-	188,826	4,755	-
2b.1.9.13	New Radwaste Building - Contaminated	27	1,711	208	2,101	81	3,278	-	1,609	9,015	9,015	-	-	3,230	59,070	-	-	-	5,237,676	17,170	-
2b.1.9.14	Old Radwaste Building	-	2,747	505	5,591	1	8,745	-	3,762	21,351	21,351	-	-	37	157,695	-	-	-	13,665,710	27,256	-
2b.1.9.15	Drywell - Decon	6	1,019	66	529	-	1,288	-	665	3,573	3,573	-	-	-	27,446	-	-	-	1,375,328	10,327	-
2b.1.9.16	Drywell - Liner Removal	2,825	1,653	87	104	557	70	-	1,951	7,248	7,248	-	-	22,108	1,135	-	-	-	957,454	53,770	-
2b.1.9.17	RB0 - Torus Removal	3,787	1,895	129	155	825	104	-	2,553	9,448	9,448	-	-	32,774	1,683	-	-	-	1,419,396	68,003	-
2b.1.9.18	Reactor Building - Systems Removal	-	8	2	27	-	41	-	17	95	95	-	-	-	748	-	-	-	64,800	82	-
2b.1.9.19	Reactor Building -19ft - Decon	80	625	13	78	52	113	-	245	1,205	1,205	-	-	2,052	2,034	-	-	-	255,715	8,078	-
2b.1.9.20	Reactor Building 119ft - Decon	624	811	9	40	39	56	-	542	2,122	2,122	-	-	1,563	1,003	-	-	-	147,620	17,317	-
2b.1.9.21	Reactor Building 23ft - Decon	59	357	5	57	-	90	-	150	719	719	-	-	-	1,616	-	-	-	140,034	4,784	-
2b.1.9.22	Reactor Building 51ft - Decon	66	373	6	64	-	100	-	161	770	770	-	-	-	1,803	-	-	-	156,192	5,036	-

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Oyster Creek Nuclear Generating Station
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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			
Decontamination of Site Buildings (continued)																					
2b.1.9.23	Reactor Building 75ft - Decon	22	200	2	21	-	33	-	73	351	351	-	-	-	603	-	-	-	52,272	2,582	-
2b.1.9	Totals	8,333	19,021	1,222	10,796	1,623	17,082	-	15,177	73,254	73,254	-	-	64,463	311,856	-	-	-	28,517,570	308,582	-
2b.1	Subtotal Period 2b Activity Costs	8,548	33,650	1,967	11,534	3,582	18,384	-	19,532	97,197	95,051	-	2,146	142,115	333,207	-	-	-	32,780,460	493,879	-
Period 2b Additional Costs																					
2b.2.1	Remedial Action Surveys	-	-	-	-	-	-	3,542	1,063	4,605	4,605	-	-	-	-	-	-	-	-	54,215	-
2b.2.2	Excavation of Underground Services	-	5,224	-	-	-	-	1,463	1,525	8,212	8,212	-	-	-	-	-	-	-	-	28,000	-
2b.2.3	Contaminated Soil Removal	-	134	3	650	-	6,000	-	1,631	8,419	8,419	-	-	-	106,200	-	-	-	9,345,592	834	-
2b.2	Subtotal Period 2b Additional Costs	-	5,358	3	650	-	6,000	5,005	4,219	21,236	21,236	-	-	-	106,200	-	-	-	9,345,592	83,049	-
Period 2b Collateral Costs																					
2b.3.1	Process decommissioning water waste	173	-	135	213	-	375	-	226	1,121	1,121	-	-	-	1,140	-	-	-	68,394	222	-
2b.3.2	Process decommissioning chemical flush waste	0	-	2	6	-	12	-	4	24	24	-	-	-	20	-	-	-	2,118	4	-
2b.3.3	Small tool allowance	-	757	-	-	-	-	-	113	870	870	-	-	-	-	-	-	-	-	-	-
2b.3.4	Spent Fuel Capital and Transfer	-	-	-	-	-	-	46,032	6,905	52,937	-	52,937	-	-	-	-	-	-	-	-	-
2b.3	Subtotal Period 2b Collateral Costs	173	757	137	219	-	387	46,032	7,248	54,952	2,015	52,937	-	-	1,160	-	-	-	70,511	226	-
Period 2b Period-Dependent Costs																					
2b.4.1	Decon supplies	2,192	-	-	-	-	-	-	548	2,740	2,740	-	-	-	-	-	-	-	-	-	-
2b.4.2	Insurance	-	-	-	-	-	-	2,070	207	2,277	2,277	-	-	-	-	-	-	-	-	-	-
2b.4.3	Property taxes	-	-	-	-	-	-	2,641	264	2,905	2,905	-	-	-	-	-	-	-	-	-	-
2b.4.4	Health physics supplies	-	4,483	-	-	-	-	-	1,121	5,603	5,603	-	-	-	-	-	-	-	-	-	-
2b.4.5	Heavy equipment rental	-	7,599	-	-	-	-	-	1,140	8,739	8,739	-	-	-	-	-	-	-	-	-	-
2b.4.6	Disposal of DAW generated	-	-	208	40	-	478	-	146	872	872	-	-	-	8,442	-	-	-	168,839	275	-
2b.4.7	Plant energy budget	-	-	-	-	-	-	3,525	529	4,054	4,054	-	-	-	-	-	-	-	-	-	-
2b.4.8	NRC Fees	-	-	-	-	-	-	1,589	159	1,748	1,748	-	-	-	-	-	-	-	-	-	-
2b.4.9	Emergency Planning Fees	-	-	-	-	-	-	6,697	670	7,366	-	7,366	-	-	-	-	-	-	-	-	-
2b.4.10	Spent Fuel Pool O&M	-	-	-	-	-	-	2,089	313	2,402	-	2,402	-	-	-	-	-	-	-	-	-
2b.4.11	Liquid Radwaste Processing Equipment/Services	-	-	-	-	-	-	528	79	607	607	-	-	-	-	-	-	-	-	-	-
2b.4.12	ISFSI Operating Costs	-	-	-	-	-	-	262	39	301	-	301	-	-	-	-	-	-	-	-	-
2b.4.13	Independent Corporate Oversight Organization	-	-	-	-	-	-	65	10	75	75	-	-	-	-	-	-	-	-	-	-
2b.4.14	Security Staff Cost	-	-	-	-	-	-	44,155	6,623	50,778	50,778	-	-	-	-	-	-	-	-	-	701,760
2b.4.15	DOC Staff Cost	-	-	-	-	-	-	36,261	5,439	41,700	41,700	-	-	-	-	-	-	-	-	-	397,120
2b.4.16	Utility Staff Cost	-	-	-	-	-	-	65,812	9,872	75,684	75,684	-	-	-	-	-	-	-	-	-	737,120
2b.4	Subtotal Period 2b Period-Dependent Costs	2,192	12,082	208	40	-	478	165,693	27,159	207,852	197,783	10,069	-	-	8,442	-	-	-	168,839	275	1,836,000
2b.0	TOTAL PERIOD 2b COST	10,913	51,846	2,315	12,443	3,582	25,249	216,730	58,158	381,238	316,085	63,006	2,146	142,115	449,008	-	-	-	42,365,400	577,430	1,836,000
PERIOD 2d - Decontamination Following Wet Fuel Storage																					
Period 2d Direct Decommissioning Activities																					
2d.1.1	Remove spent fuel racks	858	90	174	262	-	848	-	720	2,953	2,953	-	-	-	13,844	-	-	-	718,790	1,229	-
Disposal of Plant Systems																					
Drywell System Components																					
2d.1.2.1	IAA/IAC	584	474	340	234	104	700	-	670	3,107	3,107	-	-	4,134	11,381	-	-	-	761,216	7,475	-
2d.1.2.2	IBA	141	234	32	25	11	76	-	156	675	675	-	-	438	1,237	-	-	-	82,076	4,004	-
2d.1.2.3	ICA	204	376	59	42	28	122	-	243	1,075	1,075	-	-	1,098	1,988	-	-	-	148,160	6,494	-
2d.1.2.4	IEA	-	99	20	17	13	47	-	43	237	237	-	-	498	764	-	-	-	59,892	1,357	-
2d.1.2.5	RC6	-	91	3	3	9	4	-	26	136	136	-	-	373	65	-	-	-	18,521	1,134	-
2d.1.2	Totals	928	1,275	454	321	165	949	-	1,138	5,230	5,230	-	-	6,541	15,434	-	-	-	1,069,865	20,465	-
Reactor Building System Components																					
2d.1.3.1	RB1	-	282	16	18	51	29	-	89	484	484	-	-	2,009	465	-	-	-	105,802	3,454	-
2d.1.3.2	RBB	-	147	9	9	27	14	-	47	253	253	-	-	1,062	234	-	-	-	55,304	1,829	-
2d.1.3.3	RBC	-	151	10	10	30	17	-	49	267	267	-	-	1,203	270	-	-	-	62,920	1,883	-
2d.1.3.4	RBE	-	198	11	10	28	17	-	61	325	325	-	-	1,094	277	-	-	-	58,895	2,476	-
2d.1.3.5	RBF	-	168	24	18	11	52	-	62	335	335	-	-	441	860	-	-	-	62,374	2,165	-
2d.1.3.6	RBO	-	743	54	70	244	89	-	261	1,461	1,461	-	-	9,702	1,458	-	-	-	469,695	9,947	-
2d.1.3.7	RBS	-	341	44	39	48	98	-	127	698	698	-	-	1,923	1,605	-	-	-	161,498	4,419	-
2d.1.3.8	RBSW	-	166	5	7	32	5	-	49	263	263	-	-	1,258	82	-	-	-	55,335	2,080	-
2d.1.3.9	RC1/RC3	-	6	0	0	0	0	-	2	8	8	-	-	14	1	-	-	-	584	73	-
2d.1.3.10	RC7	-	111	9	9	20	18	-	38	206	206	-	-	797	296	-	-	-	47,747	1,325	-
2d.1.3.11	RCA	-	66	5	4	2	12	-	21	110	110	-	-	77	188	-	-	-	12,935	830	-
2d.1.3.12	RCB	-	97	5	4	9	9	-	29	155	155	-	-	374	153	-	-	-	23,029	1,212	-

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															Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet			
Disposal of Plant Systems (continued)																					
2d.1.3.13	RCD	-	489	27	28	81	45	-	153	822	822	-	-	3,212	732	-	-	-	168,559	6,088	-
2d.1.3.14	RCG	-	95	10	10	19	22	-	35	191	191	-	-	761	358	-	-	-	49,508	1,208	-
2d.1.3.15	RCJ	-	103	5	5	12	9	-	31	164	164	-	-	468	143	-	-	-	26,449	1,282	-
2d.1.3.16	RCM	-	152	14	13	25	29	-	52	286	286	-	-	987	472	-	-	-	64,620	1,943	-
2d.1.3.17	RCN	-	336	20	17	38	35	-	103	550	550	-	-	1,510	574	-	-	-	91,274	4,179	-
2d.1.3.18	RCS	-	121	24	19	9	56	-	51	279	279	-	-	342	905	-	-	-	60,944	1,561	-
2d.1.3.19	RCT	-	79	5	4	8	9	-	24	129	129	-	-	306	152	-	-	-	20,333	978	-
2d.1.3.20	RD8	-	122	91	74	31	224	-	111	654	654	-	-	1,250	3,651	-	-	-	240,353	1,696	-
2d.1.3.21	RDM	-	66	3	2	5	5	-	19	100	100	-	-	186	79	-	-	-	11,700	807	-
2d.1.3.22	REC	-	301	13	14	40	23	-	90	481	481	-	-	1,571	367	-	-	-	82,927	3,683	-
2d.1.3.23	REF	-	140	33	25	11	74	-	62	344	344	-	-	422	1,206	-	-	-	79,904	1,782	-
2d.1.3.24	REH/REI	-	169	8	9	27	14	-	52	279	279	-	-	1,078	236	-	-	-	56,026	2,110	-
2d.1.3.25	REL	-	299	29	28	57	59	-	105	579	579	-	-	2,281	962	-	-	-	142,671	3,771	-
2d.1.3.26	REM	-	80	3	4	11	6	-	24	128	128	-	-	439	95	-	-	-	22,761	995	-
2d.1.3.27	REO	-	171	32	27	19	76	-	72	398	398	-	-	773	1,245	-	-	-	96,074	2,213	-
2d.1.3.28	REQ	-	236	24	18	19	49	-	79	426	426	-	-	774	797	-	-	-	72,946	2,997	-
2d.1.3.29	RER	35	80	7	5	2	16	-	43	190	190	-	-	94	265	-	-	-	17,606	1,351	-
2d.1.3.30	RET	22	60	2	2	4	3	-	28	121	121	-	-	147	56	-	-	-	8,855	1,062	-
2d.1.3.31	REW	-	40	1	1	3	1	-	11	56	56	-	-	129	16	-	-	-	6,111	498	-
2d.1.3.32	REX	-	44	1	1	4	1	-	12	62	62	-	-	147	17	-	-	-	6,894	550	-
2d.1.3.33	REY	-	50	2	2	3	5	-	15	76	76	-	-	107	81	-	-	-	8,539	619	-
2d.1.3.34	RFB	-	223	12	12	33	19	-	68	367	367	-	-	1,295	315	-	-	-	68,998	2,815	-
2d.1.3.35	RFC	49	149	18	11	5	33	-	74	338	338	-	-	185	537	-	-	-	35,575	2,417	-
2d.1.3.36	RFF	-	155	7	7	18	12	-	46	245	245	-	-	728	187	-	-	-	39,311	1,946	-
2d.1.3.37	RFH	-	211	38	26	10	79	-	82	445	445	-	-	386	1,285	-	-	-	82,650	2,676	-
2d.1.3.38	RFJ	-	185	34	25	10	77	-	74	405	405	-	-	386	1,253	-	-	-	80,865	2,346	-
2d.1.3.39	RFL	-	120	3	4	18	3	-	34	182	182	-	-	702	50	-	-	-	31,138	1,528	-
2d.1.3.40	RFN	-	161	7	7	24	10	-	48	258	258	-	-	942	170	-	-	-	47,139	2,024	-
2d.1.3.41	RFQ	-	233	6	6	20	10	-	65	340	340	-	-	777	157	-	-	-	39,758	2,843	-
2d.1.3.42	RGC	-	124	4	4	15	5	-	35	187	187	-	-	580	84	-	-	-	27,935	1,563	-
2d.1.3.43	RGD	-	351	49	45	65	109	-	136	754	754	-	-	2,567	1,777	-	-	-	196,537	4,505	-
2d.1.3.44	RGI	-	75	1	2	10	2	-	21	111	111	-	-	388	26	-	-	-	17,079	956	-
2d.1.3.45	RGL	-	87	3	4	12	5	-	26	137	137	-	-	474	79	-	-	-	23,343	1,106	-
2d.1.3.46	RGP	-	40	1	1	6	1	-	11	60	60	-	-	221	16	-	-	-	9,794	496	-
2d.1.3.47	RGR	-	265	12	12	32	21	-	79	421	421	-	-	1,278	340	-	-	-	69,573	3,299	-
2d.1.3.48	RGU	-	119	3	3	12	4	-	33	175	175	-	-	473	71	-	-	-	22,872	1,505	-
2d.1.3.49	RH1	-	70	2	2	7	3	-	20	105	105	-	-	280	56	-	-	-	14,296	877	-
2d.1.3.50	RH2	-	51	3	4	11	6	-	17	93	93	-	-	441	104	-	-	-	23,316	660	-
2d.1.3.51	RH3 / RH4 / RH6	-	176	6	5	11	9	-	49	256	256	-	-	444	145	-	-	-	25,625	2,169	-
2d.1.3.52	RHA	17	40	3	2	1	6	-	21	89	89	-	-	41	103	-	-	-	7,027	704	-
2d.1.3.53	RHJ	-	63	2	2	6	2	-	18	93	93	-	-	239	41	-	-	-	11,836	788	-
2d.1.3.54	RHL	-	41	1	1	2	2	-	11	58	58	-	-	92	28	-	-	-	5,206	498	-
2d.1.3.55	RHX	-	75	3	3	9	5	-	22	118	118	-	-	349	88	-	-	-	18,727	934	-
2d.1.3.56	RHY	-	68	2	2	9	2	-	19	102	102	-	-	343	26	-	-	-	15,273	863	-
2d.1.3.57	RMCC	-	121	7	7	19	13	-	38	205	205	-	-	771	208	-	-	-	42,155	1,477	-
2d.1.3	Totals	123	8,912	771	704	1,292	1,561	-	3,056	16,419	16,419	-	-	51,322	25,444	-	-	-	3,407,195	114,062	-
Miscellaneous System Components																					
2d.1.8.1	GAA / GCA	-	28	-	-	-	-	-	4	33	-	-	33	-	-	-	-	-	-	368	-
2d.1.8	Totals	-	28	-	-	-	-	-	4	33	-	-	33	-	-	-	-	-	-	368	-
Decontamination of Site Buildings																					
2d.1.9.1	Reactor Building 91ft - Decon	47	311	4	46	-	71	-	126	605	605	-	-	-	1,287	-	-	-	111,534	4,129	-
2d.1.9	Totals	47	311	4	46	-	71	-	126	605	605	-	-	-	1,287	-	-	-	111,534	4,129	-
2d.1.10	Scaffolding in support of decommissioning	-	317	7	2	7	2	-	82	418	418	-	-	264	31	-	-	-	13,505	4,546	-
2d.1	Subtotal Period 2d Activity Costs	1,956	10,934	1,410	1,334	1,464	3,432	-	5,127	25,657	25,624	-	33	58,127	56,040	-	-	-	5,320,888	144,799	-
Period 2d Additional Costs																					
2d.2.1	License Termination Survey Planning	-	-	-	-	-	-	1,987	596	2,583	2,583	-	-	-	-	-	-	-	-	-	12,480
2d.2.2	Remedial Action Surveys	-	-	-	-	-	-	1,339	402	1,741	1,741	-	-	-	-	-	-	-	-	20,502	-
2d.2.3	Operational tools & equipment	-	-	21	43	182	-	-	36	281	281	-	-	11,710	-	-	-	-	292,750	32	-
2d.2	Subtotal Period 2d Additional Costs	-	-	21	43	182	-	3,326	1,034	4,605	4,605	-	-	11,710	-	-	-	-	292,750	20,533	12,480

Table C
Oyster Creek Nuclear Generating Station
DECON Decommissioning Cost Estimate
(thousands of 2016 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 2d Collateral Costs																					
2d.3.1	Process decommissioning water waste	67	-	53	84	-	147	-	88	439	439	-	-	-	447	-	-	-	26,837	87	-
2d.3.2	Process decommissioning chemical flush waste	5	-	195	501	-	1,005	-	348	2,054	2,054	-	-	-	1,718	-	-	-	183,018	321	-
2d.3.3	Small tool allowance	-	215	-	-	-	-	-	32	248	248	-	-	-	-	-	-	-	-	-	-
2d.3.4	Decommissioning Equipment Disposition	-	-	168	48	167	43	-	60	487	487	-	-	6,000	705	-	-	-	306,624	88	-
2d.3	Subtotal Period 2d Collateral Costs	71	215	416	633	167	1,195	-	529	3,227	3,227	-	-	6,000	2,870	-	-	-	516,479	497	-
Period 2d Period-Dependent Costs																					
2d.4.1	Decon supplies	127	-	-	-	-	-	-	32	158	158	-	-	-	-	-	-	-	-	-	-
2d.4.2	Insurance	-	-	-	-	-	-	756	76	832	832	-	-	-	-	-	-	-	-	-	-
2d.4.3	Property taxes	-	-	-	-	-	-	986	99	1,084	1,084	-	-	-	-	-	-	-	-	-	-
2d.4.4	Health physics supplies	-	1,367	-	-	-	-	-	342	1,708	1,708	-	-	-	-	-	-	-	-	-	-
2d.4.5	Heavy equipment rental	-	2,874	-	-	-	-	-	431	3,305	3,305	-	-	-	-	-	-	-	-	-	-
2d.4.6	Disposal of DAW generated	-	-	75	14	-	172	-	52	313	313	-	-	-	3,030	-	-	-	60,602	99	-
2d.4.7	Plant energy budget	-	-	-	-	-	-	711	107	818	818	-	-	-	-	-	-	-	-	-	-
2d.4.8	NRC Fees	-	-	-	-	-	-	512	51	563	563	-	-	-	-	-	-	-	-	-	-
2d.4.9	Liquid Radwaste Processing Equipment/Services	-	-	-	-	-	-	399	60	459	459	-	-	-	-	-	-	-	-	-	-
2d.4.10	ISFSI Operating Costs	-	-	-	-	-	-	99	15	114	-	114	-	-	-	-	-	-	-	-	-
2d.4.11	Independent Corporate Oversight Organization	-	-	-	-	-	-	25	4	28	28	-	-	-	-	-	-	-	-	-	-
2d.4.12	Security Staff Cost	-	-	-	-	-	-	5,175	776	5,951	5,951	-	-	-	-	-	-	-	-	-	84,343
2d.4.13	DOC Staff Cost	-	-	-	-	-	-	9,474	1,421	10,895	10,895	-	-	-	-	-	-	-	-	-	102,857
2d.4.14	Utility Staff Cost	-	-	-	-	-	-	17,960	2,694	20,654	20,654	-	-	-	-	-	-	-	-	-	196,457
2d.4	Subtotal Period 2d Period-Dependent Costs	127	4,240	75	14	-	172	36,097	6,159	46,883	46,769	114	-	-	3,030	-	-	-	60,602	99	383,657
2d.0	TOTAL PERIOD 2d COST	2,154	15,389	1,922	2,024	1,813	4,798	39,423	12,848	80,373	80,226	114	33	75,837	61,941	-	-	-	6,190,719	165,928	396,137
PERIOD 2f - License Termination																					
Period 2f Direct Decommissioning Activities																					
2f.1.1	ORISE confirmatory survey	-	-	-	-	-	-	170	51	221	221	-	-	-	-	-	-	-	-	-	-
2f.1.2	Terminate license									a											
2f.1	Subtotal Period 2f Activity Costs	-	-	-	-	-	-	170	51	221	221	-	-	-	-	-	-	-	-	-	-
Period 2f Additional Costs																					
2f.2.1	License Termination Survey	-	-	-	-	-	-	9,824	2,947	12,772	12,772	-	-	-	-	-	-	-	-	118,801	6,240
2f.2	Subtotal Period 2f Additional Costs	-	-	-	-	-	-	9,824	2,947	12,772	12,772	-	-	-	-	-	-	-	-	118,801	6,240
Period 2f Collateral Costs																					
2f.3.1	DOC staff relocation expenses	-	-	-	-	-	-	1,308	196	1,504	1,504	-	-	-	-	-	-	-	-	-	-
2f.3	Subtotal Period 2f Collateral Costs	-	-	-	-	-	-	1,308	196	1,504	1,504	-	-	-	-	-	-	-	-	-	-
Period 2f Period-Dependent Costs																					
2f.4.1	Insurance	-	-	-	-	-	-	578	58	636	636	-	-	-	-	-	-	-	-	-	-
2f.4.2	Property taxes	-	-	-	-	-	-	753	75	828	828	-	-	-	-	-	-	-	-	-	-
2f.4.3	Health physics supplies	-	723	-	-	-	-	-	181	904	904	-	-	-	-	-	-	-	-	-	-
2f.4.4	Disposal of DAW generated	-	-	9	2	-	20	-	6	37	37	-	-	-	355	-	-	-	7,097	12	-
2f.4.5	Plant energy budget	-	-	-	-	-	-	272	41	312	312	-	-	-	-	-	-	-	-	-	-
2f.4.6	NRC Fees	-	-	-	-	-	-	443	44	488	488	-	-	-	-	-	-	-	-	-	-
2f.4.7	ISFSI Operating Costs	-	-	-	-	-	-	76	11	87	-	87	-	-	-	-	-	-	-	-	-
2f.4.8	Independent Corporate Oversight Organization	-	-	-	-	-	-	19	3	22	22	-	-	-	-	-	-	-	-	-	-
2f.4.9	Security Staff Cost	-	-	-	-	-	-	3,953	593	4,546	4,546	-	-	-	-	-	-	-	-	-	64,429
2f.4.10	DOC Staff Cost	-	-	-	-	-	-	5,456	818	6,274	6,274	-	-	-	-	-	-	-	-	-	57,357
2f.4.11	Utility Staff Cost	-	-	-	-	-	-	7,850	1,177	9,027	9,027	-	-	-	-	-	-	-	-	-	80,929
2f.4	Subtotal Period 2f Period-Dependent Costs	-	723	9	2	-	20	19,398	3,008	23,160	23,073	87	-	-	355	-	-	-	7,097	12	202,714
2f.0	TOTAL PERIOD 2f COST	-	723	9	2	-	20	30,700	6,202	37,656	37,569	87	-	-	355	-	-	-	7,097	118,812	208,954
PERIOD 2 TOTALS		14,861	101,815	23,085	21,288	10,817	45,006	405,551	123,672	746,096	647,692	95,945	2,458	417,070	578,876	954	729	-	61,837,730	1,136,938	3,443,748
PERIOD 3b - Site Restoration																					
Period 3b Direct Decommissioning Activities																					
Demolition of Remaining Site Buildings																					
3b.1.1.1	Stack/Exhaust Tunnels - Remove & Decon	-	1,165	-	-	-	-	-	175	1,340	-	-	1,340	-	-	-	-	-	-	1,762	-
3b.1.1.2	Administration Building	-	460	-	-	-	-	-	69	529	-	-	529	-	-	-	-	-	-	4,330	-
3b.1.1.3	Augmented Off Gas Building	-	172	-	-	-	-	-	26	198	-	-	198	-	-	-	-	-	-	956	-
3b.1.1.4	Chlorination Building	-	21	-	-	-	-	-	3	24	-	-	24	-	-	-	-	-	-	164	-

Table C
Oyster Creek Nuclear Generating Station
DECON Decommissioning Cost Estimate
(thousands of 2016 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			
Demolition of Remaining Site Buildings (continued)																					
3b.1.1.5	Diesel Generator Building	-	71	-	-	-	-	-	11	82	-	-	82	-	-	-	-	-	-	355	-
3b.1.1.6	Dilution Structure	-	119	-	-	-	-	-	18	137	-	-	137	-	-	-	-	-	-	742	-
3b.1.1.7	Domestic Water Facility	-	10	-	-	-	-	-	1	11	-	-	11	-	-	-	-	-	-	95	-
3b.1.1.8	FLEX Buildings	-	193	-	-	-	-	-	29	222	-	-	222	-	-	-	-	-	-	1,001	-
3b.1.1.9	Fire Pump House	-	3	-	-	-	-	-	1	4	-	-	4	-	-	-	-	-	-	33	-
3b.1.1.10	Fresh Water Pump House	-	18	-	-	-	-	-	3	21	-	-	21	-	-	-	-	-	-	165	-
3b.1.1.11	Heating Boiler House	-	34	-	-	-	-	-	5	40	-	-	40	-	-	-	-	-	-	305	-
3b.1.1.12	Intake Structure	-	393	-	-	-	-	-	59	452	-	-	452	-	-	-	-	-	-	2,392	-
3b.1.1.13	Low Level Radwaste Storage	-	198	-	-	-	-	-	30	228	-	-	228	-	-	-	-	-	-	878	-
3b.1.1.14	Machine Shop	-	147	-	-	-	-	-	22	169	-	-	169	-	-	-	-	-	-	1,118	-
3b.1.1.15	Main Gate Security	-	95	-	-	-	-	-	14	109	-	-	109	-	-	-	-	-	-	674	-
3b.1.1.16	Maintenance Building	-	254	-	-	-	-	-	38	292	-	-	292	-	-	-	-	-	-	2,276	-
3b.1.1.17	Materials Warehouse	-	879	-	-	-	-	-	132	1,011	-	-	1,011	-	-	-	-	-	-	6,242	-
3b.1.1.18	Miscellaneous Structures	-	487	-	-	-	-	-	73	560	-	-	560	-	-	-	-	-	-	3,099	-
3b.1.1.19	New Radwaste Building	-	240	-	-	-	-	-	36	276	-	-	276	-	-	-	-	-	-	1,687	-
3b.1.1.20	New Sample Pump House	-	8	-	-	-	-	-	1	9	-	-	9	-	-	-	-	-	-	75	-
3b.1.1.21	Office Building	-	161	-	-	-	-	-	24	185	-	-	185	-	-	-	-	-	-	733	-
3b.1.1.22	Plant Engineering	-	160	-	-	-	-	-	24	184	-	-	184	-	-	-	-	-	-	1,142	-
3b.1.1.23	Pretreatment Building	-	27	-	-	-	-	-	4	31	-	-	31	-	-	-	-	-	-	256	-
3b.1.1.24	Reactor Building	-	3,733	-	-	-	-	-	560	4,293	-	-	4,293	-	-	-	-	-	-	22,813	-
3b.1.1.25	Sample Pool	-	11	-	-	-	-	-	2	13	-	-	13	-	-	-	-	-	-	88	-
3b.1.1.26	Security Modifications	-	910	-	-	-	-	-	137	1,047	-	-	1,047	-	-	-	-	-	-	3,373	-
3b.1.1.27	Site Emergency Building	-	304	-	-	-	-	-	46	350	-	-	350	-	-	-	-	-	-	2,214	-
3b.1.1.28	Tank Pads & Misc. Yard	-	859	-	-	-	-	-	129	987	-	-	987	-	-	-	-	-	-	7,200	-
3b.1.1.29	Turbine Building	-	2,800	-	-	-	-	-	420	3,221	-	-	3,221	-	-	-	-	-	-	19,913	-
3b.1.1.30	Turbine Pedestal	-	277	-	-	-	-	-	42	319	-	-	319	-	-	-	-	-	-	1,243	-
3b.1.1	Totals	-	14,213	-	-	-	-	-	2,132	16,344	-	-	16,344	-	-	-	-	-	-	87,326	-
Site Closeout Activities																					
3b.1.2	Remove Rubble	-	825	-	-	-	-	-	124	949	-	-	949	-	-	-	-	-	-	3,517	-
3b.1.3	Grade & landscape site	-	590	-	-	-	-	-	88	678	-	-	678	-	-	-	-	-	-	1,304	-
3b.1.4	Final report to NRC	-	-	-	-	-	-	207	31	238	238	-	-	-	-	-	-	-	-	-	1,560
3b.1	Subtotal Period 3b Activity Costs	-	15,627	-	-	-	-	207	2,375	18,209	238	-	17,972	-	-	-	-	-	-	92,147	1,560
Period 3b Additional Costs																					
3b.2.1	Concrete Crushing	-	780	-	-	-	-	11	119	909	-	-	909	-	-	-	-	-	-	3,056	-
3b.2.2	Construction Debris	-	-	-	-	-	-	768	115	883	-	-	883	-	-	-	-	-	-	-	-
3b.2.3	Install Cofferdams - Intake & Dilution	-	1,125	-	-	-	-	-	169	1,294	-	-	1,294	-	-	-	-	-	-	8,591	-
3b.2	Subtotal Period 3b Additional Costs	-	1,905	-	-	-	-	779	403	3,087	-	-	3,087	-	-	-	-	-	-	11,647	-
Period 3b Collateral Costs																					
3b.3.1	Small tool allowance	-	156	-	-	-	-	-	23	180	-	-	180	-	-	-	-	-	-	-	-
3b.3	Subtotal Period 3b Collateral Costs	-	156	-	-	-	-	-	23	180	-	-	180	-	-	-	-	-	-	-	-
Period 3b Period-Dependent Costs																					
3b.4.1	Insurance	-	-	-	-	-	-	1,190	119	1,309	-	1,309	-	-	-	-	-	-	-	-	-
3b.4.2	Property taxes	-	-	-	-	-	-	1,552	155	1,708	-	1,708	-	-	-	-	-	-	-	-	-
3b.4.3	Heavy equipment rental	-	6,217	-	-	-	-	-	933	7,149	-	-	7,149	-	-	-	-	-	-	-	-
3b.4.4	Plant energy budget	-	-	-	-	-	-	280	42	322	-	-	322	-	-	-	-	-	-	-	-
3b.4.5	NRC ISFSI Fees	-	-	-	-	-	-	391	39	430	-	430	-	-	-	-	-	-	-	-	-
3b.4.6	ISFSI Operating Costs	-	-	-	-	-	-	156	23	179	-	179	-	-	-	-	-	-	-	-	-
3b.4.7	Independent Corporate Oversight Organization	-	-	-	-	-	-	39	6	45	45	-	-	-	-	-	-	-	-	-	-
3b.4.8	Security Staff Cost	-	-	-	-	-	-	8,150	1,223	9,373	-	7,217	2,156	-	-	-	-	-	-	-	132,840
3b.4.9	DOC Staff Cost	-	-	-	-	-	-	10,797	1,620	12,417	-	-	12,417	-	-	-	-	-	-	-	110,160
3b.4.10	Utility Staff Cost	-	-	-	-	-	-	8,272	1,241	9,513	0	2,283	7,230	-	-	-	-	-	-	-	88,290
3b.4	Subtotal Period 3b Period-Dependent Costs	-	6,217	-	-	-	-	30,827	5,400	42,444	45	13,125	29,274	-	-	-	-	-	-	-	331,290
3b.0	TOTAL PERIOD 3b COST	-	23,906	-	-	-	-	31,813	8,201	63,920	282	13,125	50,512	-	-	-	-	-	-	103,794	332,850
PERIOD 3c - Fuel Storage Operations/Shipping																					
Period 3c Collateral Costs																					
3c.3.1	Spent Fuel Capital and Transfer	-	-	-	-	-	-	10,400	1,560	11,960	-	11,960	-	-	-	-	-	-	-	-	-
3c.3	Subtotal Period 3c Collateral Costs	-	-	-	-	-	-	10,400	1,560	11,960	-	11,960	-	-	-	-	-	-	-	-	-

Table C
Oyster Creek Nuclear Generating Station
DECON Decommissioning Cost Estimate
(thousands of 2016 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 3c Period-Dependent Costs																					
3c.4.1	Insurance	-	-	-	-	-	-	5,502	550	6,052	-	6,052	-	-	-	-	-	-	-	-	-
3c.4.2	Property taxes	-	-	-	-	-	-	7,173	717	7,890	-	7,890	-	-	-	-	-	-	-	-	-
3c.4.4	NRC ISFSI Fees	-	-	-	-	-	-	2,561	256	2,817	-	2,817	-	-	-	-	-	-	-	-	-
3c.4.5	ISFSI Operating Costs	-	-	-	-	-	-	720	108	828	-	828	-	-	-	-	-	-	-	-	-
3c.4.6	Independent Corporate Oversight Organization	-	-	-	-	-	-	179	27	206	-	206	-	-	-	-	-	-	-	-	-
3c.4.7	Security Staff Cost	-	-	-	-	-	-	29,004	4,351	33,354	-	33,354	-	-	-	-	-	-	-	-	464,114
3c.4.8	Utility Staff Cost	-	-	-	-	-	-	9,173	1,376	10,549	-	10,549	-	-	-	-	-	-	-	-	101,057
3c.4	Subtotal Period 3c Period-Dependent Costs	-	-	-	-	-	-	54,312	7,385	61,697	-	61,697	-	-	-	-	-	-	-	-	565,171
3c.0	TOTAL PERIOD 3c COST	-	-	-	-	-	-	64,712	8,945	73,657	-	73,657	-	-	-	-	-	-	-	-	565,171
PERIOD 3d - GTCC shipping																					
Period 3d Direct Decommissioning Activities																					
Nuclear Steam Supply System Removal																					
3d.1.1.1	Vessel & Internals GTCC Disposal	-	-	500	-	-	5,019	-	878	6,397	6,397	-	-	-	-	-	-	1,547	308,304	-	-
3d.1.1	Totals	-	-	500	-	-	5,019	-	878	6,397	6,397	-	-	-	-	-	-	1,547	308,304	-	-
3d.1	Subtotal Period 3d Activity Costs	-	-	500	-	-	5,019	-	878	6,397	6,397	-	-	-	-	-	-	1,547	308,304	-	-
Period 3d Period-Dependent Costs																					
3d.4.1	Insurance	-	-	-	-	-	-	29	3	32	-	32	-	-	-	-	-	-	-	-	-
3d.4.2	Property taxes	-	-	-	-	-	-	38	4	42	-	42	-	-	-	-	-	-	-	-	-
3d.4.4	ISFSI Operating Costs	-	-	-	-	-	-	4	1	4	-	4	-	-	-	-	-	-	-	-	-
3d.4.5	Independent Corporate Oversight Organization	-	-	-	-	-	-	1	0	1	-	1	-	-	-	-	-	-	-	-	-
3d.4.6	Security Staff Cost	-	-	-	-	-	-	155	23	178	-	178	-	-	-	-	-	-	-	-	2,480
3d.4.7	Utility Staff Cost	-	-	-	-	-	-	49	7	56	-	56	-	-	-	-	-	-	-	-	540
3d.4	Subtotal Period 3d Period-Dependent Costs	-	-	-	-	-	-	277	38	315	-	315	-	-	-	-	-	-	-	-	3,020
3d.0	TOTAL PERIOD 3d COST	-	-	500	-	-	5,019	277	916	6,712	6,397	315	-	-	-	-	-	1,547	308,304	-	3,020
PERIOD 3e - ISFSI Decontamination																					
Period 3e Additional Costs																					
3e.2.1	License Termination ISFSI	-	40	4	372	-	1,043	1,893	838	4,190	4,190	-	-	-	10,970	-	-	-	1,590,770	10,102	1,872
3e.2	Subtotal Period 3e Additional Costs	-	40	4	372	-	1,043	1,893	838	4,190	4,190	-	-	-	10,970	-	-	-	1,590,770	10,102	1,872
Period 3e Period-Dependent Costs																					
3e.4.1	Insurance	-	-	-	-	-	-	75	19	94	94	-	-	-	-	-	-	-	-	-	-
3e.4.2	Property taxes	-	-	-	-	-	-	331	83	414	414	-	-	-	-	-	-	-	-	-	-
3e.4.3	Plant energy budget	-	-	-	-	-	-	60	15	75	75	-	-	-	-	-	-	-	-	-	-
3e.4.4	Security Staff Cost	-	-	-	-	-	-	317	79	396	396	-	-	-	-	-	-	-	-	-	5,013
3e.4.5	Utility Staff Cost	-	-	-	-	-	-	354	89	443	443	-	-	-	-	-	-	-	-	-	3,803
3e.4	Subtotal Period 3e Period-Dependent Costs	-	-	-	-	-	-	1,138	284	1,422	1,422	-	-	-	-	-	-	-	-	-	8,816
3e.0	TOTAL PERIOD 3e COST	-	40	4	372	-	1,043	3,031	1,122	5,612	5,612	-	-	-	10,970	-	-	-	1,590,770	10,102	10,688
PERIOD 3f - ISFSI Site Restoration																					
Period 3f Additional Costs																					
3f.2.1	Site Restoration ISFSI	-	1,396	-	-	-	-	128	229	1,753	-	-	1,753	-	-	-	-	-	-	6,508	160
3f.2	Subtotal Period 3f Additional Costs	-	1,396	-	-	-	-	128	229	1,753	-	-	1,753	-	-	-	-	-	-	6,508	160
Period 3f Collateral Costs																					
3f.3.1	Small tool allowance	-	10	-	-	-	-	-	1	11	-	-	11	-	-	-	-	-	-	-	-
3f.3	Subtotal Period 3f Collateral Costs	-	10	-	-	-	-	-	1	11	-	-	11	-	-	-	-	-	-	-	-
Period 3f Period-Dependent Costs																					
3f.4.2	Property taxes	-	-	-	-	-	-	167	17	184	-	-	184	-	-	-	-	-	-	-	-
3f.4.3	Heavy equipment rental	-	163	-	-	-	-	-	24	188	-	-	188	-	-	-	-	-	-	-	-
3f.4.4	Plant energy budget	-	-	-	-	-	-	30	5	35	-	-	35	-	-	-	-	-	-	-	-
3f.4.5	Security Staff Cost	-	-	-	-	-	-	160	24	184	-	-	184	-	-	-	-	-	-	-	2,527
3f.4.6	Utility Staff Cost	-	-	-	-	-	-	142	21	164	-	-	164	-	-	-	-	-	-	-	1,569
3f.4	Subtotal Period 3f Period-Dependent Costs	-	163	-	-	-	-	499	91	753	-	-	753	-	-	-	-	-	-	-	4,096
3f.0	TOTAL PERIOD 3f COST	-	1,568	-	-	-	-	627	321	2,517	-	-	2,517	-	-	-	-	-	-	6,508	4,256

Table C
Oyster Creek Nuclear Generating Station
DECON Decommissioning Cost Estimate
(thousands of 2016 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 3 TOTALS		-	25,514	504	372	-	6,062	100,459	19,505	152,417	12,292	87,097	53,029	-	10,970	-	-	1,547	1,899,074	120,404	915,985
TOTAL COST TO DECOMMISSION		**18,957**	**144,554**	**23,839**	**23,853**	**12,282**	**70,608**	**687,515**	**181,341**	**1,162,949**	**888,715**	**217,703**	**56,531**	**419,416**	**674,241**	**2,449**	**729**	**1,547**	**67,779,780**	**1,436,178**	**5,688,584**

TOTAL COST TO DECOMMISSION WITH 18.47% CONTINGENCY:	**$1,162,949**	**thousands of 2016 dollars**
TOTAL NRC LICENSE TERMINATION COST IS 76.42% OR:	**$888,715**	**thousands of 2016 dollars**
SPENT FUEL MANAGEMENT COST IS 18.72% OR:	**$217,703**	**thousands of 2016 dollars**
NON-NUCLEAR DEMOLITION COST IS 4.86% OR:	**$56,531**	**thousands of 2016 dollars**
TOTAL LOW-LEVEL RADIOACTIVE WASTE VOLUME BURIED (EXCLUDING GTCC):	**677,419**	**cubic feet**
TOTAL GREATER THAN CLASS C RADWASTE VOLUME GENERATED:	**1,547**	**cubic feet**
TOTAL SCRAP METAL REMOVED:	**23,537**	**tons**
TOTAL CRAFT LABOR REQUIREMENTS:	**1,436,178**	**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

APPENDIX D

DETAILED COST ANALYSIS

DELAYED DECON

Table D
Oyster Creek Nuclear Generating Station
Delayed DECON Decommissioning Cost Estimate
(thousands of 2016 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 Direct Decommissioning Activities																					
Period 0a Additional Costs																					
0a.2.1	Site Organization	-	-	-	-	-	-	4,095	614	4,709	4,709	-	-	-	-	-	-	-	-	-	37,440
0a.2.2	Corporate Resources	-	-	-	-	-	-	6,856	1,028	7,885	7,885	-	-	-	-	-	-	-	-	-	58,240
0a.2	Subtotal Period 0a Additional Costs	-	-	-	-	-	-	10,951	1,643	12,593	12,593	-	-	-	-	-	-	-	-	-	95,680
0a.0	TOTAL PERIOD 0a COST	-	-	-	-	-	-	10,951	1,643	12,593	12,593	-	-	-	-	-	-	-	-	-	95,680
PERIOD 1a - Shutdown through Transition																					
Period 1a Direct Decommissioning Activities																					
1a.1.1	SAFSTOR site characterization survey	-	-	-	-	-	-	494	148	642	642	-	-	-	-	-	-	-	-	-	-
1a.1.2	Prepare preliminary decommissioning cost	-	-	-	-	-	-	172	26	198	198	-	-	-	-	-	-	-	-	-	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	-	-	-	-	-	-	265	40	305	305	-	-	-	-	-	-	-	-	-	2,000
1a.1.8	Review plant dwgs & specs.	-	-	-	-	-	-	172	26	198	198	-	-	-	-	-	-	-	-	-	1,300
1a.1.9	Perform detailed rad survey									a											
1a.1.10	Estimate by-product inventory	-	-	-	-	-	-	133	20	152	152	-	-	-	-	-	-	-	-	-	1,000
1a.1.11	End product description	-	-	-	-	-	-	133	20	152	152	-	-	-	-	-	-	-	-	-	1,000
1a.1.12	Detailed by-product inventory	-	-	-	-	-	-	199	30	229	229	-	-	-	-	-	-	-	-	-	1,500
1a.1.13	Define major work sequence	-	-	-	-	-	-	133	20	152	152	-	-	-	-	-	-	-	-	-	1,000
1a.1.14	Perform SER and EA	-	-	-	-	-	-	411	62	473	473	-	-	-	-	-	-	-	-	-	3,100
1a.1.15	Perform Site-Specific Cost Study	-	-	-	-	-	-	663	99	762	762	-	-	-	-	-	-	-	-	-	5,000
Activity Specifications																					
1a.1.16.1	Prepare plant and facilities for SAFSTOR	-	-	-	-	-	-	652	98	750	750	-	-	-	-	-	-	-	-	-	4,920
1a.1.16.2	Plant systems	-	-	-	-	-	-	552	83	635	635	-	-	-	-	-	-	-	-	-	4,167
1a.1.16.3	Plant structures and buildings	-	-	-	-	-	-	414	62	476	476	-	-	-	-	-	-	-	-	-	3,120
1a.1.16.4	Waste management	-	-	-	-	-	-	265	40	305	305	-	-	-	-	-	-	-	-	-	2,000
1a.1.16.5	Facility and site dormancy	-	-	-	-	-	-	265	40	305	305	-	-	-	-	-	-	-	-	-	2,000
1a.1.16	Total	-	-	-	-	-	-	2,148	322	2,470	2,470	-	-	-	-	-	-	-	-	-	16,207
Detailed Work Procedures																					
1a.1.17.1	Plant systems	-	-	-	-	-	-	157	24	180	180	-	-	-	-	-	-	-	-	-	1,183
1a.1.17.2	Facility closeout & dormancy	-	-	-	-	-	-	159	24	183	183	-	-	-	-	-	-	-	-	-	1,200
1a.1.17	Total	-	-	-	-	-	-	316	47	363	363	-	-	-	-	-	-	-	-	-	2,383
1a.1.18	Procure vacuum drying system	-	-	-	-	-	-	13	2	15	15	-	-	-	-	-	-	-	-	-	100
1a.1.19	Drain/de-energize non-cont. systems									a											
1a.1.20	Drain & dry NSSS									a											
1a.1.21	Drain/de-energize contaminated systems									a											
1a.1.22	Decon/secure contaminated systems									a											
1a.1	Subtotal Period 1a Activity Costs	-	-	-	-	-	-	5,251	862	6,113	6,113	-	-	-	-	-	-	-	-	-	35,890
Period 1a Additional Costs																					
1a.2.1	Dredging	-	-	-	-	-	-	3,500	525	4,025	4,025	-	-	-	-	-	-	-	-	-	-
1a.2	Subtotal Period 1a Additional Costs	-	-	-	-	-	-	3,500	525	4,025	4,025	-	-	-	-	-	-	-	-	-	-
Period 1a Period-Dependent Costs																					
1a.4.1	Insurance	-	-	-	-	-	-	2,763	276	3,040	3,040	-	-	-	-	-	-	-	-	-	-
1a.4.2	Property taxes	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1a.4.3	Health physics supplies	-	563	-	-	-	-	-	141	704	704	-	-	-	-	-	-	-	-	-	-
1a.4.4	Heavy equipment rental	-	780	-	-	-	-	-	117	897	897	-	-	-	-	-	-	-	-	-	-
1a.4.5	Disposal of DAW generated	-	-	15	3	-	35	-	11	63	63	-	-	-	611	-	-	-	12,224	20	-
1a.4.6	Plant energy budget	-	-	-	-	-	-	1,807	271	2,078	2,078	-	-	-	-	-	-	-	-	-	-
1a.4.7	NRC Fees	-	-	-	-	-	-	1,145	115	1,260	1,260	-	-	-	-	-	-	-	-	-	-
1a.4.8	Emergency Planning Fees	-	-	-	-	-	-	3,245	324	3,569	-	3,569	-	-	-	-	-	-	-	-	-
1a.4.9	Spent Fuel Pool O&M	-	-	-	-	-	-	803	120	924	-	924	-	-	-	-	-	-	-	-	-
1a.4.10	ISFSI Operating Costs	-	-	-	-	-	-	101	15	116	-	116	-	-	-	-	-	-	-	-	-
1a.4.11	Independent Corporate Oversight Organization	-	-	-	-	-	-	25	4	29	29	-	-	-	-	-	-	-	-	-	-
1a.4.12	Security Staff Cost	-	-	-	-	-	-	16,976	2,546	19,522	19,522	-	-	-	-	-	-	-	-	-	269,794
1a.4.13	Utility Staff Cost	-	-	-	-	-	-	37,517	5,628	43,145	43,145	-	-	-	-	-	-	-	-	-	424,560

Table D
Oyster Creek Nuclear Generating Station
Delayed DECON Decommissioning Cost Estimate
(thousands of 2016 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.4	Subtotal Period 1a Period-Dependent Costs	-	1,344	15	3	-	35	64,382	9,568	75,347	70,738	4,609	-	-	611	-	-	-	12,224	20	694,354
1a.0	TOTAL PERIOD 1a COST	-	1,344	15	3	-	35	73,133	10,955	85,484	80,876	4,609	-	-	611	-	-	-	12,224	20	730,244
PERIOD 1b - SAFSTOR Limited DECON Activities																					
Period 1b Direct Decommissioning Activities																					
Decontamination of Site Buildings																					
1b.1.1.1	New Radwaste Building - Systems Removal	0	-	-	-	-	-	-	0	0	0	-	-	-	-	-	-	-	1	-	
1b.1.1.2	Old Radwaste Building - Systems Removal	0	-	-	-	-	-	-	0	0	0	-	-	-	-	-	-	-	1	-	
1b.1.1.3	Augmented Off Gas - Decon	3	-	-	-	-	-	-	1	4	4	-	-	-	-	-	-	-	33	-	
1b.1.1.4	Stack/Exhaust Tunnels - Remove & Decon	66	-	-	-	-	-	-	33	99	99	-	-	-	-	-	-	-	849	-	
1b.1.1.5	Turbine Building 0ft - Decon	12	-	-	-	-	-	-	6	18	18	-	-	-	-	-	-	-	137	-	
1b.1.1.6	New Radwaste Building - Contaminated	27	-	-	-	-	-	-	14	41	41	-	-	-	-	-	-	-	319	-	
1b.1.1.7	Drywell - Liner Removal	2,512	-	-	-	-	-	-	1,256	3,768	3,768	-	-	-	-	-	-	-	28,819	-	
1b.1.1.8	RB0 - Torus Removal	3,368	-	-	-	-	-	-	1,684	5,052	5,052	-	-	-	-	-	-	-	38,634	-	
1b.1.1.9	Reactor Building -19ft - Decon	8	-	-	-	-	-	-	4	13	13	-	-	-	-	-	-	-	96	-	
1b.1.1.10	Reactor Building 119ft - Decon	523	-	-	-	-	-	-	261	784	784	-	-	-	-	-	-	-	5,996	-	
1b.1.1	Totals	6,520	-	-	-	-	-	-	3,260	9,780	9,780	-	-	-	-	-	-	-	74,884	-	
1b.1	Subtotal Period 1b Activity Costs	6,520	-	-	-	-	-	-	3,260	9,780	9,780	-	-	-	-	-	-	-	74,884	-	
Period 1b Additional Costs																					
1b.2.1	Spent fuel pool isolation	-	-	-	-	-	-	11,358	1,704	13,062	13,062	-	-	-	-	-	-	-	-	-	-
1b.2	Subtotal Period 1b Additional Costs	-	-	-	-	-	-	11,358	1,704	13,062	13,062	-	-	-	-	-	-	-	-	-	-
Period 1b Collateral Costs																					
1b.3.1	Decon equipment	1,033	-	-	-	-	-	-	155	1,188	1,188	-	-	-	-	-	-	-	-	-	-
1b.3.2	Process decommissioning water waste	288	-	215	339	-	598	-	366	1,806	1,806	-	-	-	1,817	-	-	-	109,016	354	-
1b.3.4	Small tool allowance	-	125	-	-	-	-	-	19	144	144	-	-	-	-	-	-	-	-	-	-
1b.3	Subtotal Period 1b Collateral Costs	1,321	125	215	339	-	598	-	540	3,138	3,138	-	-	-	1,817	-	-	-	109,016	354	-
Period 1b Period-Dependent Costs																					
1b.4.1	Decon supplies	1,272	-	-	-	-	-	-	318	1,590	1,590	-	-	-	-	-	-	-	-	-	-
1b.4.2	Insurance	-	-	-	-	-	-	522	52	574	574	-	-	-	-	-	-	-	-	-	-
1b.4.3	Property taxes	-	-	-	-	-	-	493	49	542	542	-	-	-	-	-	-	-	-	-	-
1b.4.4	Health physics supplies	-	532	-	-	-	-	-	133	665	665	-	-	-	-	-	-	-	-	-	-
1b.4.5	Heavy equipment rental	-	194	-	-	-	-	-	29	223	223	-	-	-	-	-	-	-	-	-	-
1b.4.6	Disposal of DAW generated	-	-	4	1	-	10	-	3	17	17	-	-	-	168	-	-	-	3,367	5	-
1b.4.7	Plant energy budget	-	-	-	-	-	-	449	67	517	517	-	-	-	-	-	-	-	-	-	-
1b.4.8	NRC Fees	-	-	-	-	-	-	167	17	184	184	-	-	-	-	-	-	-	-	-	-
1b.4.9	Emergency Planning Fees	-	-	-	-	-	-	807	81	887	-	887	-	-	-	-	-	-	-	-	-
1b.4.10	Spent Fuel Pool O&M	-	-	-	-	-	-	200	30	230	-	230	-	-	-	-	-	-	-	-	-
1b.4.11	ISFSI Operating Costs	-	-	-	-	-	-	25	4	29	-	29	-	-	-	-	-	-	-	-	-
1b.4.12	Independent Corporate Oversight Organization	-	-	-	-	-	-	6	1	7	7	-	-	-	-	-	-	-	-	-	-
1b.4.13	Security Staff Cost	-	-	-	-	-	-	4,221	633	4,854	4,854	-	-	-	-	-	-	-	-	-	67,080
1b.4.14	Utility Staff Cost	-	-	-	-	-	-	9,328	1,399	10,727	10,727	-	-	-	-	-	-	-	-	-	105,560
1b.4	Subtotal Period 1b Period-Dependent Costs	1,272	726	4	1	-	10	16,217	2,816	21,046	19,900	1,146	-	-	168	-	-	-	3,367	5	172,640
1b.0	TOTAL PERIOD 1b COST	9,113	851	219	340	-	608	27,575	8,319	47,025	45,879	1,146	-	-	1,985	-	-	-	112,383	75,244	172,640
PERIOD 1c - Preparations for SAFSTOR Dormancy																					
Period 1c Direct Decommissioning Activities																					
1c.1.1	Prepare support equipment for storage	-	550	-	-	-	-	-	82	632	632	-	-	-	-	-	-	-	-	3,000	-
1c.1.2	Install containment pressure equal. lines	-	63	-	-	-	-	-	9	72	72	-	-	-	-	-	-	-	-	700	-
1c.1.3	Interim survey prior to dormancy	-	-	-	-	-	-	733	220	953	953	-	-	-	-	-	-	-	-	10,559	-
1c.1.4	Secure building accesses									a											
1c.1.5	Prepare & submit interim report	-	-	-	-	-	-	77	12	89	89	-	-	-	-	-	-	-	-	-	583
1c.1	Subtotal Period 1c Activity Costs	-	612	-	-	-	-	810	323	1,746	1,746	-	-	-	-	-	-	-	-	14,259	583
Period 1c Collateral Costs																					
1c.3.1	Process decommissioning water waste	237	-	178	280	-	495	-	302	1,492	1,492	-	-	-	1,502	-	-	-	90,106	293	-
1c.3.3	Small tool allowance	-	6	-	-	-	-	-	1	7	7	-	-	-	-	-	-	-	-	-	-
1c.3	Subtotal Period 1c Collateral Costs	237	6	178	280	-	495	-	303	1,500	1,500	-	-	-	1,502	-	-	-	90,106	293	-

Table D
Oyster Creek Nuclear Generating Station
Delayed DECON Decommissioning Cost Estimate
(thousands of 2016 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 Class A Cu. Feet	Burial Volumes Class B Cu. Feet	Burial Volumes Class C Cu. Feet	Burial Volumes GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
Period 1c Period-Dependent Costs																					
1c.4.1	Insurance	-	-	-	-	-	-	522	52	574	574	-	-	-	-	-	-	-	-	-	-
1c.4.2	Property taxes	-	-	-	-	-	-	493	49	542	542	-	-	-	-	-	-	-	-	-	-
1c.4.3	Health physics supplies	-	216	-	-	-	-	-	54	270	270	-	-	-	-	-	-	-	-	-	-
1c.4.4	Heavy equipment rental	-	194	-	-	-	-	-	29	223	223	-	-	-	-	-	-	-	-	-	-
1c.4.5	Disposal of DAW generated	-	-	4	1	-	9	-	3	16	16	-	-	-	152	-	-	-	3,039	5	-
1c.4.6	Plant energy budget	-	-	-	-	-	-	449	67	517	517	-	-	-	-	-	-	-	-	-	-
1c.4.7	NRC Fees	-	-	-	-	-	-	167	17	184	184	-	-	-	-	-	-	-	-	-	-
1c.4.8	Emergency Planning Fees	-	-	-	-	-	-	807	81	887	-	887	-	-	-	-	-	-	-	-	-
1c.4.9	Spent Fuel Pool O&M	-	-	-	-	-	-	200	30	230	-	230	-	-	-	-	-	-	-	-	-
1c.4.10	ISFSI Operating Costs	-	-	-	-	-	-	25	4	29	-	29	-	-	-	-	-	-	-	-	-
1c.4.11	Independent Corporate Oversight Organization	-	-	-	-	-	-	6	1	7	7	-	-	-	-	-	-	-	-	-	-
1c.4.12	Security Staff Cost	-	-	-	-	-	-	4,221	633	4,854	4,854	-	-	-	-	-	-	-	-	-	67,080
1c.4.13	Utility Staff Cost	-	-	-	-	-	-	9,328	1,399	10,727	10,727	-	-	-	-	-	-	-	-	-	105,560
1c.4	Subtotal Period 1c Period-Dependent Costs	-	410	4	1	-	9	16,217	2,419	19,059	17,913	1,146	-	-	152	-	-	-	3,039	5	172,640
1c.0	TOTAL PERIOD 1c COST	237	1,029	181	281	-	503	17,028	3,045	22,305	21,159	1,146	-	-	1,654	-	-	-	93,146	14,557	173,223
PERIOD 1 TOTALS		9,350	3,223	416	624	-	1,146	117,736	22,320	154,815	147,914	6,900	-	-	4,250	-	-	-	217,752	89,821	1,076,108
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	-	-	-	-	-	-	716	107	824	824	-	-	-	-	-	-	-	-	-	-
2a.1.5	Maintenance supplies	-	-	-	-	-	-	1,925	481	2,406	2,406	-	-	-	-	-	-	-	-	-	-
2a.1	Subtotal Period 2a Activity Costs	-	-	-	-	-	-	2,641	589	3,230	3,230	-	-	-	-	-	-	-	-	-	-
Period 2a Collateral Costs																					
2a.3.1	Spent Fuel Capital and Transfer	-	-	-	-	-	-	13,970	2,096	16,066	-	16,066	-	-	-	-	-	-	-	-	-
2a.3	Subtotal Period 2a Collateral Costs	-	-	-	-	-	-	13,970	2,096	16,066	-	16,066	-	-	-	-	-	-	-	-	-
Period 2a Period-Dependent Costs																					
2a.4.1	Insurance	-	-	-	-	-	-	11,869	1,187	13,056	11,599	1,457	-	-	-	-	-	-	-	-	-
2a.4.2	Property taxes	-	-	-	-	-	-	14,563	1,456	16,020	16,020	-	-	-	-	-	-	-	-	-	-
2a.4.3	Health physics supplies	-	3,101	-	-	-	-	-	775	3,876	3,876	-	-	-	-	-	-	-	-	-	-
2a.4.4	Disposal of DAW generated	-	-	78	15	-	179	-	55	327	327	-	-	-	3,166	-	-	-	63,312	103	-
2a.4.5	Plant energy budget	-	-	-	-	-	-	4,959	744	5,703	2,851	2,851	-	-	-	-	-	-	-	-	-
2a.4.6	NRC Fees	-	-	-	-	-	-	3,932	393	4,325	4,325	-	-	-	-	-	-	-	-	-	-
2a.4.7	Emergency Planning Fees	-	-	-	-	-	-	35,326	3,533	38,858	-	38,858	-	-	-	-	-	-	-	-	-
2a.4.8	Spent Fuel Pool O&M	-	-	-	-	-	-	11,019	1,653	12,672	-	12,672	-	-	-	-	-	-	-	-	-
2a.4.9	ISFSI Operating Costs	-	-	-	-	-	-	1,380	207	1,587	-	1,587	-	-	-	-	-	-	-	-	-
2a.4.10	Independent Corporate Oversight Organization	-	-	-	-	-	-	344	52	395	-	395	-	-	-	-	-	-	-	-	-
2a.4.11	Security Staff Cost	-	-	-	-	-	-	175,138	26,271	201,409	33,375	168,034	-	-	-	-	-	-	-	-	2,737,707
2a.4.12	Utility Staff Cost	-	-	-	-	-	-	99,250	14,887	114,137	25,429	88,709	-	-	-	-	-	-	-	-	1,133,537
2a.4	Subtotal Period 2a Period-Dependent Costs	-	3,101	78	15	-	179	357,780	51,213	412,365	97,801	314,564	-	-	3,166	-	-	-	63,312	103	3,871,245
2a.0	TOTAL PERIOD 2a COST	-	3,101	78	15	-	179	374,391	53,897	431,661	101,031	330,629	-	-	3,166	-	-	-	63,312	103	3,871,245
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	-	-	-	-	-	-	39	6	45	45	-	-	-	-	-	-	-	-	-	-
2b.1.5	Maintenance supplies	-	-	-	-	-	-	105	26	131	131	-	-	-	-	-	-	-	-	-	-
2b.1	Subtotal Period 2b Activity Costs	-	-	-	-	-	-	144	32	176	176	-	-	-	-	-	-	-	-	-	-
Period 2b Collateral Costs																					
2b.3.1	Spent Fuel Capital and Transfer	-	-	-	-	-	-	3,870	581	4,451	-	4,451	-	-	-	-	-	-	-	-	-
2b.3	Subtotal Period 2b Collateral Costs	-	-	-	-	-	-	3,870	581	4,451	-	4,451	-	-	-	-	-	-	-	-	-
Period 2b Period-Dependent Costs																					
2b.4.1	Insurance	-	-	-	-	-	-	575	58	633	633	-	-	-	-	-	-	-	-	-	-
2b.4.2	Property taxes	-	-	-	-	-	-	750	75	825	825	-	-	-	-	-	-	-	-	-	-
2b.4.3	Health physics supplies	-	82	-	-	-	-	-	21	103	103	-	-	-	-	-	-	-	-	-	-

Table D
Oyster Creek Nuclear Generating Station
Delayed DECON Decommissioning Cost Estimate
(thousands of 2016 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	-	-	2	0	-	5	-	1	9	9	-	-	-	83	-	-	-	1,659	3	-
2b.4.5	Plant energy budget	-	-	-	-	-	-	135	20	156	156	-	-	-	-	-	-	-	-	-	-
2b.4.6	NRC Fees	-	-	-	-	-	-	205	20	225	225	-	-	-	-	-	-	-	-	-	-
2b.4.7	ISFSI Operating Costs	-	-	-	-	-	-	75	11	87	-	87	-	-	-	-	-	-	-	-	-
2b.4.8	Independent Corporate Oversight Organization	-	-	-	-	-	-	19	3	22	-	22	-	-	-	-	-	-	-	-	-
2b.4.9	Security Staff Cost	-	-	-	-	-	-	3,939	591	4,529	1,821	2,709	-	-	-	-	-	-	-	-	64,194
2b.4.10	Utility Staff Cost	-	-	-	-	-	-	2,198	330	2,527	1,387	1,140	-	-	-	-	-	-	-	-	25,051
2b.4	Subtotal Period 2b Period-Dependent Costs	-	82	2	0	-	5	7,896	1,130	9,115	5,158	3,957	-	-	83	-	-	-	1,659	3	89,246
2b.0	TOTAL PERIOD 2b COST	-	82	2	0	-	5	11,910	1,742	13,742	5,335	8,407	-	-	83	-	-	-	1,659	3	89,246
PERIOD 2 TOTALS		-	3,183	80	15	-	184	386,301	55,639	445,402	106,366	339,037	-	-	3,249	-	-	-	64,972	106	3,960,490
PERIOD 3a - Reactivate Site Following SAFSTOR Dormancy																					
Period 3a Direct Decommissioning Activities																					
3a.1.1	Prepare preliminary decommissioning cost	-	-	-	-	-	-	172	26	198	198	-	-	-	-	-	-	-	-	-	1,300
3a.1.2	Review plant dwgs & specs.	-	-	-	-	-	-	610	91	701	701	-	-	-	-	-	-	-	-	-	4,600
3a.1.3	Perform detailed rad survey									a											
3a.1.4	End product description	-	-	-	-	-	-	133	20	152	152	-	-	-	-	-	-	-	-	-	1,000
3a.1.5	Detailed by-product inventory	-	-	-	-	-	-	172	26	198	198	-	-	-	-	-	-	-	-	-	1,300
3a.1.6	Define major work sequence	-	-	-	-	-	-	994	149	1,143	1,143	-	-	-	-	-	-	-	-	-	7,500
3a.1.7	Perform SER and EA	-	-	-	-	-	-	411	62	473	473	-	-	-	-	-	-	-	-	-	3,100
3a.1.8	Perform Site-Specific Cost Study	-	-	-	-	-	-	663	99	762	762	-	-	-	-	-	-	-	-	-	5,000
3a.1.9	Prepare/submit License Termination Plan	-	-	-	-	-	-	543	81	624	624	-	-	-	-	-	-	-	-	-	4,096
3a.1.10	Receive NRC approval of termination plan									a											
Activity Specifications																					
3a.1.11.1	Re-activate plant & temporary facilities	-	-	-	-	-	-	977	147	1,123	1,011	-	112	-	-	-	-	-	-	-	7,370
3a.1.11.2	Plant systems	-	-	-	-	-	-	552	83	635	572	-	64	-	-	-	-	-	-	-	4,167
3a.1.11.3	Reactor internals	-	-	-	-	-	-	941	141	1,082	1,082	-	-	-	-	-	-	-	-	-	7,100
3a.1.11.4	Reactor vessel	-	-	-	-	-	-	862	129	991	991	-	-	-	-	-	-	-	-	-	6,500
3a.1.11.5	Sacrificial shield	-	-	-	-	-	-	66	10	76	76	-	-	-	-	-	-	-	-	-	500
3a.1.11.6	Moisture separators/reheaters	-	-	-	-	-	-	133	20	152	152	-	-	-	-	-	-	-	-	-	1,000
3a.1.11.7	Reinforced concrete	-	-	-	-	-	-	212	32	244	122	-	122	-	-	-	-	-	-	-	1,600
3a.1.11.8	Main Turbine	-	-	-	-	-	-	277	42	318	318	-	-	-	-	-	-	-	-	-	2,088
3a.1.11.9	Main Condensers	-	-	-	-	-	-	277	42	318	318	-	-	-	-	-	-	-	-	-	2,088
3a.1.11.10	Pressure suppression structure	-	-	-	-	-	-	265	40	305	305	-	-	-	-	-	-	-	-	-	2,000
3a.1.11.11	Drywell	-	-	-	-	-	-	212	32	244	244	-	-	-	-	-	-	-	-	-	1,600
3a.1.11.12	Plant structures & buildings	-	-	-	-	-	-	414	62	476	238	-	238	-	-	-	-	-	-	-	3,120
3a.1.11.13	Waste management	-	-	-	-	-	-	610	91	701	701	-	-	-	-	-	-	-	-	-	4,600
3a.1.11.14	Facility & site closeout	-	-	-	-	-	-	119	18	137	69	-	69	-	-	-	-	-	-	-	900
3a.1.11	Total	-	-	-	-	-	-	5,916	887	6,803	6,199	-	604	-	-	-	-	-	-	-	44,633
Planning & Site Preparations																					
3a.1.12	Prepare dismantling sequence	-	-	-	-	-	-	318	48	366	366	-	-	-	-	-	-	-	-	-	2,400
3a.1.13	Plant prep. & temp. svces	-	-	-	-	-	-	3,200	480	3,680	3,680	-	-	-	-	-	-	-	-	-	-
3a.1.14	Design water clean-up system	-	-	-	-	-	-	186	28	213	213	-	-	-	-	-	-	-	-	-	1,400
3a.1.15	Rigging/Cont. Cntrl Envlps/tooling/etc.	-	-	-	-	-	-	2,300	345	2,645	2,645	-	-	-	-	-	-	-	-	-	-
3a.1.16	Procure casks/liners & containers	-	-	-	-	-	-	163	24	187	187	-	-	-	-	-	-	-	-	-	1,230
3a.1	Subtotal Period 3a Activity Costs	-	-	-	-	-	-	15,780	2,367	18,147	17,543	-	604	-	-	-	-	-	-	-	77,559
Period 3a Period-Dependent Costs																					
3a.4.1	Insurance	-	-	-	-	-	-	766	77	843	843	-	-	-	-	-	-	-	-	-	-
3a.4.2	Property taxes	-	-	-	-	-	-	999	100	1,099	1,099	-	-	-	-	-	-	-	-	-	-
3a.4.3	Health physics supplies	-	491	-	-	-	-	-	123	614	614	-	-	-	-	-	-	-	-	-	-
3a.4.4	Heavy equipment rental	-	778	-	-	-	-	-	117	895	895	-	-	-	-	-	-	-	-	-	-
3a.4.5	Disposal of DAW generated	-	-	13	2	-	29	-	9	53	53	-	-	-	514	-	-	-	10,287	17	-
3a.4.6	Plant energy budget	-	-	-	-	-	-	1,802	270	2,072	2,072	-	-	-	-	-	-	-	-	-	-
3a.4.7	NRC Fees	-	-	-	-	-	-	371	37	408	408	-	-	-	-	-	-	-	-	-	-
3a.4.8	Independent Corporate Oversight Organization	-	-	-	-	-	-	25	4	29	29	-	-	-	-	-	-	-	-	-	-
3a.4.9	Security Staff Cost	-	-	-	-	-	-	4,068	610	4,678	4,678	-	-	-	-	-	-	-	-	-	65,179
3a.4.10	Utility Staff Cost	-	-	-	-	-	-	22,976	3,446	26,422	26,422	-	-	-	-	-	-	-	-	-	258,629
3a.4	Subtotal Period 3a Period-Dependent Costs	-	1,269	13	2	-	29	31,007	4,793	37,113	37,113	-	-	-	514	-	-	-	10,287	17	323,807
3a.0	TOTAL PERIOD 3a COST	-	1,269	13	2	-	29	46,788	7,160	55,261	54,657	-	604	-	514	-	-	-	10,287	17	401,366

Table D
Oyster Creek Nuclear Generating Station
Delayed DECON Decommissioning Cost Estimate
(thousands of 2016 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 Class A Cu. Feet	Burial Volumes Class B Cu. Feet	Burial Volumes Class C Cu. Feet	Burial Volumes GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
PERIOD 3b - Decommissioning Preparations																					
Period 3b Direct Decommissioning Activities																					
Detailed Work Procedures																					
3b.1.1.1	Plant systems	-	-	-	-	-	-	627	94	721	649	-	72	-	-	-	-	-	-	-	4,733
3b.1.1.2	Reactor internals	-	-	-	-	-	-	530	80	610	610	-	-	-	-	-	-	-	-	-	4,000
3b.1.1.3	Remaining buildings	-	-	-	-	-	-	179	27	206	51	-	154	-	-	-	-	-	-	-	1,350
3b.1.1.4	CRD housings & NIs	-	-	-	-	-	-	133	20	152	152	-	-	-	-	-	-	-	-	-	1,000
3b.1.1.5	Incore instrumentation	-	-	-	-	-	-	133	20	152	152	-	-	-	-	-	-	-	-	-	1,000
3b.1.1.6	Removal primary containment	-	-	-	-	-	-	265	40	305	305	-	-	-	-	-	-	-	-	-	2,000
3b.1.1.7	Reactor vessel	-	-	-	-	-	-	481	72	553	553	-	-	-	-	-	-	-	-	-	3,630
3b.1.1.8	Facility closeout	-	-	-	-	-	-	159	24	183	91	-	91	-	-	-	-	-	-	-	1,200
3b.1.1.9	Sacrificial shield	-	-	-	-	-	-	159	24	183	183	-	-	-	-	-	-	-	-	-	1,200
3b.1.1.10	Reinforced concrete	-	-	-	-	-	-	133	20	152	76	-	76	-	-	-	-	-	-	-	1,000
3b.1.1.11	Main Turbine	-	-	-	-	-	-	276	41	317	317	-	-	-	-	-	-	-	-	-	2,080
3b.1.1.12	Main Condensers	-	-	-	-	-	-	277	42	318	318	-	-	-	-	-	-	-	-	-	2,088
3b.1.1.13	Moisture separators & reheaters	-	-	-	-	-	-	265	40	305	305	-	-	-	-	-	-	-	-	-	2,000
3b.1.1.14	Radwaste building	-	-	-	-	-	-	362	54	416	375	-	42	-	-	-	-	-	-	-	2,730
3b.1.1.15	Reactor building	-	-	-	-	-	-	362	54	416	375	-	42	-	-	-	-	-	-	-	2,730
3b.1.1	Total	-	-	-	-	-	-	4,340	651	4,991	4,513	-	477	-	-	-	-	-	-	-	32,741
3b.1	Subtotal Period 3b Activity Costs	-	-	-	-	-	-	4,340	651	4,991	4,513	-	477	-	-	-	-	-	-	-	32,741
Period 3b Additional Costs																					
3b.2.1	Site Characterization	-	-	-	-	-	-	5,626	1,688	7,314	7,314	-	-	-	-	-	-	-	-	27,140	9,952
3b.2	Subtotal Period 3b Additional Costs	-	-	-	-	-	-	5,626	1,688	7,314	7,314	-	-	-	-	-	-	-	-	27,140	9,952
Period 3b Collateral Costs																					
3b.3.1	Decon equipment	1,033	-	-	-	-	-	-	155	1,188	1,188	-	-	-	-	-	-	-	-	-	-
3b.3.2	DOC staff relocation expenses	-	-	-	-	-	-	1,308	196	1,504	1,504	-	-	-	-	-	-	-	-	-	-
3b.3.3	Pipe cutting equipment	-	1,200	-	-	-	-	-	180	1,380	1,380	-	-	-	-	-	-	-	-	-	-
3b.3	Subtotal Period 3b Collateral Costs	1,033	1,200	-	-	-	-	1,308	531	4,072	4,072	-	-	-	-	-	-	-	-	-	-
Period 3b Period-Dependent Costs																					
3b.4.1	Decon supplies	32	-	-	-	-	-	-	8	40	40	-	-	-	-	-	-	-	-	-	-
3b.4.2	Insurance	-	-	-	-	-	-	384	38	423	423	-	-	-	-	-	-	-	-	-	-
3b.4.3	Property taxes	-	-	-	-	-	-	501	50	551	551	-	-	-	-	-	-	-	-	-	-
3b.4.4	Health physics supplies	-	271	-	-	-	-	-	68	339	339	-	-	-	-	-	-	-	-	-	-
3b.4.5	Heavy equipment rental	-	390	-	-	-	-	-	59	449	449	-	-	-	-	-	-	-	-	-	-
3b.4.6	Disposal of DAW generated	-	-	7	1	-	17	-	5	30	30	-	-	-	292	-	-	-	5,834	10	-
3b.4.7	Plant energy budget	-	-	-	-	-	-	903	136	1,039	1,039	-	-	-	-	-	-	-	-	-	-
3b.4.8	NRC Fees	-	-	-	-	-	-	186	19	205	205	-	-	-	-	-	-	-	-	-	-
3b.4.9	Independent Corporate Oversight Organization	-	-	-	-	-	-	13	2	14	14	-	-	-	-	-	-	-	-	-	-
3b.4.10	Security Staff Cost	-	-	-	-	-	-	2,040	306	2,345	2,345	-	-	-	-	-	-	-	-	-	32,679
3b.4.11	DOC Staff Cost	-	-	-	-	-	-	5,354	803	6,157	6,157	-	-	-	-	-	-	-	-	-	58,560
3b.4.12	Utility Staff Cost	-	-	-	-	-	-	11,519	1,728	13,247	13,247	-	-	-	-	-	-	-	-	-	129,669
3b.4	Subtotal Period 3b Period-Dependent Costs	32	662	7	1	-	17	20,900	3,221	24,839	24,839	-	-	-	292	-	-	-	5,834	10	220,907
3b.0	TOTAL PERIOD 3b COST	1,065	1,862	7	1	-	17	32,174	6,091	41,216	40,739	-	477	-	292	-	-	-	5,834	27,150	263,600
PERIOD 3 TOTALS		1,065	3,131	20	4	-	46	78,961	13,250	96,477	95,395	-	1,082	-	806	-	-	-	16,121	27,166	664,966
PERIOD 4a - Large Component Removal																					
Period 4a Direct Decommissioning Activities																					
Nuclear Steam Supply System Removal																					
4a.1.1.2	Recirculation Pumps & Motors	13	134	47	134	11	210	-	119	669	669	-	-	107	1,053	-	-	-	196,350	2,156	-
4a.1.1.3	CRDMs & NIs Removal	49	1,139	537	139	-	293	-	457	2,613	2,613	-	-	-	5,179	-	-	-	248,300	15,254	-
4a.1.1.4	Reactor Vessel Internals	143	5,317	8,098	1,321	-	9,592	314	11,257	36,041	36,041	-	-	-	1,252	1,420	350	-	287,483	27,115	1,243
4a.1.1.5	Vessel & Internals GTCC Disposal	-	-	-	-	-	5,019	-	753	5,772	5,772	-	-	-	-	-	-	1,547	308,304	-	-
4a.1.1.6	Reactor Vessel	128	8,072	2,343	1,985	-	2,536	314	8,515	23,893	23,893	-	-	-	16,414	-	-	-	1,684,136	27,115	1,243
4a.1.1	Totals	332	14,662	11,024	3,580	11	17,650	627	21,101	68,988	68,988	-	-	107	23,898	1,420	350	1,547	2,724,574	71,640	2,486
Removal of Major Equipment																					
4a.1.2	Main Turbine/Generator	-	404	1,989	387	2,252	-	-	696	5,728	5,728	-	-	80,711	-	-	-	-	3,632,000	4,957	-
4a.1.3	Main Condensers	-	1,242	1,380	269	1,562	-	-	723	5,177	5,177	-	-	56,000	-	-	-	-	2,520,000	15,180	-

Table D
Oyster Creek Nuclear Generating Station
Delayed DECON Decommissioning Cost Estimate
(thousands of 2016 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																					
New Radwaste Building System Components																					
4a.1.7.1	7EB	-	201	11	9	9	23	-	60	312	312	-	-	362	371	-	-	-	34,040	2,494	-
4a.1.7.2	N2G	-	14	0	0	1	-	-	4	19	19	-	-	49	-	-	-	-	2,007	178	-
4a.1.7.3	N2P	-	30	1	1	9	-	-	9	50	50	-	-	341	-	-	-	-	13,830	357	-
4a.1.7.4	N3A	-	83	1	2	10	-	-	23	119	119	-	-	398	-	-	-	-	16,151	1,000	-
4a.1.7.5	N3D	-	100	1	2	13	-	-	27	143	143	-	-	501	-	-	-	-	20,362	1,263	-
4a.1.7.6	N3I	-	21	0	0	1	0	-	6	28	28	-	-	27	6	-	-	-	1,396	273	-
4a.1.7.7	N3N	-	125	1	2	11	-	-	33	172	172	-	-	447	-	-	-	-	18,140	1,529	-
4a.1.7.8	N3P	-	32	0	1	5	-	-	9	46	46	-	-	179	-	-	-	-	7,267	383	-
4a.1.7.9	N3Q	-	21	0	0	2	-	-	6	30	30	-	-	80	-	-	-	-	3,260	271	-
4a.1.7.10	N3R	-	21	0	0	2	-	-	6	30	30	-	-	97	-	-	-	-	3,934	261	-
4a.1.7.11	N3S	-	32	0	1	5	-	-	9	46	46	-	-	187	-	-	-	-	7,583	400	-
4a.1.7.12	N3T	-	19	0	0	1	-	-	5	26	26	-	-	58	-	-	-	-	2,357	243	-
4a.1.7.13	N3U	-	140	17	14	15	37	-	50	274	274	-	-	610	609	-	-	-	56,410	1,730	-
4a.1.7.14	N3W	-	145	19	15	16	41	-	53	290	290	-	-	643	672	-	-	-	61,008	1,795	-
4a.1.7.15	N3Y	-	258	6	13	77	-	-	79	433	433	-	-	3,054	-	-	-	-	124,028	3,179	-
4a.1.7.16	N51	-	35	0	1	6	-	-	10	52	52	-	-	239	-	-	-	-	9,707	433	-
4a.1.7.17	N52	-	28	2	1	3	3	-	9	45	45	-	-	121	47	-	-	-	7,333	353	-
4a.1.7.18	N53	-	43	3	3	6	5	-	14	73	73	-	-	248	84	-	-	-	14,341	541	-
4a.1.7.19	N54	-	21	1	1	1	2	-	6	31	31	-	-	46	32	-	-	-	3,463	260	-
4a.1.7.20	N55	-	91	1	2	10	-	-	25	128	128	-	-	414	-	-	-	-	16,809	1,137	-
4a.1.7.21	N56	-	120	1	3	18	-	-	33	177	177	-	-	734	-	-	-	-	29,828	1,389	-
4a.1.7.22	N5A	-	52	1	2	7	2	-	15	79	79	-	-	290	29	-	-	-	13,230	663	-
4a.1.7.23	N5B	-	49	1	1	8	-	-	14	72	72	-	-	307	-	-	-	-	12,485	621	-
4a.1.7.24	N5C	-	22	0	0	3	-	-	6	31	31	-	-	106	-	-	-	-	4,294	267	-
4a.1.7.25	N5D	-	35	0	1	4	-	-	9	49	49	-	-	152	-	-	-	-	6,190	426	-
4a.1.7.26	N5E	-	23	0	0	3	-	-	6	33	33	-	-	110	-	-	-	-	4,453	278	-
4a.1.7.27	N5F	-	33	2	1	2	3	-	10	52	52	-	-	91	51	-	-	-	6,346	408	-
4a.1.7.28	N5G	-	16	0	0	1	-	-	4	22	22	-	-	40	-	-	-	-	1,645	205	-
4a.1.7.29	N5H	-	14	1	1	0	2	-	4	21	21	-	-	5	28	-	-	-	1,697	173	-
4a.1.7.30	N5I	-	19	0	0	1	-	-	5	26	26	-	-	51	-	-	-	-	2,090	238	-
4a.1.7.31	N5J	-	15	0	1	3	-	-	4	23	23	-	-	131	-	-	-	-	5,328	187	-
4a.1.7.32	N5K	-	18	0	0	2	-	-	5	26	26	-	-	75	-	-	-	-	3,050	224	-
4a.1.7.33	N5N	-	34	0	1	4	-	-	9	48	48	-	-	143	-	-	-	-	5,803	433	-
4a.1.7.34	N5O	-	90	1	3	17	-	-	25	136	136	-	-	670	-	-	-	-	27,221	1,105	-
4a.1.7.35	N5P	-	33	2	2	5	4	-	10	56	56	-	-	183	69	-	-	-	10,873	420	-
4a.1.7.36	N5Q	-	32	2	2	5	4	-	10	55	55	-	-	182	68	-	-	-	10,767	414	-
4a.1.7.37	N5S	-	80	4	10	55	-	-	30	179	179	-	-	2,195	-	-	-	-	89,151	1,024	-
4a.1.7.38	N5T	-	73	2	3	15	3	-	22	119	119	-	-	606	44	-	-	-	26,849	930	-
4a.1.7.39	N5U	-	74	2	3	15	3	-	22	120	120	-	-	607	44	-	-	-	26,908	942	-
4a.1.7.40	N5Y	-	28	1	1	4	1	-	8	44	44	-	-	153	22	-	-	-	7,328	358	-
4a.1.7.41	N5Z	-	28	1	1	4	1	-	8	44	44	-	-	153	22	-	-	-	7,328	358	-
4a.1.7.42	PPA	-	93	1	2	14	-	-	26	136	136	-	-	572	-	-	-	-	23,240	1,139	-
4a.1.7	Totals	-	2,441	89	109	394	134	-	728	3,896	3,896	-	-	15,660	2,197	-	-	-	749,527	30,282	-
Old Radwaste Building System Components																					
4a.1.8.1	7BA	-	103	1	2	12	-	-	28	146	146	-	-	480	-	-	-	-	19,481	1,272	-
4a.1.8.2	7DA	-	60	6	5	3	14	-	20	108	108	-	-	122	229	-	-	-	16,859	739	-
4a.1.8.3	7FA	-	27	2	2	5	3	-	9	47	47	-	-	206	48	-	-	-	10,856	355	-
4a.1.8.4	PBA	-	183	14	12	22	26	-	59	316	316	-	-	893	431	-	-	-	58,315	2,327	-
4a.1.8.5	PDA	-	64	1	2	9	-	-	18	93	93	-	-	373	-	-	-	-	15,150	808	-
4a.1.8.6	PMA	-	15	0	0	1	-	-	4	21	21	-	-	54	-	-	-	-	2,174	190	-
4a.1.8.7	PRA	-	102	2	4	22	-	-	29	158	158	-	-	855	-	-	-	-	34,703	1,292	-
4a.1.8.8	PTK / PTP	-	16	0	0	1	-	-	4	21	21	-	-	30	-	-	-	-	1,199	202	-
4a.1.8	Totals	-	570	25	26	76	43	-	171	912	912	-	-	3,011	708	-	-	-	158,736	7,184	-
Turbine Building System Components																					
4a.1.9.1	7CA	-	322	24	22	44	45	-	104	561	561	-	-	1,755	737	-	-	-	109,631	4,021	-
4a.1.9.2	TB2	-	1,189	23	52	300	-	-	352	1,915	1,915	-	-	11,906	-	-	-	-	483,529	14,570	-
4a.1.9.3	TB23	-	6	0	0	1	-	-	2	10	10	-	-	42	-	-	-	-	1,699	83	-
4a.1.9.4	TB38	-	20	0	1	3	-	-	6	30	30	-	-	124	-	-	-	-	5,034	229	-
4a.1.9.5	TC2	-	1,936	83	186	1,082	-	-	683	3,970	3,970	-	-	42,978	-	-	-	-	1,745,363	23,871	-
4a.1.9.6	TE2	-	232	7	16	92	-	-	75	422	422	-	-	3,643	-	-	-	-	147,941	2,835	-
4a.1.9.7	TEE	-	394	8	18	104	-	-	118	641	641	-	-	4,115	-	-	-	-	167,126	4,871	-
4a.1.9.8	TEG	-	32	0	1	3	-	-	9	44	44	-	-	139	-	-	-	-	5,640	380	-
4a.1.9.9	TP2	-	320	8	17	100	-	-	98	543	543	-	-	3,971	-	-	-	-	161,284	3,949	-
4a.1.9.10	TP3	-	141	10	10	22	19	-	46	247	247	-	-	859	325	-	-	-	51,269	1,794	-

Table D
Oyster Creek Nuclear Generating Station
Delayed DECON Decommissioning Cost Estimate
(thousands of 2016 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 Class A Cu. Feet	Burial Volumes Class B Cu. Feet	Burial Volumes Class C Cu. Feet	Burial Volumes GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
Turbine Building System Components (continued)																					
4a.1.9.11	TPE	-	127	12	10	16	23	-	42	230	230	-	-	647	373	-	-	-	45,337	1,575	-
4a.1.9	Totals	-	4,718	176	331	1,767	87	-	1,534	8,613	8,613	-	-	70,179	1,434	-	-	-	2,923,851	58,177	-
4a.1.12	Scaffolding in support of decommissioning	-	1,131	30	7	29	8	-	293	1,499	1,499	-	-	1,057	124	-	-	-	54,018	16,226	-
4a.1	Subtotal Period 4a Activity Costs	332	25,170	14,714	4,710	6,092	17,922	627	25,246	94,813	94,813	-	-	226,725	28,361	1,420	350	1,547	12,762,710	203,645	2,486
Period 4a Additional Costs																					
4a.2.1	Remedial Action Surveys	-	-	-	-	-	-	1,786	536	2,321	2,321	-	-	-	-	-	-	-	-	27,330	-
4a.2.2	Disposition of Liquid RCRA Waste (not Lead)	-	-	-	17	593	-	-	91	701	701	-	-	2,019	-	-	-	-	115,076	-	-
4a.2.3	Disposition of PCB Soil RCRA Waste (not Lead)	-	-	-	1,349	-	14,876	-	3,921	20,146	20,146	-	-	-	63,779	-	-	-	3,240,000	-	-
4a.2.4	Disposition of Lead Inventory	-	-	-	26	873	-	-	135	1,033	1,033	-	-	328	-	-	-	-	232,673	-	-
4a.2.5	Asbestos Remediation	-	12,982	3	277	-	1,084	-	3,558	17,905	17,905	-	-	-	19,193	-	-	-	249,515	150,230	-
4a.2.6	Disposal of Spare LP Turbine Rotor	-	40	135	30	185	-	-	56	446	446	-	-	5,607	-	-	-	-	298,595	469	-
4a.2.7	Barnwell AC Avoided Cost	-	-	-	-	-	(952)	-	-	(952)	(952)	-	-	-	-	-	-	-	-	-	-
4a.2	Subtotal Period 4a Additional Costs	-	13,022	138	1,698	1,650	15,008	1,786	8,297	41,599	41,599	-	-	7,953	82,973	-	-	-	4,135,859	178,029	-
Period 4a Collateral Costs																					
4a.3.1	Process decommissioning water waste	26	-	26	41	-	72	-	39	203	203	-	-	-	218	-	-	-	13,081	43	-
4a.3.2	Process decommissioning chemical flush waste	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4a.3.3	Small tool allowance	-	509	-	-	-	-	-	76	586	527	-	59	-	-	-	-	-	-	-	-
4a.3	Subtotal Period 4a Collateral Costs	26	509	26	41	-	72	-	116	789	730	-	59	-	218	-	-	-	13,081	43	-
Period 4a Period-Dependent Costs																					
4a.4.1	Decon supplies	83	-	-	-	-	-	-	21	104	104	-	-	-	-	-	-	-	-	-	-
4a.4.2	Insurance	-	-	-	-	-	-	1,008	101	1,109	1,109	-	-	-	-	-	-	-	-	-	-
4a.4.3	Property taxes	-	-	-	-	-	-	1,314	131	1,446	1,301	-	145	-	-	-	-	-	-	-	-
4a.4.4	Health physics supplies	-	2,715	-	-	-	-	-	679	3,394	3,394	-	-	-	-	-	-	-	-	-	-
4a.4.5	Heavy equipment rental	-	3,731	-	-	-	-	-	560	4,291	4,291	-	-	-	-	-	-	-	-	-	-
4a.4.6	Disposal of DAW generated	-	-	113	22	-	260	-	80	475	475	-	-	-	4,601	-	-	-	92,022	150	-
4a.4.7	Plant energy budget	-	-	-	-	-	-	2,251	338	2,589	2,589	-	-	-	-	-	-	-	-	-	-
4a.4.8	NRC Fees	-	-	-	-	-	-	773	77	850	850	-	-	-	-	-	-	-	-	-	-
4a.4.9	Barnwell Annual Flat Fee	-	-	-	-	-	461	-	-	461	461	-	-	-	-	-	-	-	-	-	-
4a.4.10	Liquid Radwaste Processing Equipment/Services	-	-	-	-	-	-	532	80	612	612	-	-	-	-	-	-	-	-	-	-
4a.4.11	Independent Corporate Oversight Organization	-	-	-	-	-	-	33	5	38	38	-	-	-	-	-	-	-	-	-	-
4a.4.12	Security Staff Cost	-	-	-	-	-	-	5,350	802	6,152	6,152	-	-	-	-	-	-	-	-	-	85,714
4a.4.13	DOC Staff Cost	-	-	-	-	-	-	17,110	2,566	19,676	19,676	-	-	-	-	-	-	-	-	-	189,257
4a.4.14	Utility Staff Cost	-	-	-	-	-	-	30,513	4,577	35,090	35,090	-	-	-	-	-	-	-	-	-	342,857
4a.4	Subtotal Period 4a Period-Dependent Costs	83	6,447	113	22	-	721	58,883	10,017	76,286	76,142	-	145	-	4,601	-	-	-	92,022	150	617,829
4a.0	TOTAL PERIOD 4a COST	440	45,148	14,992	6,470	7,742	33,723	61,296	43,676	213,488	213,285	-	203	234,678	116,153	1,420	350	1,547	17,003,670	381,866	620,315
PERIOD 4b - Site Decontamination																					
Period 4b Direct Decommissioning Activities																					
4b.1.1	Remove spent fuel racks	768	90	174	262	-	848	-	675	2,818	2,818	-	-	-	13,844	-	-	-	718,790	1,229	-
Disposal of Plant Systems																					
Drywell System Components																					
4b.1.2.1	IAA/IAC	-	409	258	192	179	523	-	315	1,877	1,877	-	-	7,111	8,511	-	-	-	732,325	5,749	-
4b.1.2.2	IBA	-	203	23	19	22	50	-	72	389	389	-	-	880	815	-	-	-	78,098	2,591	-
4b.1.2.3	ICA	-	326	42	32	46	79	-	117	642	642	-	-	1,841	1,275	-	-	-	141,314	4,157	-
4b.1.2.4	IEA	-	88	10	11	23	22	-	34	188	188	-	-	926	355	-	-	-	56,054	1,177	-
4b.1.2.5	RC6	-	81	1	2	11	-	-	22	117	117	-	-	440	-	-	-	-	17,889	989	-
4b.1.2	Totals	-	1,107	334	256	282	674	-	559	3,212	3,212	-	-	11,199	10,957	-	-	-	1,025,680	14,663	-
Reactor Building System Components																					
4b.1.3.1	RB1	-	249	5	11	63	-	-	74	401	401	-	-	2,495	-	-	-	-	101,308	2,991	-
4b.1.3.2	RBB	-	131	3	6	33	-	-	39	211	211	-	-	1,306	-	-	-	-	53,019	1,597	-
4b.1.3.3	RBC	-	134	3	6	37	-	-	40	221	221	-	-	1,485	-	-	-	-	60,294	1,647	-
4b.1.3.4	RBE	-	176	3	6	35	-	-	50	270	270	-	-	1,381	-	-	-	-	56,063	2,156	-
4b.1.3.5	RBF	-	150	17	14	19	35	-	53	288	288	-	-	740	574	-	-	-	59,778	1,912	-
4b.1.3.6	RBO	-	663	22	49	283	-	-	218	1,234	1,234	-	-	11,229	-	-	-	-	456,005	8,678	-
4b.1.3.7	RBS	-	306	26	27	69	50	-	106	584	584	-	-	2,757	808	-	-	-	153,952	3,901	-
4b.1.3.8	RBSW	-	166	3	6	34	-	-	48	256	256	-	-	1,343	-	-	-	-	54,558	2,077	-
4b.1.3.9	RC1/RC3	-	5	0	0	0	-	-	1	7	7	-	-	14	-	-	-	-	577	63	-
4b.1.3.10	RC7	-	111	2	5	28	-	-	33	179	179	-	-	1,106	-	-	-	-	44,917	1,311	-

Table D
Oyster Creek Nuclear Generating Station
Delayed DECON Decommissioning Cost Estimate
(thousands of 2016 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.1.3.11	RCA	-	59	4	3	4	7	-	18	94	94	-	-	147	122	-	-	-	12,295	726	-
4b.1.3.12	RCB	-	86	2	3	13	2	-	24	129	129	-	-	501	31	-	-	-	21,946	1,051	-
4b.1.3.13	RCD	-	434	8	17	100	-	-	127	686	686	-	-	3,974	-	-	-	-	161,384	5,318	-
4b.1.3.14	RCG	-	83	2	5	29	-	-	26	145	145	-	-	1,136	-	-	-	-	46,136	1,041	-
4b.1.3.15	RCJ	-	92	1	3	16	-	-	26	137	137	-	-	617	-	-	-	-	25,044	1,121	-
4b.1.3.16	RCM	-	135	3	6	37	-	-	41	223	223	-	-	1,481	-	-	-	-	60,136	1,694	-
4b.1.3.17	RCN	-	300	4	9	53	-	-	85	451	451	-	-	2,107	-	-	-	-	85,581	3,666	-
4b.1.3.18	RCS	-	108	17	15	16	38	-	43	237	237	-	-	636	623	-	-	-	58,255	1,369	-
4b.1.3.19	RCT	-	70	1	2	12	-	-	20	105	105	-	-	464	-	-	-	-	18,858	858	-
4b.1.3.20	RD8	-	108	78	66	47	188	-	99	586	586	-	-	1,861	3,068	-	-	-	234,860	1,498	-
4b.1.3.21	RDM	-	59	1	1	7	-	-	16	83	83	-	-	268	-	-	-	-	10,870	701	-
4b.1.3.22	REC	-	266	4	8	49	-	-	76	403	403	-	-	1,953	-	-	-	-	79,329	3,190	-
4b.1.3.23	REF	-	124	27	21	17	60	-	54	303	303	-	-	667	972	-	-	-	77,647	1,555	-
4b.1.3.24	REH/REI	-	150	3	6	33	-	-	44	235	235	-	-	1,325	-	-	-	-	53,806	1,846	-
4b.1.3.25	REL	-	267	6	14	83	-	-	82	452	452	-	-	3,286	-	-	-	-	133,445	3,285	-
4b.1.3.26	REM	-	71	1	2	14	-	-	20	108	108	-	-	538	-	-	-	-	21,846	868	-
4b.1.3.27	REO	-	151	25	22	28	56	-	62	344	344	-	-	1,115	918	-	-	-	92,965	1,934	-
4b.1.3.28	REQ	-	209	11	11	33	17	-	64	346	346	-	-	1,311	283	-	-	-	67,964	2,612	-
4b.1.3.29	RER	-	70	5	4	4	11	-	22	117	117	-	-	177	185	-	-	-	16,844	882	-
4b.1.3.30	RET	-	40	1	1	5	1	-	11	59	59	-	-	185	20	-	-	-	8,535	500	-
4b.1.3.31	REW	-	35	0	1	4	-	-	9	49	49	-	-	146	-	-	-	-	5,936	432	-
4b.1.3.32	REX	-	38	0	1	4	-	-	10	54	54	-	-	165	-	-	-	-	6,710	477	-
4b.1.3.33	REY	-	44	0	1	5	-	-	12	62	62	-	-	192	-	-	-	-	7,781	543	-
4b.1.3.34	RFB	-	197	3	7	41	-	-	57	305	305	-	-	1,622	-	-	-	-	65,859	2,449	-
4b.1.3.35	RFC	-	129	14	9	8	24	-	42	226	226	-	-	337	390	-	-	-	34,111	1,651	-
4b.1.3.36	RFF	-	138	2	4	23	-	-	39	206	206	-	-	923	-	-	-	-	37,469	1,696	-
4b.1.3.37	RFH	-	188	30	22	17	61	-	71	389	389	-	-	692	992	-	-	-	79,790	2,343	-
4b.1.3.38	RFJ	-	165	27	21	17	59	-	64	354	354	-	-	690	962	-	-	-	78,082	2,057	-
4b.1.3.39	RFL	-	106	1	3	19	-	-	30	159	159	-	-	754	-	-	-	-	30,625	1,337	-
4b.1.3.40	RFN	-	143	2	5	28	-	-	41	219	219	-	-	1,118	-	-	-	-	45,418	1,768	-
4b.1.3.41	RFQ	-	206	2	4	24	-	-	56	291	291	-	-	942	-	-	-	-	38,243	2,456	-
4b.1.3.42	RGC	-	110	1	3	17	-	-	31	162	162	-	-	667	-	-	-	-	27,107	1,368	-
4b.1.3.43	RGD	-	313	9	19	111	-	-	99	550	550	-	-	4,427	-	-	-	-	179,773	3,921	-
4b.1.3.44	RGI	-	66	1	2	10	-	-	18	98	98	-	-	414	-	-	-	-	16,826	835	-
4b.1.3.45	RGL	-	77	1	2	14	-	-	22	117	117	-	-	555	-	-	-	-	22,545	967	-
4b.1.3.46	RGP	-	35	0	1	6	-	-	10	53	53	-	-	238	-	-	-	-	9,661	437	-
4b.1.3.47	RGR	-	235	3	7	41	-	-	66	353	353	-	-	1,633	-	-	-	-	66,314	2,876	-
4b.1.3.48	RGU	-	105	1	2	14	-	-	29	151	151	-	-	547	-	-	-	-	22,199	1,312	-
4b.1.3.49	RH1	-	62	1	1	9	-	-	17	90	90	-	-	339	-	-	-	-	13,754	762	-
4b.1.3.50	RH2	-	45	1	2	14	-	-	14	77	77	-	-	550	-	-	-	-	22,340	572	-
4b.1.3.51	RH3 / RH4 / RH6	-	157	1	3	15	-	-	42	218	218	-	-	592	-	-	-	-	24,061	1,896	-
4b.1.3.52	RHA	-	26	2	2	2	4	-	8	44	44	-	-	83	63	-	-	-	6,655	327	-
4b.1.3.53	RHJ	-	56	1	1	7	-	-	15	80	80	-	-	282	-	-	-	-	11,443	687	-
4b.1.3.54	RHL	-	36	0	1	3	-	-	10	49	49	-	-	121	-	-	-	-	4,913	431	-
4b.1.3.55	RHX	-	67	1	2	11	-	-	19	100	100	-	-	440	-	-	-	-	17,877	814	-
4b.1.3.56	RHY	-	60	1	2	9	-	-	17	89	89	-	-	369	-	-	-	-	14,998	750	-
4b.1.3.57	RMCC	-	121	2	4	25	-	-	35	186	186	-	-	989	-	-	-	-	40,165	1,468	-
4b.1.3	Totals	-	7,932	393	481	1,698	614	-	2,503	13,621	13,621	-	-	67,430	10,011	-	-	-	3,258,874	98,680	-
New Radwaste Building System Components																					
4b.1.4.1	N38	-	213	3	6	35	-	-	60	317	317	-	-	1,392	-	-	-	-	56,536	2,566	-
4b.1.4.2	N48	-	108	1	2	13	-	-	29	154	154	-	-	530	-	-	-	-	21,506	1,308	-
4b.1.4.3	N4A	-	36	2	2	5	4	-	11	61	61	-	-	183	70	-	-	-	11,009	470	-
4b.1.4.4	N4B	-	34	2	2	4	4	-	11	56	56	-	-	162	59	-	-	-	9,599	442	-
4b.1.4.5	N4D	-	113	1	2	12	-	-	30	157	157	-	-	459	-	-	-	-	18,650	1,350	-
4b.1.4.6	N4E	-	8	0	0	0	-	-	2	11	11	-	-	17	-	-	-	-	687	107	-
4b.1.4.7	N4F	-	24	0	0	2	-	-	6	33	33	-	-	98	-	-	-	-	3,986	289	-
4b.1.4.8	N4H	-	28	1	1	5	2	-	9	46	46	-	-	217	26	-	-	-	10,164	365	-
4b.1.4.9	N4K	-	30	0	1	4	-	-	8	43	43	-	-	176	-	-	-	-	7,138	364	-
4b.1.4.10	N4L	-	44	0	1	4	-	-	12	61	61	-	-	177	-	-	-	-	7,195	553	-
4b.1.4.11	N5R	-	94	2	4	26	-	-	28	155	155	-	-	1,029	-	-	-	-	41,782	1,188	-
4b.1.4.12	N5V	-	73	5	5	12	10	-	24	129	129	-	-	482	162	-	-	-	27,689	934	-
4b.1.4.13	N5W	-	11	0	0	0	-	-	3	15	15	-	-	10	-	-	-	-	401	148	-
4b.1.4.14	N5X	-	91	2	4	21	-	-	27	144	144	-	-	842	-	-	-	-	34,176	1,155	-
4b.1.4	Totals	-	909	19	31	145	19	-	260	1,383	1,383	-	-	5,774	318	-	-	-	250,517	11,238	-

Table D
Oyster Creek Nuclear Generating Station
Delayed DECON Decommissioning Cost Estimate
(thousands of 2016 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			
Old Radwaste Building System Components																					
4b.1.5.1	ORW Pre D&D Desludge and Decon	-	248	-	-	-	-	-	37	285	285	-	-	-	-	-	-	-	-	2,839	-
4b.1.5.2	PRD	-	19	0	1	4	-	-	5	29	29	-	-	151	-	-	-	-	6,112	245	-
4b.1.5.3	PSB	-	172	2	5	30	-	-	49	259	259	-	-	1,198	-	-	-	-	48,634	2,135	-
4b.1.5.4	PTA	-	47	1	2	9	-	-	14	73	73	-	-	371	-	-	-	-	15,084	601	-
4b.1.5.5	PUA	-	258	3	6	35	-	-	71	372	372	-	-	1,389	-	-	-	-	56,392	3,154	-
4b.1.5.6	PUU	-	174	6	10	46	5	-	54	295	295	-	-	1,825	92	-	-	-	78,644	2,226	-
4b.1.5.7	PVA	-	12	0	0	0	-	-	3	15	15	-	-	13	-	-	-	-	519	148	-
4b.1.5.8	UAB	-	377	5	10	60	-	-	105	556	556	-	-	2,367	-	-	-	-	96,117	4,649	-
4b.1.5.9	UAS	-	258	4	10	57	-	-	75	405	405	-	-	2,277	-	-	-	-	92,465	3,222	-
4b.1.5	Totals	-	1,565	21	43	241	5	-	413	2,288	2,288	-	-	9,590	92	-	-	-	393,967	19,220	-
Turbine Building System Components																					
4b.1.6.1	TD2	-	74	1	2	10	-	-	20	107	107	-	-	390	-	-	-	-	15,850	875	-
4b.1.6.2	TF2	-	401	19	42	243	-	-	145	849	849	-	-	9,646	-	-	-	-	391,743	4,891	-
4b.1.6.3	TFG	-	29	0	1	4	-	-	8	41	41	-	-	150	-	-	-	-	6,106	361	-
4b.1.6.4	TG2	-	293	15	33	190	-	-	108	639	639	-	-	7,564	-	-	-	-	307,179	3,660	-
4b.1.6.5	TH2	-	570	25	55	321	-	-	201	1,172	1,172	-	-	12,740	-	-	-	-	517,385	7,040	-
4b.1.6.6	TKA	-	29	0	0	2	-	-	8	39	39	-	-	74	-	-	-	-	2,996	348	-
4b.1.6.7	TL2	-	123	8	7	13	14	-	38	203	203	-	-	523	223	-	-	-	32,889	1,482	-
4b.1.6.8	TMA	-	75	2	4	23	-	-	23	126	126	-	-	895	-	-	-	-	36,367	921	-
4b.1.6.9	TN2	-	396	9	19	112	-	-	120	656	656	-	-	4,447	-	-	-	-	180,585	4,873	-
4b.1.6.10	TO2	-	212	-	-	-	-	-	32	244	-	-	244	-	-	-	-	-	-	2,826	-
4b.1.6.11	TOA	-	108	2	4	26	-	-	32	171	171	-	-	1,014	-	-	-	-	41,172	1,303	-
4b.1.6.12	TOCR	-	90	3	7	43	-	-	30	174	174	-	-	1,692	-	-	-	-	68,697	1,058	-
4b.1.6.13	TOR	-	80	2	4	23	-	-	24	134	134	-	-	931	-	-	-	-	37,795	994	-
4b.1.6.14	TOV	-	24	0	0	2	-	-	6	33	33	-	-	98	-	-	-	-	3,978	292	-
4b.1.6.15	TOW	-	127	5	11	64	-	-	43	250	250	-	-	2,557	-	-	-	-	103,857	1,547	-
4b.1.6.16	TOX / TOY	-	35	0	1	3	-	-	9	48	48	-	-	124	-	-	-	-	5,052	423	-
4b.1.6.17	TS2	-	248	8	17	98	-	-	80	450	450	-	-	3,875	-	-	-	-	157,362	2,995	-
4b.1.6.18	TTA	-	75	2	4	23	-	-	23	127	127	-	-	899	-	-	-	-	36,508	957	-
4b.1.6.19	TU2	-	229	4	9	53	-	-	67	362	362	-	-	2,096	-	-	-	-	85,139	2,856	-
4b.1.6	Totals	-	3,219	103	219	1,252	14	-	1,018	5,825	5,581	-	244	49,717	223	-	-	-	2,030,661	39,703	-
Augmented Offgas System Components																					
4b.1.7.1	AY8	-	176	3	7	40	-	-	51	277	277	-	-	1,596	-	-	-	-	64,813	2,154	-
4b.1.7.2	AYA	-	37	1	2	13	-	-	12	65	65	-	-	512	-	-	-	-	20,775	459	-
4b.1.7.3	AYB	-	35	1	1	7	-	-	10	54	54	-	-	267	-	-	-	-	10,862	441	-
4b.1.7.4	AYC	-	90	2	4	25	-	-	27	149	149	-	-	1,012	-	-	-	-	41,078	1,127	-
4b.1.7.5	AYE	-	31	0	0	3	-	-	8	43	43	-	-	103	-	-	-	-	4,199	375	-
4b.1.7.6	AZ8	-	67	1	3	15	-	-	20	106	106	-	-	611	-	-	-	-	24,796	824	-
4b.1.7.7	AZA	-	15	0	0	1	-	-	4	21	21	-	-	40	-	-	-	-	1,638	188	-
4b.1.7.8	AZC	-	127	2	5	29	-	-	37	200	200	-	-	1,145	-	-	-	-	46,509	1,555	-
4b.1.7.9	AZD	-	21	0	0	2	-	-	6	29	29	-	-	75	-	-	-	-	3,063	267	-
4b.1.7.10	AZE	-	20	0	0	2	-	-	5	28	28	-	-	70	-	-	-	-	2,856	256	-
4b.1.7.11	AZF	-	19	0	0	2	-	-	5	27	27	-	-	90	-	-	-	-	3,672	239	-
4b.1.7.12	AZI	-	37	1	1	9	-	-	11	58	58	-	-	343	-	-	-	-	13,938	461	-
4b.1.7	Totals	-	676	11	25	148	-	-	196	1,056	1,056	-	-	5,865	-	-	-	-	238,198	8,345	-
Miscellaneous System Components																					
4b.1.8.1	BAA	-	323	6	14	82	-	-	96	521	521	-	-	3,241	-	-	-	-	131,602	3,979	-
4b.1.8.2	BBA	-	109	4	9	55	-	-	37	215	215	-	-	2,183	-	-	-	-	88,656	1,368	-
4b.1.8.3	BDA	-	13	0	0	1	-	-	3	18	18	-	-	27	-	-	-	-	1,083	167	-
4b.1.8.4	CAA	-	763	20	44	258	-	-	238	1,323	1,323	-	-	10,252	-	-	-	-	416,330	9,611	-
4b.1.8.5	DAA	-	79	1	2	9	-	-	21	112	112	-	-	376	-	-	-	-	15,277	1,005	-
4b.1.8.6	DAC	-	187	2	5	31	-	-	52	278	278	-	-	1,230	-	-	-	-	49,940	2,323	-
4b.1.8.7	DGB	-	102	-	-	-	-	-	15	118	-	-	118	-	-	-	-	-	-	1,336	-
4b.1.8.8	DOT	-	18	-	-	-	-	-	3	20	-	-	20	-	-	-	-	-	-	223	-
4b.1.8.9	DPH	-	118	-	-	-	-	-	18	135	-	-	135	-	-	-	-	-	-	1,527	-
4b.1.8.10	DWF	-	27	-	-	-	-	-	4	32	-	-	32	-	-	-	-	-	-	360	-
4b.1.8.11	FWP	-	159	-	-	-	-	-	24	182	-	-	182	-	-	-	-	-	-	2,018	-
4b.1.8.12	GAA / GCA	-	28	-	-	-	-	-	4	33	-	-	33	-	-	-	-	-	-	368	-
4b.1.8.13	INTAKE STRUCTURE	-	248	-	-	-	-	-	37	285	-	-	285	-	-	-	-	-	-	3,218	-
4b.1.8.14	MAA	-	156	3	6	37	-	-	46	248	248	-	-	1,469	-	-	-	-	59,650	1,920	-
4b.1.8.15	MBA	-	63	1	2	10	-	-	18	94	94	-	-	413	-	-	-	-	16,776	764	-
4b.1.8.16	MBS / MBT	-	46	0	0	3	-	-	12	62	62	-	-	108	-	-	-	-	4,371	575	-
4b.1.8.17	MS	-	50	-	-	-	-	-	8	58	-	-	58	-	-	-	-	-	-	676	-
4b.1.8.18	NMB ROOF	-	24	-	-	-	-	-	4	28	-	-	28	-	-	-	-	-	-	312	-
4b.1.8.19	OB	-	364	-	-	-	-	-	55	418	-	-	418	-	-	-	-	-	-	4,806	-

Table D
Oyster Creek Nuclear Generating Station
Delayed DECON Decommissioning Cost Estimate
(thousands of 2016 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			
Miscellaneous System Components (continued)																					
4b.1.8.20	PTB	-	53	-	-	-	-	-	8	61	-	-	61	-	-	-	-	-	-	688	-
4b.1.8.21	RSF ROOF	-	36	0	1	4	-	-	10	51	51	-	-	175	-	-	-	-	7,097	451	-
4b.1.8.22	UYARD	-	2,084	12	27	155	-	-	549	2,827	2,827	-	-	6,162	-	-	-	-	250,262	21,730	-
4b.1.8.23	WAA	-	205	2	5	30	-	-	57	299	299	-	-	1,197	-	-	-	-	48,603	2,479	-
4b.1.8.24	WHS	-	24	-	-	-	-	-	4	28	-	-	28	-	-	-	-	-	-	318	-
4b.1.8.25	YARD AREAS	-	509	-	-	-	-	-	76	585	-	-	585	-	-	-	-	-	-	6,583	-
4b.1.8.26	YDA / YFA / YLA	-	2	0	0	0	-	-	1	4	4	-	-	19	-	-	-	-	783	30	-
4b.1.8	Totals	-	5,791	52	116	676	-	-	1,399	8,035	6,052	-	1,983	26,851	-	-	-	-	1,090,429	68,833	-
4b.1.9	Scaffolding in support of decommissioning	-	1,697	45	11	44	11	-	440	2,249	2,249	-	-	1,586	186	-	-	-	81,027	24,339	-
Decontamination of Site Buildings																					
4b.1.10.1	New Radwaste Building - Systems Removal	0	63	14	156	0	244	-	102	580	580	-	-	6	4,408	-	-	-	382,187	509	-
4b.1.10.2	Old Radwaste Building - Systems Removal	0	5	2	17	0	26	-	10	59	59	-	-	6	468	-	-	-	40,787	48	-
4b.1.10.3	Turbine Building - Systems Removal	-	524	34	376	-	588	-	338	1,860	1,860	-	-	-	10,610	-	-	-	919,350	5,153	-
4b.1.10.4	Augmented Off Gas - Decon	24	145	2	23	1	35	-	61	290	290	-	-	45	639	-	-	-	57,151	1,936	-
4b.1.10.5	LLRW Storage - Decon	13	45	1	14	-	21	-	25	118	118	-	-	-	385	-	-	-	33,330	639	-
4b.1.10.6	Miscellaneous Buildings - Decon	12	60	1	13	-	21	-	28	136	136	-	-	-	378	-	-	-	32,778	816	-
4b.1.10.7	New Radwaste Building - Decon	58	546	9	88	6	136	-	214	1,057	1,057	-	-	235	2,459	-	-	-	222,123	6,909	-
4b.1.10.8	Old Radwaste Building - Decon	-	487	33	359	4	561	-	320	1,764	1,764	-	-	152	10,121	-	-	-	882,864	4,443	-
4b.1.10.9	Stack/Exhaust Tunnels - Remove & Decon	127	614	5	55	-	86	-	247	1,134	1,134	-	-	-	1,545	-	-	-	133,878	8,747	-
4b.1.10.10	Turbine Building 0ft - Decon	88	659	11	88	29	133	-	261	1,269	1,269	-	-	1,144	2,398	-	-	-	252,086	8,612	-
4b.1.10.11	Turbine Building 23ft - Decon	58	472	9	68	28	101	-	187	923	923	-	-	1,109	1,821	-	-	-	200,768	6,072	-
4b.1.10.12	Turbine Building 46ft - Decon	36	149	3	39	-	60	-	76	364	364	-	-	-	1,090	-	-	-	94,413	2,085	-
4b.1.10.13	New Radwaste Building - Contaminated	27	1,711	208	2,101	81	3,278	-	1,609	9,015	9,015	-	-	3,230	59,070	-	-	-	5,237,676	17,170	-
4b.1.10.14	Old Radwaste Building	-	2,747	505	5,591	1	8,745	-	3,762	21,351	21,351	-	-	37	157,695	-	-	-	13,665,710	27,256	-
4b.1.10.15	Drywell - Decon	5	911	56	516	-	1,038	-	573	3,097	3,097	-	-	-	20,821	-	-	-	1,302,709	9,201	-
4b.1.10.16	Drywell - Liner Removal	2,512	1,483	87	104	557	70	-	1,752	6,566	6,566	-	-	22,108	1,135	-	-	-	957,454	47,934	-
4b.1.10.17	RB0 - Torus Removal	3,368	1,703	129	155	825	104	-	2,296	8,580	8,580	-	-	32,774	1,683	-	-	-	1,419,396	60,660	-
4b.1.10.18	Reactor Building - Systems Removal	-	7	2	27	-	41	-	16	94	94	-	-	-	748	-	-	-	64,800	72	-
4b.1.10.19	Reactor Building -19ft - Decon	40	344	10	44	52	60	-	136	685	685	-	-	2,052	1,068	-	-	-	172,078	4,375	-
4b.1.10.20	Reactor Building 119ft - Decon	538	665	8	24	39	31	-	453	1,758	1,758	-	-	1,563	541	-	-	-	107,660	14,564	-
4b.1.10.21	Reactor Building 23ft - Decon	26	158	3	29	-	45	-	68	329	329	-	-	-	808	-	-	-	70,017	2,109	-
4b.1.10.22	Reactor Building 51ft - Decon	29	165	3	32	-	50	-	73	353	353	-	-	-	901	-	-	-	78,096	2,218	-
4b.1.10.23	Reactor Building 75ft - Decon	10	89	1	11	-	17	-	33	160	160	-	-	-	302	-	-	-	26,136	1,143	-
4b.1.10.24	Reactor Building 91ft - Decon	21	138	2	23	-	36	-	57	277	277	-	-	-	644	-	-	-	55,770	1,822	-
4b.1.10	Totals	6,992	13,888	1,136	9,950	1,623	15,529	-	12,700	61,818	61,818	-	-	64,463	281,737	-	-	-	26,409,220	234,494	-
4b.1	Subtotal Period 4b Activity Costs	7,760	36,873	2,289	11,396	6,109	17,714	-	20,163	102,305	100,078	-	2,227	242,474	317,367	-	-	-	35,497,360	520,743	-
Period 4b Additional Costs																					
4b.2.1	License Termination Survey Planning	-	-	-	-	-	-	1,987	596	2,583	2,583	-	-	-	-	-	-	-	-	-	12,480
4b.2.2	Remedial Action Surveys	-	-	-	-	-	-	2,013	604	2,617	2,617	-	-	-	-	-	-	-	-	30,809	-
4b.2.3	Excavation of Underground Services	-	5,224	-	-	-	-	1,463	1,525	8,212	8,212	-	-	-	-	-	-	-	-	28,000	-
4b.2.4	License Termination ISFSI	-	40	4	372	-	1,043	2,529	997	4,985	4,985	-	-	-	10,970	-	-	-	1,590,770	6,259	10,568
4b.2.5	Operational tools & equipment	-	-	21	43	182	-	-	36	281	281	-	-	11,710	-	-	-	-	292,750	32	-
4b.2.6	Contaminated Soil Removal	-	134	3	650	-	6,000	-	1,631	8,419	8,419	-	-	-	106,200	-	-	-	9,345,592	834	-
4b.2	Subtotal Period 4b Additional Costs	-	5,398	28	1,065	182	7,043	7,992	5,389	27,097	27,097	-	-	11,710	117,170	-	-	-	11,229,110	65,934	23,048
Period 4b Collateral Costs																					
4b.3.1	Process decommissioning water waste	56	-	59	93	-	164	-	89	460	460	-	-	-	497	-	-	-	29,800	97	-
4b.3.3	Small tool allowance	-	805	-	-	-	-	-	121	926	926	-	-	-	-	-	-	-	-	-	-
4b.3.4	Decommissioning Equipment Disposition	-	-	168	48	167	43	-	60	487	487	-	-	6,000	705	-	-	-	306,624	88	-
4b.3	Subtotal Period 4b Collateral Costs	56	805	227	141	167	207	-	270	1,873	1,873	-	-	6,000	1,202	-	-	-	336,424	185	-
Period 4b Period-Dependent Costs																					
4b.4.1	Decon supplies	1,350	-	-	-	-	-	-	338	1,688	1,688	-	-	-	-	-	-	-	-	-	-
4b.4.2	Insurance	-	-	-	-	-	-	1,136	114	1,249	1,249	-	-	-	-	-	-	-	-	-	-
4b.4.3	Property taxes	-	-	-	-	-	-	1,481	148	1,629	1,629	-	-	-	-	-	-	-	-	-	-
4b.4.4	Health physics supplies	-	3,864	-	-	-	-	-	966	4,830	4,830	-	-	-	-	-	-	-	-	-	-
4b.4.5	Heavy equipment rental	-	4,319	-	-	-	-	-	648	4,966	4,966	-	-	-	-	-	-	-	-	-	-
4b.4.6	Disposal of DAW generated	-	-	197	38	-	452	-	138	824	824	-	-	-	7,979	-	-	-	159,586	260	-
4b.4.7	Plant energy budget	-	-	-	-	-	-	2,003	300	2,304	2,304	-	-	-	-	-	-	-	-	-	-
4b.4.8	NRC Fees	-	-	-	-	-	-	871	87	958	958	-	-	-	-	-	-	-	-	-	-
4b.4.9	Liquid Radwaste Processing Equipment/Services	-	-	-	-	-	-	600	90	690	690	-	-	-	-	-	-	-	-	-	-
4b.4.10	Independent Corporate Oversight Organization	-	-	-	-	-	-	37	6	43	43	-	-	-	-	-	-	-	-	-	-
4b.4.11	Security Staff Cost	-	-	-	-	-	-	6,029	904	6,934	6,934	-	-	-	-	-	-	-	-	-	96,607
4b.4.12	DOC Staff Cost	-	-	-	-	-	-	18,799	2,820	21,618	21,618	-	-	-	-	-	-	-	-	-	207,126

Table D
Oyster Creek Nuclear Generating Station
Delayed DECON Decommissioning Cost Estimate
(thousands of 2016 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 4b Period-Dependent Costs (continued)																					
4b.4.13	Utility Staff Cost	-	-	-	-	-	-	32,624	4,894	37,518	37,518	-	-	-	-	-	-	-	-	-	364,789
4b.4	Subtotal Period 4b Period-Dependent Costs	1,350	8,182	197	38	-	452	63,580	11,452	85,251	85,251	-	-	-	7,979	-	-	-	159,586	260	668,521
4b.0	TOTAL PERIOD 4b COST	9,167	51,258	2,741	12,640	6,458	25,416	71,572	37,274	216,526	214,299	-	2,227	260,184	443,719	-	-	-	47,222,480	587,122	691,569
PERIOD 4f - License Termination																					
Period 4f Direct Decommissioning Activities																					
4f.1.1	ORISE confirmatory survey	-	-	-	-	-	-	170	51	221	221	-	-	-	-	-	-	-	-	-	-
4f.1.2	Terminate license									a											
4f.1	Subtotal Period 4f Activity Costs	-	-	-	-	-	-	170	51	221	221	-	-	-	-	-	-	-	-	-	-
Period 4f Additional Costs																					
4f.2.1	License Termination Survey	-	-	-	-	-	-	9,824	2,947	12,772	12,772	-	-	-	-	-	-	-	-	118,801	6,240
4f.2	Subtotal Period 4f Additional Costs	-	-	-	-	-	-	9,824	2,947	12,772	12,772	-	-	-	-	-	-	-	-	118,801	6,240
Period 4f Collateral Costs																					
4f.3.1	DOC staff relocation expenses	-	-	-	-	-	-	1,308	196	1,504	1,504	-	-	-	-	-	-	-	-	-	-
4f.3	Subtotal Period 4f Collateral Costs	-	-	-	-	-	-	1,308	196	1,504	1,504	-	-	-	-	-	-	-	-	-	-
Period 4f Period-Dependent Costs																					
4f.4.2	Property taxes	-	-	-	-	-	-	753	75	828	828	-	-	-	-	-	-	-	-	-	-
4f.4.3	Health physics supplies	-	720	-	-	-	-	-	180	900	900	-	-	-	-	-	-	-	-	-	-
4f.4.4	Disposal of DAW generated	-	-	9	2	-	20	-	6	36	36	-	-	-	351	-	-	-	7,025	11	-
4f.4.5	Plant energy budget	-	-	-	-	-	-	272	41	312	312	-	-	-	-	-	-	-	-	-	-
4f.4.6	NRC Fees	-	-	-	-	-	-	443	44	488	488	-	-	-	-	-	-	-	-	-	-
4f.4.7	Independent Corporate Oversight Organization	-	-	-	-	-	-	19	3	22	22	-	-	-	-	-	-	-	-	-	-
4f.4.8	Security Staff Cost	-	-	-	-	-	-	1,224	184	1,408	1,408	-	-	-	-	-	-	-	-	-	18,857
4f.4.9	DOC Staff Cost	-	-	-	-	-	-	5,456	818	6,274	6,274	-	-	-	-	-	-	-	-	-	57,357
4f.4.10	Utility Staff Cost	-	-	-	-	-	-	7,275	1,091	8,367	8,367	-	-	-	-	-	-	-	-	-	74,643
4f.4	Subtotal Period 4f Period-Dependent Costs	-	720	9	2	-	20	15,442	2,443	18,635	18,635	-	-	-	351	-	-	-	7,025	11	150,857
4f.0	TOTAL PERIOD 4f COST	-	720	9	2	-	20	26,744	5,637	33,131	33,131	-	-	-	351	-	-	-	7,025	118,812	157,097
PERIOD 4 TOTALS		9,607	97,127	17,741	19,111	14,201	59,159	159,612	86,587	463,145	460,715	-	2,430	494,862	560,223	1,420	350	1,547	64,233,170	1,087,800	1,468,981
PERIOD 5b - Site Restoration																					
Period 5b Direct Decommissioning Activities																					
Demolition of Remaining Site Buildings																					
5b.1.1.1	Stack/Exhaust Tunnels - Remove & Decon	-	1,144	-	-	-	-	-	172	1,316	-	-	1,316	-	-	-	-	-	-	1,536	-
5b.1.1.2	Administration Building	-	460	-	-	-	-	-	69	529	-	-	529	-	-	-	-	-	-	4,330	-
5b.1.1.3	Augmented Off Gas Building	-	172	-	-	-	-	-	26	198	-	-	198	-	-	-	-	-	-	956	-
5b.1.1.4	Chlorination Building	-	21	-	-	-	-	-	3	24	-	-	24	-	-	-	-	-	-	164	-
5b.1.1.5	Diesel Generator Building	-	71	-	-	-	-	-	11	82	-	-	82	-	-	-	-	-	-	355	-
5b.1.1.6	Dilution Structure	-	119	-	-	-	-	-	18	137	-	-	137	-	-	-	-	-	-	742	-
5b.1.1.7	Domestic Water Facility	-	10	-	-	-	-	-	1	11	-	-	11	-	-	-	-	-	-	95	-
5b.1.1.8	FLEX Buildings	-	193	-	-	-	-	-	29	222	-	-	222	-	-	-	-	-	-	1,001	-
5b.1.1.9	Fire Pump House	-	3	-	-	-	-	-	1	4	-	-	4	-	-	-	-	-	-	33	-
5b.1.1.10	Fresh Water Pump House	-	18	-	-	-	-	-	3	21	-	-	21	-	-	-	-	-	-	165	-
5b.1.1.11	Heating Boiler House	-	34	-	-	-	-	-	5	40	-	-	40	-	-	-	-	-	-	305	-
5b.1.1.12	Intake Structure	-	393	-	-	-	-	-	59	452	-	-	452	-	-	-	-	-	-	2,392	-
5b.1.1.13	Low Level Radwaste Storage	-	198	-	-	-	-	-	30	228	-	-	228	-	-	-	-	-	-	878	-
5b.1.1.14	Machine Shop	-	147	-	-	-	-	-	22	169	-	-	169	-	-	-	-	-	-	1,118	-
5b.1.1.15	Main Gate Security	-	95	-	-	-	-	-	14	109	-	-	109	-	-	-	-	-	-	674	-
5b.1.1.16	Maintenance Building	-	254	-	-	-	-	-	38	292	-	-	292	-	-	-	-	-	-	2,276	-
5b.1.1.17	Materials Warehouse	-	879	-	-	-	-	-	132	1,011	-	-	1,011	-	-	-	-	-	-	6,242	-
5b.1.1.18	Miscellaneous Structures	-	487	-	-	-	-	-	73	560	-	-	560	-	-	-	-	-	-	3,099	-
5b.1.1.19	New Radwaste Building	-	240	-	-	-	-	-	36	276	-	-	276	-	-	-	-	-	-	1,687	-
5b.1.1.20	New Sample Pump House	-	8	-	-	-	-	-	1	9	-	-	9	-	-	-	-	-	-	75	-
5b.1.1.21	Office Building	-	161	-	-	-	-	-	24	185	-	-	185	-	-	-	-	-	-	733	-
5b.1.1.22	Plant Engineering	-	160	-	-	-	-	-	24	184	-	-	184	-	-	-	-	-	-	1,142	-
5b.1.1.23	Pretreatment Building	-	27	-	-	-	-	-	4	31	-	-	31	-	-	-	-	-	-	256	-
5b.1.1.24	Reactor Building	-	3,733	-	-	-	-	-	560	4,293	-	-	4,293	-	-	-	-	-	-	22,813	-
5b.1.1.25	Sample Pool	-	11	-	-	-	-	-	2	13	-	-	13	-	-	-	-	-	-	88	-
5b.1.1.26	Security Modifications	-	910	-	-	-	-	-	137	1,047	-	-	1,047	-	-	-	-	-	-	3,373	-
5b.1.1.27	Site Emergency Building	-	304	-	-	-	-	-	46	350	-	-	350	-	-	-	-	-	-	2,214	-

Table D
Oyster Creek Nuclear Generating Station
Delayed DECON Decommissioning Cost Estimate
(thousands of 2016 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			
Demolition of Remaining Site Buildings (continued)																					
5b.1.1.28	Tank Pads & Misc. Yard	-	859	-	-	-	-	-	129	987	-	-	987	-	-	-	-	-	-	7,200	-
5b.1.1.29	Turbine Building	-	2,800	-	-	-	-	-	420	3,221	-	-	3,221	-	-	-	-	-	-	19,913	-
5b.1.1.30	Turbine Pedestal	-	277	-	-	-	-	-	42	319	-	-	319	-	-	-	-	-	-	1,243	-
5b.1.1	Totals	-	14,192	-	-	-	-	-	2,129	16,320	-	-	16,320	-	-	-	-	-	-	87,101	-
Site Closeout Activities																					
5b.1.2	Remove Rubble	-	825	-	-	-	-	-	124	949	-	-	949	-	-	-	-	-	-	3,517	-
5b.1.3	Grade & landscape site	-	590	-	-	-	-	-	88	678	-	-	678	-	-	-	-	-	-	1,304	-
5b.1.4	Final report to NRC	-	-	-	-	-	-	207	31	238	238	-	-	-	-	-	-	-	-	-	1,560
5b.1	Subtotal Period 5b Activity Costs	-	15,607	-	-	-	-	207	2,372	18,185	238	-	17,948	-	-	-	-	-	-	91,922	1,560
Period 5b Additional Costs																					
5b.2.1	Concrete Crushing	-	780	-	-	-	-	11	119	909	-	-	909	-	-	-	-	-	-	3,056	-
5b.2.2	Construction Debris	-	-	-	-	-	-	768	115	883	-	-	883	-	-	-	-	-	-	-	-
5b.2.3	Install Cofferdams - Intake & Dilution	-	1,125	-	-	-	-	-	169	1,294	-	-	1,294	-	-	-	-	-	-	8,591	-
5b.2.4	Site Restoration ISFSI	-	626	-	-	-	-	76	105	807	-	-	807	-	-	-	-	-	-	2,972	160
5b.2	Subtotal Period 5b Additional Costs	-	2,531	-	-	-	-	855	508	3,894	-	-	3,894	-	-	-	-	-	-	14,619	160
Period 5b Collateral Costs																					
5b.3.1	Small tool allowance	-	160	-	-	-	-	-	24	184	-	-	184	-	-	-	-	-	-	-	-
5b.3	Subtotal Period 5b Collateral Costs	-	160	-	-	-	-	-	24	184	-	-	184	-	-	-	-	-	-	-	-
Period 5b Period-Dependent Costs																					
5b.4.2	Property taxes	-	-	-	-	-	-	1,552	155	1,708	-	-	1,708	-	-	-	-	-	-	-	-
5b.4.3	Heavy equipment rental	-	6,217	-	-	-	-	-	933	7,149	-	-	7,149	-	-	-	-	-	-	-	-
5b.4.4	Plant energy budget	-	-	-	-	-	-	280	42	322	-	-	322	-	-	-	-	-	-	-	-
5b.4.5	Security Staff Cost	-	-	-	-	-	-	2,524	379	2,903	-	-	2,903	-	-	-	-	-	-	-	38,880
5b.4.6	DOC Staff Cost	-	-	-	-	-	-	10,797	1,620	12,417	-	-	12,417	-	-	-	-	-	-	-	110,160
5b.4.7	Utility Staff Cost	-	-	-	-	-	-	6,092	914	7,006	-	-	7,006	-	-	-	-	-	-	-	63,180
5b.4	Subtotal Period 5b Period-Dependent Costs	-	6,217	-	-	-	-	21,246	4,042	31,505	-	-	31,505	-	-	-	-	-	-	-	212,220
5b.0	TOTAL PERIOD 5b COST	-	24,514	-	-	-	-	22,308	6,946	53,768	238	-	53,530	-	-	-	-	-	-	106,541	213,940
PERIOD 5 TOTALS		-	24,514	-	-	-	-	22,308	6,946	53,768	238	-	53,530	-	-	-	-	-	-	106,541	213,940
TOTAL COST TO DECOMMISSION		**20,022**	**131,178**	**18,257**	**19,755**	**14,201**	**60,534**	**775,869**	**186,385**	**1,226,200**	**823,222**	**345,937**	**57,042**	**494,862**	**568,528**	**1,420**	**350**	**1,547**	**64,532,020**	**1,311,435**	**7,480,164**

TOTAL COST TO DECOMMISSION WITH 17.92% CONTINGENCY:	**$1,226,200**	**thousands of 2016 dollars**
TOTAL NRC LICENSE TERMINATION COST IS 67.14% OR:	**$823,222**	**thousands of 2016 dollars**
SPENT FUEL MANAGEMENT COST IS 28.21% OR:	**$345,937**	**thousands of 2016 dollars**
NON-NUCLEAR DEMOLITION COST IS 4.65% OR:	**$57,042**	**thousands of 2016 dollars**
TOTAL LOW-LEVEL RADIOACTIVE WASTE VOLUME BURIED (EXCLUDING GTCC):	**570,298**	**cubic feet**
TOTAL GREATER THAN CLASS C RADWASTE VOLUME GENERATED:	**1,547**	**cubic feet**
TOTAL SCRAP METAL REMOVED:	**23,586**	**tons**
TOTAL CRAFT LABOR REQUIREMENTS:	**1,311,435**	**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

APPENDIX E

DETAILED COST ANALYSIS

SAFSTOR

Table E
Oyster Creek Nuclear Generating Station
SAFSTOR Decommissioning Cost Estimate
(thousands of 2016 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 Direct Decommissioning Activities																					
Period 0a Additional Costs																					
0a.2.1	Site Organization	-	-	-	-	-	-	4,095	614	4,709	4,709	-	-	-	-	-	-	-	-	-	37,440
0a.2.2	Corporate Resources	-	-	-	-	-	-	6,856	1,028	7,885	7,885	-	-	-	-	-	-	-	-	-	58,240
0a.2	Subtotal Period 0a Additional Costs	-	-	-	-	-	-	10,951	1,643	12,593	12,593	-	-	-	-	-	-	-	-	-	95,680
0a.0	TOTAL PERIOD 0a COST	-	-	-	-	-	-	10,951	1,643	12,593	12,593	-	-	-	-	-	-	-	-	-	95,680
PERIOD 1a - Shutdown through Transition																					
Period 1a Direct Decommissioning Activities																					
1a.1.1	SAFSTOR site characterization survey	-	-	-	-	-	-	494	148	642	642	-	-	-	-	-	-	-	-	-	-
1a.1.2	Prepare preliminary decommissioning cost	-	-	-	-	-	-	172	26	198	198	-	-	-	-	-	-	-	-	-	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	-	-	-	-	-	-	265	40	305	305	-	-	-	-	-	-	-	-	-	2,000
1a.1.8	Review plant dwgs & specs.	-	-	-	-	-	-	172	26	198	198	-	-	-	-	-	-	-	-	-	1,300
1a.1.9	Perform detailed rad survey									a											
1a.1.10	Estimate by-product inventory	-	-	-	-	-	-	133	20	152	152	-	-	-	-	-	-	-	-	-	1,000
1a.1.11	End product description	-	-	-	-	-	-	133	20	152	152	-	-	-	-	-	-	-	-	-	1,000
1a.1.12	Detailed by-product inventory	-	-	-	-	-	-	199	30	229	229	-	-	-	-	-	-	-	-	-	1,500
1a.1.13	Define major work sequence	-	-	-	-	-	-	133	20	152	152	-	-	-	-	-	-	-	-	-	1,000
1a.1.14	Perform SER and EA	-	-	-	-	-	-	411	62	473	473	-	-	-	-	-	-	-	-	-	3,100
1a.1.15	Perform Site-Specific Cost Study	-	-	-	-	-	-	663	99	762	762	-	-	-	-	-	-	-	-	-	5,000
Activity Specifications																					
1a.1.16.1	Prepare plant and facilities for SAFSTOR	-	-	-	-	-	-	652	98	750	750	-	-	-	-	-	-	-	-	-	4,920
1a.1.16.2	Plant systems	-	-	-	-	-	-	552	83	635	635	-	-	-	-	-	-	-	-	-	4,167
1a.1.16.3	Plant structures and buildings	-	-	-	-	-	-	414	62	476	476	-	-	-	-	-	-	-	-	-	3,120
1a.1.16.4	Waste management	-	-	-	-	-	-	265	40	305	305	-	-	-	-	-	-	-	-	-	2,000
1a.1.16.5	Facility and site dormancy	-	-	-	-	-	-	265	40	305	305	-	-	-	-	-	-	-	-	-	2,000
1a.1.16	Total	-	-	-	-	-	-	2,148	322	2,470	2,470	-	-	-	-	-	-	-	-	-	16,207
Detailed Work Procedures																					
1a.1.17.1	Plant systems	-	-	-	-	-	-	157	24	180	180	-	-	-	-	-	-	-	-	-	1,183
1a.1.17.2	Facility closeout & dormancy	-	-	-	-	-	-	159	24	183	183	-	-	-	-	-	-	-	-	-	1,200
1a.1.17	Total	-	-	-	-	-	-	316	47	363	363	-	-	-	-	-	-	-	-	-	2,383
1a.1.18	Procure vacuum drying system	-	-	-	-	-	-	13	2	15	15	-	-	-	-	-	-	-	-	-	100
1a.1.19	Drain/de-energize non-cont. systems									a											
1a.1.20	Drain & dry NSSS									a											
1a.1.21	Drain/de-energize contaminated systems									a											
1a.1.22	Decon/secure contaminated systems									a											
1a.1	Subtotal Period 1a Activity Costs	-	-	-	-	-	-	5,251	862	6,113	6,113	-	-	-	-	-	-	-	-	-	35,890
Period 1a Additional Costs																					
1a.2.1	ISFSI Expansion	-	-	-	-	-	-	8,000	1,200	9,200	-	9,200	-	-	-	-	-	-	-	-	-
1a.2.2	Dredging	-	-	-	-	-	-	3,500	525	4,025	4,025	-	-	-	-	-	-	-	-	-	-
1a.2	Subtotal Period 1a Additional Costs	-	-	-	-	-	-	11,500	1,725	13,225	4,025	9,200	-	-	-	-	-	-	-	-	-
Period 1a Collateral Costs																					
1a.3.1	Spent Fuel Capital and Transfer	-	-	-	-	-	-	8,166	1,225	9,391	-	9,391	-	-	-	-	-	-	-	-	-
1a.3	Subtotal Period 1a Collateral Costs	-	-	-	-	-	-	8,166	1,225	9,391	-	9,391	-	-	-	-	-	-	-	-	-
Period 1a Period-Dependent Costs																					
1a.4.1	Insurance	-	-	-	-	-	-	2,763	276	3,040	3,040	-	-	-	-	-	-	-	-	-	-
1a.4.2	Property taxes	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1a.4.3	Health physics supplies	-	563	-	-	-	-	-	141	704	704	-	-	-	-	-	-	-	-	-	-
1a.4.4	Heavy equipment rental	-	780	-	-	-	-	-	117	897	897	-	-	-	-	-	-	-	-	-	-
1a.4.5	Disposal of DAW generated	-	-	15	3	-	35	-	11	63	63	-	-	-	611	-	-	-	12,224	20	-
1a.4.6	Plant energy budget	-	-	-	-	-	-	1,807	271	2,078	2,078	-	-	-	-	-	-	-	-	-	-
1a.4.7	NRC Fees	-	-	-	-	-	-	1,145	115	1,260	1,260	-	-	-	-	-	-	-	-	-	-
1a.4.8	Emergency Planning Fees	-	-	-	-	-	-	3,245	324	3,569	-	3,569	-	-	-	-	-	-	-	-	-

Table E
Oyster Creek Nuclear Generating Station
SAFSTOR Decommissioning Cost Estimate
(thousands of 2016 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 Class A Cu. Feet	Burial Volumes Class B Cu. Feet	Burial Volumes Class C Cu. Feet	Burial Volumes GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
Period 1a Period-Dependent Costs (continued)																					
1a.4.9	Spent Fuel Pool O&M	-	-	-	-	-	-	803	120	924	-	924	-	-	-	-	-	-	-	-	-
1a.4.10	ISFSI Operating Costs	-	-	-	-	-	-	101	15	116	-	116	-	-	-	-	-	-	-	-	-
1a.4.11	Independent Corporate Oversight Organization	-	-	-	-	-	-	25	4	29	29	-	-	-	-	-	-	-	-	-	-
1a.4.12	Security Staff Cost	-	-	-	-	-	-	16,976	2,546	19,522	19,522	-	-	-	-	-	-	-	-	-	269,794
1a.4.13	Utility Staff Cost	-	-	-	-	-	-	37,517	5,628	43,145	43,145	-	-	-	-	-	-	-	-	-	424,560
1a.4	Subtotal Period 1a Period-Dependent Costs	-	1,344	15	3	-	35	64,382	9,568	75,347	70,738	4,609	-	-	611	-	-	-	12,224	20	694,354
1a.0	TOTAL PERIOD 1a COST	-	1,344	15	3	-	35	89,299	13,380	104,075	80,876	23,199	-	-	611	-	-	-	12,224	20	730,244
PERIOD 1b - SAFSTOR Limited DECON Activities																					
Period 1b Direct Decommissioning Activities																					
Decontamination of Site Buildings																					
1b.1.1.1	New Radwaste Building - Systems Removal	0	-	-	-	-	-	-	0	0	0	-	-	-	-	-	-	-	-	1	-
1b.1.1.2	Old Radwaste Building - Systems Removal	0	-	-	-	-	-	-	0	0	0	-	-	-	-	-	-	-	-	1	-
1b.1.1.3	Augmented Off Gas - Decon	3	-	-	-	-	-	-	1	4	4	-	-	-	-	-	-	-	-	33	-
1b.1.1.4	Stack/Exhaust Tunnels - Remove & Decon	66	-	-	-	-	-	-	33	99	99	-	-	-	-	-	-	-	-	849	-
1b.1.1.5	Turbine Building 0ft - Decon	12	-	-	-	-	-	-	6	18	18	-	-	-	-	-	-	-	-	137	-
1b.1.1.6	New Radwaste Building - Contaminated	27	-	-	-	-	-	-	14	41	41	-	-	-	-	-	-	-	-	319	-
1b.1.1.7	Drywell - Liner Removal	2,512	-	-	-	-	-	-	1,256	3,768	3,768	-	-	-	-	-	-	-	-	28,819	-
1b.1.1.8	RB0 - Torus Removal	3,368	-	-	-	-	-	-	1,684	5,052	5,052	-	-	-	-	-	-	-	-	38,634	-
1b.1.1.9	Reactor Building -19ft - Decon	8	-	-	-	-	-	-	4	13	13	-	-	-	-	-	-	-	-	96	-
1b.1.1.10	Reactor Building 119ft - Decon	523	-	-	-	-	-	-	261	784	784	-	-	-	-	-	-	-	-	5,996	-
1b.1.1	Totals	6,520	-	-	-	-	-	-	3,260	9,780	9,780	-	-	-	-	-	-	-	-	74,884	-
1b.1	Subtotal Period 1b Activity Costs	6,520	-	-	-	-	-	-	3,260	9,780	9,780	-	-	-	-	-	-	-	-	74,884	-
Period 1b Additional Costs																					
1b.2.1	Spent fuel pool isolation	-	-	-	-	-	-	11,358	1,704	13,062	13,062	-	-	-	-	-	-	-	-	-	-
1b.2	Subtotal Period 1b Additional Costs	-	-	-	-	-	-	11,358	1,704	13,062	13,062	-	-	-	-	-	-	-	-	-	-
Period 1b Collateral Costs																					
1b.3.1	Decon equipment	1,033	-	-	-	-	-	-	155	1,188	1,188	-	-	-	-	-	-	-	-	-	-
1b.3.2	Process decommissioning water waste	288	-	215	339	-	598	-	366	1,806	1,806	-	-	-	1,817	-	-	-	109,016	354	-
1b.3.4	Small tool allowance	-	125	-	-	-	-	-	19	144	144	-	-	-	-	-	-	-	-	-	-
1b.3.5	Spent Fuel Capital and Transfer	-	-	-	-	-	-	3,971	596	4,566	-	4,566	-	-	-	-	-	-	-	-	-
1b.3	Subtotal Period 1b Collateral Costs	1,321	125	215	339	-	598	3,971	1,135	7,704	3,138	4,566	-	-	1,817	-	-	-	109,016	354	-
Period 1b Period-Dependent Costs																					
1b.4.1	Decon supplies	1,272	-	-	-	-	-	-	318	1,590	1,590	-	-	-	-	-	-	-	-	-	-
1b.4.2	Insurance	-	-	-	-	-	-	522	52	574	574	-	-	-	-	-	-	-	-	-	-
1b.4.3	Property taxes	-	-	-	-	-	-	493	49	542	542	-	-	-	-	-	-	-	-	-	-
1b.4.4	Health physics supplies	-	532	-	-	-	-	-	133	665	665	-	-	-	-	-	-	-	-	-	-
1b.4.5	Heavy equipment rental	-	194	-	-	-	-	-	29	223	223	-	-	-	-	-	-	-	-	-	-
1b.4.6	Disposal of DAW generated	-	-	4	1	-	10	-	3	17	17	-	-	-	168	-	-	-	3,367	5	-
1b.4.7	Plant energy budget	-	-	-	-	-	-	449	67	517	517	-	-	-	-	-	-	-	-	-	-
1b.4.8	NRC Fees	-	-	-	-	-	-	167	17	184	184	-	-	-	-	-	-	-	-	-	-
1b.4.9	Emergency Planning Fees	-	-	-	-	-	-	807	81	887	-	887	-	-	-	-	-	-	-	-	-
1b.4.10	Spent Fuel Pool O&M	-	-	-	-	-	-	200	30	230	-	230	-	-	-	-	-	-	-	-	-
1b.4.11	ISFSI Operating Costs	-	-	-	-	-	-	25	4	29	-	29	-	-	-	-	-	-	-	-	-
1b.4.12	Independent Corporate Oversight Organization	-	-	-	-	-	-	6	1	7	7	-	-	-	-	-	-	-	-	-	-
1b.4.13	Security Staff Cost	-	-	-	-	-	-	4,221	633	4,854	4,854	-	-	-	-	-	-	-	-	-	67,080
1b.4.14	Utility Staff Cost	-	-	-	-	-	-	9,328	1,399	10,727	10,727	-	-	-	-	-	-	-	-	-	105,560
1b.4	Subtotal Period 1b Period-Dependent Costs	1,272	726	4	1	-	10	16,217	2,816	21,046	19,900	1,146	-	-	168	-	-	-	3,367	5	172,640
1b.0	TOTAL PERIOD 1b COST	9,113	851	219	340	-	608	31,546	8,915	51,591	45,879	5,712	-	-	1,985	-	-	-	112,383	75,244	172,640
PERIOD 1c - Preparations for SAFSTOR Dormancy																					
Period 1c Direct Decommissioning Activities																					
1c.1.1	Prepare support equipment for storage	-	550	-	-	-	-	-	82	632	632	-	-	-	-	-	-	-	-	3,000	-
1c.1.2	Install containment pressure equal. lines	-	63	-	-	-	-	-	9	72	72	-	-	-	-	-	-	-	-	700	-
1c.1.3	Interim survey prior to dormancy	-	-	-	-	-	-	733	220	953	953	-	-	-	-	-	-	-	-	10,559	-
1c.1.4	Secure building accesses									a											
1c.1.5	Prepare & submit interim report	-	-	-	-	-	-	77	12	89	89	-	-	-	-	-	-	-	-	-	583

Table E
Oyster Creek Nuclear Generating Station
SAFSTOR Decommissioning Cost Estimate
(thousands of 2016 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			
1c.1	Subtotal Period 1c Activity Costs	-	612	-	-	-	-	810	323	1,746	1,746	-	-	-	-	-	-	-	-	14,259	583
Period 1c Collateral Costs																					
1c.3.1	Process decommissioning water waste	237	-	178	280	-	495	-	302	1,492	1,492	-	-	-	1,502	-	-	-	90,106	293	-
1c.3.3	Small tool allowance	-	6	-	-	-	-	-	1	7	7	-	-	-	-	-	-	-	-	-	-
1c.3.4	Spent Fuel Capital and Transfer	-	-	-	-	-	-	3,971	596	4,566	-	4,566	-	-	-	-	-	-	-	-	-
1c.3	Subtotal Period 1c Collateral Costs	237	6	178	280	-	495	3,971	899	6,066	1,500	4,566	-	-	1,502	-	-	-	90,106	293	-
Period 1c Period-Dependent Costs																					
1c.4.1	Insurance	-	-	-	-	-	-	522	52	574	574	-	-	-	-	-	-	-	-	-	-
1c.4.2	Property taxes	-	-	-	-	-	-	493	49	542	542	-	-	-	-	-	-	-	-	-	-
1c.4.3	Health physics supplies	-	216	-	-	-	-	-	54	270	270	-	-	-	-	-	-	-	-	-	-
1c.4.4	Heavy equipment rental	-	194	-	-	-	-	-	29	223	223	-	-	-	-	-	-	-	-	-	-
1c.4.5	Disposal of DAW generated	-	-	4	1	-	9	-	3	16	16	-	-	-	152	-	-	-	3,039	5	-
1c.4.6	Plant energy budget	-	-	-	-	-	-	449	67	517	517	-	-	-	-	-	-	-	-	-	-
1c.4.7	NRC Fees	-	-	-	-	-	-	167	17	184	184	-	-	-	-	-	-	-	-	-	-
1c.4.8	Emergency Planning Fees	-	-	-	-	-	-	807	81	887	-	887	-	-	-	-	-	-	-	-	-
1c.4.9	Spent Fuel Pool O&M	-	-	-	-	-	-	200	30	230	-	230	-	-	-	-	-	-	-	-	-
1c.4.10	ISFSI Operating Costs	-	-	-	-	-	-	25	4	29	-	29	-	-	-	-	-	-	-	-	-
1c.4.11	Independent Corporate Oversight Organization	-	-	-	-	-	-	6	1	7	7	-	-	-	-	-	-	-	-	-	-
1c.4.12	Security Staff Cost	-	-	-	-	-	-	4,221	633	4,854	4,854	-	-	-	-	-	-	-	-	-	67,080
1c.4.13	Utility Staff Cost	-	-	-	-	-	-	9,328	1,399	10,727	10,727	-	-	-	-	-	-	-	-	-	105,560
1c.4	Subtotal Period 1c Period-Dependent Costs	-	410	4	1	-	9	16,217	2,419	19,059	17,913	1,146	-	-	152	-	-	-	3,039	5	172,640
1c.0	TOTAL PERIOD 1c COST	237	1,029	181	281	-	503	20,998	3,641	26,871	21,159	5,712	-	-	1,654	-	-	-	93,146	14,557	173,223
PERIOD 1 TOTALS		9,350	3,223	416	624	-	1,146	141,843	25,936	182,538	147,914	34,624	-	-	4,250	-	-	-	217,752	89,821	1,076,108
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	-	-	-	-	-	-	208	31	239	239	-	-	-	-	-	-	-	-	-	-
2a.1.5	Maintenance supplies	-	-	-	-	-	-	560	140	700	700	-	-	-	-	-	-	-	-	-	-
2a.1	Subtotal Period 2a Activity Costs	-	-	-	-	-	-	768	171	939	939	-	-	-	-	-	-	-	-	-	-
Period 2a Collateral Costs																					
2a.3.1	Spent Fuel Capital and Transfer	-	-	-	-	-	-	69,856	10,478	80,334	-	80,334	-	-	-	-	-	-	-	-	-
2a.3	Subtotal Period 2a Collateral Costs	-	-	-	-	-	-	69,856	10,478	80,334	-	80,334	-	-	-	-	-	-	-	-	-
Period 2a Period-Dependent Costs																					
2a.4.1	Insurance	-	-	-	-	-	-	4,389	439	4,828	3,372	1,456	-	-	-	-	-	-	-	-	-
2a.4.2	Property taxes	-	-	-	-	-	-	4,810	481	5,291	5,291	-	-	-	-	-	-	-	-	-	-
2a.4.3	Health physics supplies	-	902	-	-	-	-	-	225	1,127	1,127	-	-	-	-	-	-	-	-	-	-
2a.4.4	Disposal of DAW generated	-	-	23	4	-	52	-	16	95	95	-	-	-	920	-	-	-	18,406	30	-
2a.4.5	Plant energy budget	-	-	-	-	-	-	1,442	216	1,658	829	829	-	-	-	-	-	-	-	-	-
2a.4.6	NRC Fees	-	-	-	-	-	-	1,143	114	1,257	1,257	-	-	-	-	-	-	-	-	-	-
2a.4.7	Emergency Planning Fees	-	-	-	-	-	-	10,270	1,027	11,297	-	11,297	-	-	-	-	-	-	-	-	-
2a.4.8	Spent Fuel Pool O&M	-	-	-	-	-	-	3,204	481	3,684	-	3,684	-	-	-	-	-	-	-	-	-
2a.4.9	ISFSI Operating Costs	-	-	-	-	-	-	401	60	461	-	461	-	-	-	-	-	-	-	-	-
2a.4.10	Independent Corporate Oversight Organization	-	-	-	-	-	-	100	15	115	-	115	-	-	-	-	-	-	-	-	-
2a.4.11	Security Staff Cost	-	-	-	-	-	-	50,916	7,637	58,554	9,703	48,851	-	-	-	-	-	-	-	-	795,909
2a.4.12	Utility Staff Cost	-	-	-	-	-	-	28,854	4,328	33,182	7,393	25,789	-	-	-	-	-	-	-	-	329,543
2a.4	Subtotal Period 2a Period-Dependent Costs	-	902	23	4	-	52	105,529	15,040	121,549	29,067	92,483	-	-	920	-	-	-	18,406	30	1,125,451
2a.0	TOTAL PERIOD 2a COST	-	902	23	4	-	52	176,152	25,690	202,822	30,006	172,817	-	-	920	-	-	-	18,406	30	1,125,451
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	-	-	-	-	-	-	547	82	629	629	-	-	-	-	-	-	-	-	-	-
2b.1.5	Maintenance supplies	-	-	-	-	-	-	1,470	368	1,838	1,838	-	-	-	-	-	-	-	-	-	-
2b.1	Subtotal Period 2b Activity Costs	-	-	-	-	-	-	2,017	450	2,467	2,467	-	-	-	-	-	-	-	-	-	-

Table E
Oyster Creek Nuclear Generating Station
SAFSTOR Decommissioning Cost Estimate
(thousands of 2016 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 Collateral Costs																					
2b.3.1	Spent Fuel Capital and Transfer	-	-	-	-	-	-	10,400	1,560	11,960	-	11,960	-	-	-	-	-	-	-	-	-
2b.3	Subtotal Period 2b Collateral Costs	-	-	-	-	-	-	10,400	1,560	11,960	-	11,960	-	-	-	-	-	-	-	-	-
Period 2b Period-Dependent Costs																					
2b.4.1	Insurance	-	-	-	-	-	-	8,054	805	8,859	8,859	-	-	-	-	-	-	-	-	-	-
2b.4.2	Property taxes	-	-	-	-	-	-	10,502	1,050	11,553	11,553	-	-	-	-	-	-	-	-	-	-
2b.4.3	Health physics supplies	-	1,149	-	-	-	-	-	287	1,436	1,436	-	-	-	-	-	-	-	-	-	-
2b.4.4	Disposal of DAW generated	-	-	29	5	-	66	-	20	120	120	-	-	-	1,162	-	-	-	23,231	38	-
2b.4.5	Plant energy budget	-	-	-	-	-	-	1,894	284	2,178	2,178	-	-	-	-	-	-	-	-	-	-
2b.4.6	NRC Fees	-	-	-	-	-	-	2,868	287	3,155	3,155	-	-	-	-	-	-	-	-	-	-
2b.4.7	ISFSI Operating Costs	-	-	-	-	-	-	1,054	158	1,212	-	1,212	-	-	-	-	-	-	-	-	-
2b.4.8	Independent Corporate Oversight Organization	-	-	-	-	-	-	263	39	302	-	302	-	-	-	-	-	-	-	-	-
2b.4.9	Security Staff Cost	-	-	-	-	-	-	55,141	8,271	63,412	25,493	37,919	-	-	-	-	-	-	-	-	898,720
2b.4.10	Utility Staff Cost	-	-	-	-	-	-	30,769	4,615	35,384	19,423	15,960	-	-	-	-	-	-	-	-	350,720
2b.4	Subtotal Period 2b Period-Dependent Costs	-	1,149	29	5	-	66	110,545	15,818	127,612	72,218	55,394	-	-	1,162	-	-	-	23,231	38	1,249,440
2b.0	TOTAL PERIOD 2b COST	-	1,149	29	5	-	66	122,962	17,828	142,039	74,685	67,354	-	-	1,162	-	-	-	23,231	38	1,249,440
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	-	-	-	-	-	-	2,043	306	2,350	2,350	-	-	-	-	-	-	-	-	-	-
2c.1.5	Maintenance supplies	-	-	-	-	-	-	5,491	1,373	6,863	6,863	-	-	-	-	-	-	-	-	-	-
2c.1	Subtotal Period 2c Activity Costs	-	-	-	-	-	-	7,534	1,679	9,213	9,213	-	-	-	-	-	-	-	-	-	-
Period 2c Period-Dependent Costs																					
2c.4.1	Insurance	-	-	-	-	-	-	30,077	3,008	33,084	33,084	-	-	-	-	-	-	-	-	-	-
2c.4.2	Property taxes	-	-	-	-	-	-	39,220	3,922	43,142	43,142	-	-	-	-	-	-	-	-	-	-
2c.4.3	Health physics supplies	-	4,036	-	-	-	-	-	1,009	5,045	5,045	-	-	-	-	-	-	-	-	-	-
2c.4.4	Disposal of DAW generated	-	-	98	19	-	226	-	69	413	413	-	-	-	3,995	-	-	-	79,898	130	-
2c.4.5	Plant energy budget	-	-	-	-	-	-	7,072	1,061	8,133	8,133	-	-	-	-	-	-	-	-	-	-
2c.4.6	NRC Fees	-	-	-	-	-	-	9,871	987	10,858	10,858	-	-	-	-	-	-	-	-	-	-
2c.4.7	Security Staff Cost	-	-	-	-	-	-	82,782	12,417	95,199	95,199	-	-	-	-	-	-	-	-	-	1,227,857
2c.4.8	Utility Staff Cost	-	-	-	-	-	-	63,073	9,461	72,534	72,534	-	-	-	-	-	-	-	-	-	716,250
2c.4	Subtotal Period 2c Period-Dependent Costs	-	4,036	98	19	-	226	232,095	31,934	268,408	268,408	-	-	-	3,995	-	-	-	79,898	130	1,944,107
2c.0	TOTAL PERIOD 2c COST	-	4,036	98	19	-	226	239,629	33,613	277,621	277,621	-	-	-	3,995	-	-	-	79,898	130	1,944,107
PERIOD 2 TOTALS		-	6,086	150	29	-	344	538,743	77,130	622,482	382,312	240,170	-	-	6,077	-	-	-	121,535	198	4,318,998
PERIOD 3a - Reactivate Site Following SAFSTOR Dormancy																					
Period 3a Direct Decommissioning Activities																					
3a.1.1	Prepare preliminary decommissioning cost	-	-	-	-	-	-	172	26	198	198	-	-	-	-	-	-	-	-	-	1,300
3a.1.2	Review plant dwgs & specs.	-	-	-	-	-	-	610	91	701	701	-	-	-	-	-	-	-	-	-	4,600
3a.1.3	Perform detailed rad survey									a											
3a.1.4	End product description	-	-	-	-	-	-	133	20	152	152	-	-	-	-	-	-	-	-	-	1,000
3a.1.5	Detailed by-product inventory	-	-	-	-	-	-	172	26	198	198	-	-	-	-	-	-	-	-	-	1,300
3a.1.6	Define major work sequence	-	-	-	-	-	-	994	149	1,143	1,143	-	-	-	-	-	-	-	-	-	7,500
3a.1.7	Perform SER and EA	-	-	-	-	-	-	411	62	473	473	-	-	-	-	-	-	-	-	-	3,100
3a.1.8	Perform Site-Specific Cost Study	-	-	-	-	-	-	663	99	762	762	-	-	-	-	-	-	-	-	-	5,000
3a.1.9	Prepare/submit License Termination Plan	-	-	-	-	-	-	543	81	624	624	-	-	-	-	-	-	-	-	-	4,096
3a.1.10	Receive NRC approval of termination plan									a											
Activity Specifications																					
3a.1.11.1	Re-activate plant & temporary facilities	-	-	-	-	-	-	977	147	1,123	1,011	-	112	-	-	-	-	-	-	-	7,370
3a.1.11.2	Plant systems	-	-	-	-	-	-	552	83	635	572	-	64	-	-	-	-	-	-	-	4,167
3a.1.11.3	Reactor internals	-	-	-	-	-	-	941	141	1,082	1,082	-	-	-	-	-	-	-	-	-	7,100
3a.1.11.4	Reactor vessel	-	-	-	-	-	-	862	129	991	991	-	-	-	-	-	-	-	-	-	6,500
3a.1.11.5	Sacrificial shield	-	-	-	-	-	-	66	10	76	76	-	-	-	-	-	-	-	-	-	500
3a.1.11.6	Moisture separators/reheaters	-	-	-	-	-	-	133	20	152	152	-	-	-	-	-	-	-	-	-	1,000
3a.1.11.7	Reinforced concrete	-	-	-	-	-	-	212	32	244	122	-	122	-	-	-	-	-	-	-	1,600
3a.1.11.8	Main Turbine	-	-	-	-	-	-	277	42	318	318	-	-	-	-	-	-	-	-	-	2,088
3a.1.11.9	Main Condensers	-	-	-	-	-	-	277	42	318	318	-	-	-	-	-	-	-	-	-	2,088

Table E
Oyster Creek Nuclear Generating Station
SAFSTOR Decommissioning Cost Estimate
(thousands of 2016 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 Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
Activity Specifications (continued)																					
3a.1.11.10	Pressure suppression structure	-	-	-	-	-	-	265	40	305	305	-	-	-	-	-	-	-	-	-	2,000
3a.1.11.11	Drywell	-	-	-	-	-	-	212	32	244	244	-	-	-	-	-	-	-	-	-	1,600
3a.1.11.12	Plant structures & buildings	-	-	-	-	-	-	414	62	476	238	-	238	-	-	-	-	-	-	-	3,120
3a.1.11.13	Waste management	-	-	-	-	-	-	610	91	701	701	-	-	-	-	-	-	-	-	-	4,600
3a.1.11.14	Facility & site closeout	-	-	-	-	-	-	119	18	137	69	-	69	-	-	-	-	-	-	-	900
3a.1.11	Total	-	-	-	-	-	-	5,916	887	6,803	6,199	-	604	-	-	-	-	-	-	-	44,633
Planning & Site Preparations																					
3a.1.12	Prepare dismantling sequence	-	-	-	-	-	-	318	48	366	366	-	-	-	-	-	-	-	-	-	2,400
3a.1.13	Plant prep. & temp. svces	-	-	-	-	-	-	3,200	480	3,680	3,680	-	-	-	-	-	-	-	-	-	-
3a.1.14	Design water clean-up system	-	-	-	-	-	-	186	28	213	213	-	-	-	-	-	-	-	-	-	1,400
3a.1.15	Rigging/Cont. Cntrl Envlps/tooling/etc.	-	-	-	-	-	-	2,300	345	2,645	2,645	-	-	-	-	-	-	-	-	-	-
3a.1.16	Procure casks/liners & containers	-	-	-	-	-	-	163	24	187	187	-	-	-	-	-	-	-	-	-	1,230
3a.1	Subtotal Period 3a Activity Costs	-	-	-	-	-	-	15,780	2,367	18,147	17,543	-	604	-	-	-	-	-	-	-	77,559
Period 3a Period-Dependent Costs																					
3a.4.1	Insurance	-	-	-	-	-	-	766	77	843	843	-	-	-	-	-	-	-	-	-	-
3a.4.2	Property taxes	-	-	-	-	-	-	999	100	1,099	1,099	-	-	-	-	-	-	-	-	-	-
3a.4.3	Health physics supplies	-	491	-	-	-	-	-	123	614	614	-	-	-	-	-	-	-	-	-	-
3a.4.4	Heavy equipment rental	-	778	-	-	-	-	-	117	895	895	-	-	-	-	-	-	-	-	-	-
3a.4.5	Disposal of DAW generated	-	-	13	2	-	29	-	9	53	53	-	-	-	514	-	-	-	10,287	17	-
3a.4.6	Plant energy budget	-	-	-	-	-	-	1,802	270	2,072	2,072	-	-	-	-	-	-	-	-	-	-
3a.4.7	NRC Fees	-	-	-	-	-	-	371	37	408	408	-	-	-	-	-	-	-	-	-	-
3a.4.8	Independent Corporate Oversight Organization	-	-	-	-	-	-	25	4	29	29	-	-	-	-	-	-	-	-	-	-
3a.4.9	Security Staff Cost	-	-	-	-	-	-	4,068	610	4,678	4,678	-	-	-	-	-	-	-	-	-	65,179
3a.4.10	Utility Staff Cost	-	-	-	-	-	-	22,976	3,446	26,422	26,422	-	-	-	-	-	-	-	-	-	258,629
3a.4	Subtotal Period 3a Period-Dependent Costs	-	1,269	13	2	-	29	31,007	4,793	37,113	37,113	-	-	-	514	-	-	-	10,287	17	323,807
3a.0	TOTAL PERIOD 3a COST	-	1,269	13	2	-	29	46,788	7,160	55,261	54,657	-	604	-	514	-	-	-	10,287	17	401,366
PERIOD 3b - Decommissioning Preparations																					
Period 3b Direct Decommissioning Activities																					
Detailed Work Procedures																					
3b.1.1.1	Plant systems	-	-	-	-	-	-	627	94	721	649	-	72	-	-	-	-	-	-	-	4,733
3b.1.1.2	Reactor internals	-	-	-	-	-	-	530	80	610	610	-	-	-	-	-	-	-	-	-	4,000
3b.1.1.3	Remaining buildings	-	-	-	-	-	-	179	27	206	51	-	154	-	-	-	-	-	-	-	1,350
3b.1.1.4	CRD housings & NIs	-	-	-	-	-	-	133	20	152	152	-	-	-	-	-	-	-	-	-	1,000
3b.1.1.5	Incore instrumentation	-	-	-	-	-	-	133	20	152	152	-	-	-	-	-	-	-	-	-	1,000
3b.1.1.6	Removal primary containment	-	-	-	-	-	-	265	40	305	305	-	-	-	-	-	-	-	-	-	2,000
3b.1.1.7	Reactor vessel	-	-	-	-	-	-	481	72	553	553	-	-	-	-	-	-	-	-	-	3,630
3b.1.1.8	Facility closeout	-	-	-	-	-	-	159	24	183	91	-	91	-	-	-	-	-	-	-	1,200
3b.1.1.9	Sacrificial shield	-	-	-	-	-	-	159	24	183	183	-	-	-	-	-	-	-	-	-	1,200
3b.1.1.10	Reinforced concrete	-	-	-	-	-	-	133	20	152	76	-	76	-	-	-	-	-	-	-	1,000
3b.1.1.11	Main Turbine	-	-	-	-	-	-	276	41	317	317	-	-	-	-	-	-	-	-	-	2,080
3b.1.1.12	Main Condensers	-	-	-	-	-	-	277	42	318	318	-	-	-	-	-	-	-	-	-	2,088
3b.1.1.13	Moisture separators & reheaters	-	-	-	-	-	-	265	40	305	305	-	-	-	-	-	-	-	-	-	2,000
3b.1.1.14	Radwaste building	-	-	-	-	-	-	362	54	416	375	-	42	-	-	-	-	-	-	-	2,730
3b.1.1.15	Reactor building	-	-	-	-	-	-	362	54	416	375	-	42	-	-	-	-	-	-	-	2,730
3b.1.1	Total	-	-	-	-	-	-	4,340	651	4,991	4,513	-	477	-	-	-	-	-	-	-	32,741
3b.1	Subtotal Period 3b Activity Costs	-	-	-	-	-	-	4,340	651	4,991	4,513	-	477	-	-	-	-	-	-	-	32,741
Period 3b Additional Costs																					
3b.2.1	Site Characterization	-	-	-	-	-	-	5,626	1,688	7,314	7,314	-	-	-	-	-	-	-	-	27,140	9,952
3b.2	Subtotal Period 3b Additional Costs	-	-	-	-	-	-	5,626	1,688	7,314	7,314	-	-	-	-	-	-	-	-	27,140	9,952
Period 3b Collateral Costs																					
3b.3.1	Decon equipment	1,033	-	-	-	-	-	-	155	1,188	1,188	-	-	-	-	-	-	-	-	-	-
3b.3.2	DOC staff relocation expenses	-	-	-	-	-	-	1,308	196	1,504	1,504	-	-	-	-	-	-	-	-	-	-
3b.3.3	Pipe cutting equipment	-	1,200	-	-	-	-	-	180	1,380	1,380	-	-	-	-	-	-	-	-	-	-
3b.3	Subtotal Period 3b Collateral Costs	1,033	1,200	-	-	-	-	1,308	531	4,072	4,072	-	-	-	-	-	-	-	-	-	-
Period 3b Period-Dependent Costs																					
3b.4.1	Decon supplies	32	-	-	-	-	-	-	8	40	40	-	-	-	-	-	-	-	-	-	-
3b.4.2	Insurance	-	-	-	-	-	-	384	38	423	423	-	-	-	-	-	-	-	-	-	-
3b.4.3	Property taxes	-	-	-	-	-	-	501	50	551	551	-	-	-	-	-	-	-	-	-	-
3b.4.4	Health physics supplies	-	271	-	-	-	-	-	68	339	339	-	-	-	-	-	-	-	-	-	-

Table E
Oyster Creek Nuclear Generating Station
SAFSTOR Decommissioning Cost Estimate
(thousands of 2016 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 Class A Cu. Feet	Burial Volumes Class B Cu. Feet	Burial Volumes Class C Cu. Feet	Burial Volumes GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
Period 3b Period-Dependent Costs (continued)																					
3b.4.5	Heavy equipment rental	-	390	-	-	-	-	-	59	449	449	-	-	-	-	-	-	-	-	-	-
3b.4.6	Disposal of DAW generated	-	-	7	1	-	17	-	5	30	30	-	-	-	292	-	-	-	5,834	10	-
3b.4.7	Plant energy budget	-	-	-	-	-	-	903	136	1,039	1,039	-	-	-	-	-	-	-	-	-	-
3b.4.8	NRC Fees	-	-	-	-	-	-	186	19	205	205	-	-	-	-	-	-	-	-	-	-
3b.4.9	Independent Corporate Oversight Organization	-	-	-	-	-	-	13	2	14	14	-	-	-	-	-	-	-	-	-	-
3b.4.10	Security Staff Cost	-	-	-	-	-	-	2,040	306	2,345	2,345	-	-	-	-	-	-	-	-	-	32,679
3b.4.11	DOC Staff Cost	-	-	-	-	-	-	5,354	803	6,157	6,157	-	-	-	-	-	-	-	-	-	58,560
3b.4.12	Utility Staff Cost	-	-	-	-	-	-	11,519	1,728	13,247	13,247	-	-	-	-	-	-	-	-	-	129,669
3b.4	Subtotal Period 3b Period-Dependent Costs	32	662	7	1	-	17	20,900	3,221	24,839	24,839	-	-	-	292	-	-	-	5,834	10	220,907
3b.0	TOTAL PERIOD 3b COST	1,065	1,862	7	1	-	17	32,174	6,091	41,216	40,739	-	477	-	292	-	-	-	5,834	27,150	263,600
PERIOD 3 TOTALS		1,065	3,131	20	4	-	46	78,961	13,250	96,477	95,395	-	1,082	-	806	-	-	-	16,121	27,166	664,966
PERIOD 4a - Large Component Removal																					
Period 4a Direct Decommissioning Activities																					
Nuclear Steam Supply System Removal																					
4a.1.1.2	Recirculation Pumps & Motors	13	134	47	78	66	105	-	93	536	536	-	-	633	527	-	-	-	196,350	2,156	-
4a.1.1.3	CRDMs & NIs Removal	49	1,139	537	139	-	293	-	457	2,613	2,613	-	-	-	5,179	-	-	-	248,300	15,254	-
4a.1.1.4	Reactor Vessel Internals	121	4,920	7,634	1,126	-	9,494	260	10,727	34,282	34,282	-	-	-	1,323	1,546	224	-	288,053	21,753	1,029
4a.1.1.5	Vessel & Internals GTCC Disposal	-	-	-	-	-	5,019	-	753	5,772	5,772	-	-	-	-	-	-	1,547	308,304	-	-
4a.1.1.6	Reactor Vessel	-	7,676	1,748	843	-	1,987	260	7,438	19,952	19,952	-	-	-	16,489	-	-	-	1,684,281	21,753	1,029
4a.1.1	Totals	182	13,870	9,966	2,186	66	16,899	519	19,467	63,156	63,156	-	-	633	23,518	1,546	224	1,547	2,725,289	60,915	2,057
Removal of Major Equipment																					
4a.1.2	Main Turbine/Generator	-	404	1,989	387	2,252	-	-	696	5,728	5,728	-	-	80,711	-	-	-	-	3,632,000	4,957	-
4a.1.3	Main Condensers	-	1,242	1,380	269	1,562	-	-	723	5,177	5,177	-	-	56,000	-	-	-	-	2,520,000	15,180	-
Disposal of Plant Systems																					
New Radwaste Building System Components																					
4a.1.7.1	7EB	-	201	11	9	9	23	-	60	312	312	-	-	362	371	-	-	-	34,040	2,494	-
4a.1.7.2	N2G	-	14	0	0	1	-	-	4	19	19	-	-	49	-	-	-	-	2,007	178	-
4a.1.7.3	N2P	-	30	1	1	9	-	-	9	50	50	-	-	341	-	-	-	-	13,830	357	-
4a.1.7.4	N3A	-	83	1	2	10	-	-	23	119	119	-	-	398	-	-	-	-	16,151	1,000	-
4a.1.7.5	N3D	-	100	1	2	13	-	-	27	143	143	-	-	501	-	-	-	-	20,362	1,263	-
4a.1.7.6	N3I	-	21	0	0	1	0	-	6	28	28	-	-	27	6	-	-	-	1,396	273	-
4a.1.7.7	N3N	-	125	1	2	11	-	-	33	172	172	-	-	447	-	-	-	-	18,140	1,529	-
4a.1.7.8	N3P	-	32	0	1	5	-	-	9	46	46	-	-	179	-	-	-	-	7,267	383	-
4a.1.7.9	N3Q	-	21	0	0	2	-	-	6	30	30	-	-	80	-	-	-	-	3,260	271	-
4a.1.7.10	N3R	-	21	0	0	2	-	-	6	30	30	-	-	97	-	-	-	-	3,934	261	-
4a.1.7.11	N3S	-	32	0	1	5	-	-	9	46	46	-	-	187	-	-	-	-	7,583	400	-
4a.1.7.12	N3T	-	19	0	0	1	-	-	5	26	26	-	-	58	-	-	-	-	2,357	243	-
4a.1.7.13	N3U	-	140	17	14	15	37	-	50	274	274	-	-	610	609	-	-	-	56,410	1,730	-
4a.1.7.14	N3W	-	145	19	15	16	41	-	53	290	290	-	-	643	672	-	-	-	61,008	1,795	-
4a.1.7.15	N3Y	-	258	6	13	77	-	-	79	433	433	-	-	3,054	-	-	-	-	124,028	3,179	-
4a.1.7.16	N51	-	35	0	1	6	-	-	10	52	52	-	-	239	-	-	-	-	9,707	433	-
4a.1.7.17	N52	-	28	2	1	3	3	-	9	45	45	-	-	121	47	-	-	-	7,333	353	-
4a.1.7.18	N53	-	43	3	3	6	5	-	14	73	73	-	-	248	84	-	-	-	14,341	541	-
4a.1.7.19	N54	-	21	1	1	1	2	-	6	31	31	-	-	46	32	-	-	-	3,463	260	-
4a.1.7.20	N55	-	91	1	2	10	-	-	25	128	128	-	-	414	-	-	-	-	16,809	1,137	-
4a.1.7.21	N56	-	120	1	3	18	-	-	33	177	177	-	-	734	-	-	-	-	29,828	1,389	-
4a.1.7.22	N5A	-	52	1	2	7	2	-	15	79	79	-	-	290	29	-	-	-	13,230	663	-
4a.1.7.23	N5B	-	49	1	1	8	-	-	14	72	72	-	-	307	-	-	-	-	12,485	621	-
4a.1.7.24	N5C	-	22	0	0	3	-	-	6	31	31	-	-	106	-	-	-	-	4,294	267	-
4a.1.7.25	N5D	-	35	0	1	4	-	-	9	49	49	-	-	152	-	-	-	-	6,190	426	-
4a.1.7.26	N5E	-	23	0	0	3	-	-	6	33	33	-	-	110	-	-	-	-	4,453	278	-
4a.1.7.27	N5F	-	33	2	1	2	3	-	10	52	52	-	-	91	51	-	-	-	6,346	408	-
4a.1.7.28	N5G	-	16	0	0	1	-	-	4	22	22	-	-	40	-	-	-	-	1,645	205	-
4a.1.7.29	N5H	-	14	1	1	0	2	-	4	21	21	-	-	5	28	-	-	-	1,697	173	-
4a.1.7.30	N5I	-	19	0	0	1	-	-	5	26	26	-	-	51	-	-	-	-	2,090	238	-
4a.1.7.31	N5J	-	15	0	1	3	-	-	4	23	23	-	-	131	-	-	-	-	5,328	187	-
4a.1.7.32	N5K	-	18	0	0	2	-	-	5	26	26	-	-	75	-	-	-	-	3,050	224	-
4a.1.7.33	N5N	-	34	0	1	4	-	-	9	48	48	-	-	143	-	-	-	-	5,803	433	-
4a.1.7.34	N5O	-	90	1	3	17	-	-	25	136	136	-	-	670	-	-	-	-	27,221	1,105	-
4a.1.7.35	N5P	-	33	2	2	5	4	-	10	56	56	-	-	183	69	-	-	-	10,873	420	-

Table E
Oyster Creek Nuclear Generating Station
SAFSTOR Decommissioning Cost Estimate
(thousands of 2016 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 Class A Cu. Feet	Burial Volumes Class B Cu. Feet	Burial Volumes Class C Cu. Feet	Burial Volumes GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
Disposal of Plant Systems (continued)																					
4a.1.7.36	N5Q	-	32	2	2	5	4	-	10	55	55	-	-	182	68	-	-	-	10,767	414	-
4a.1.7.37	N5S	-	80	4	10	55	-	-	30	179	179	-	-	2,195	-	-	-	-	89,151	1,024	-
4a.1.7.38	N5T	-	73	2	3	15	3	-	22	119	119	-	-	606	44	-	-	-	26,849	930	-
4a.1.7.39	N5U	-	74	2	3	15	3	-	22	120	120	-	-	607	44	-	-	-	26,908	942	-
4a.1.7.40	N5Y	-	28	1	1	4	1	-	8	44	44	-	-	153	22	-	-	-	7,328	358	-
4a.1.7.41	N5Z	-	28	1	1	4	1	-	8	44	44	-	-	153	22	-	-	-	7,328	358	-
4a.1.7.42	PPA	-	93	1	2	14	-	-	26	136	136	-	-	572	-	-	-	-	23,240	1,139	-
4a.1.7	Totals	-	2,441	89	109	394	134	-	728	3,896	3,896	-	-	15,660	2,197	-	-	-	749,527	30,282	-
Old Radwaste Building System Components																					
4a.1.8.1	7BA	-	103	1	2	12	-	-	28	146	146	-	-	480	-	-	-	-	19,481	1,272	-
4a.1.8.2	7DA	-	60	6	5	3	14	-	20	108	108	-	-	122	229	-	-	-	16,859	739	-
4a.1.8.3	7FA	-	27	2	2	5	3	-	9	47	47	-	-	206	48	-	-	-	10,856	355	-
4a.1.8.4	PBA	-	183	14	12	22	26	-	59	316	316	-	-	893	431	-	-	-	58,315	2,327	-
4a.1.8.5	PDA	-	64	1	2	9	-	-	18	93	93	-	-	373	-	-	-	-	15,150	808	-
4a.1.8.6	PMA	-	15	0	0	1	-	-	4	21	21	-	-	54	-	-	-	-	2,174	190	-
4a.1.8.7	PRA	-	102	2	4	22	-	-	29	158	158	-	-	855	-	-	-	-	34,703	1,292	-
4a.1.8.8	PTK / PTP	-	16	0	0	1	-	-	4	21	21	-	-	30	-	-	-	-	1,199	202	-
4a.1.8	Totals	-	570	25	26	76	43	-	171	912	912	-	-	3,011	708	-	-	-	158,736	7,184	-
Turbine Building System Components																					
4a.1.9.1	7CA	-	322	24	22	44	45	-	104	561	561	-	-	1,755	737	-	-	-	109,631	4,021	-
4a.1.9.2	TB2	-	1,189	23	52	300	-	-	352	1,915	1,915	-	-	11,906	-	-	-	-	483,529	14,570	-
4a.1.9.3	TB23	-	6	0	0	1	-	-	2	10	10	-	-	42	-	-	-	-	1,699	83	-
4a.1.9.4	TB38	-	20	0	1	3	-	-	6	30	30	-	-	124	-	-	-	-	5,034	229	-
4a.1.9.5	TC2	-	1,936	83	186	1,082	-	-	683	3,970	3,970	-	-	42,978	-	-	-	-	1,745,363	23,871	-
4a.1.9.6	TE2	-	232	7	16	92	-	-	75	422	422	-	-	3,643	-	-	-	-	147,941	2,835	-
4a.1.9.7	TEE	-	394	8	18	104	-	-	118	641	641	-	-	4,115	-	-	-	-	167,126	4,871	-
4a.1.9.8	TEG	-	32	0	1	3	-	-	9	44	44	-	-	139	-	-	-	-	5,640	380	-
4a.1.9.9	TP2	-	320	8	17	100	-	-	98	543	543	-	-	3,971	-	-	-	-	161,284	3,949	-
4a.1.9.10	TP3	-	141	10	10	22	19	-	46	247	247	-	-	859	325	-	-	-	51,269	1,794	-
4a.1.9.11	TPE	-	127	12	10	16	23	-	42	230	230	-	-	647	373	-	-	-	45,337	1,575	-
4a.1.9	Totals	-	4,718	176	331	1,767	87	-	1,534	8,613	8,613	-	-	70,179	1,434	-	-	-	2,923,851	58,177	-
4a.1.12	Scaffolding in support of decommissioning	-	1,131	30	7	29	8	-	293	1,499	1,499	-	-	1,057	124	-	-	-	54,018	16,226	-
4a.1	Subtotal Period 4a Activity Costs	182	24,378	13,656	3,316	6,147	17,171	519	23,612	88,981	88,981	-	-	227,252	27,980	1,546	224	1,547	12,763,420	192,920	2,057
Period 4a Additional Costs																					
4a.2.1	Remedial Action Surveys	-	-	-	-	-	-	1,421	426	1,848	1,848	-	-	-	-	-	-	-	-	21,754	-
4a.2.2	Disposition of Liquid RCRA Waste (not Lead)	-	-	-	17	593	-	-	91	701	701	-	-	2,019	-	-	-	-	115,076	-	-
4a.2.3	Disposition of PCB Soil RCRA Waste (not Lead)	-	-	-	1,349	-	14,876	-	3,921	20,146	20,146	-	-	-	63,779	-	-	-	3,240,000	-	-
4a.2.4	Disposition of Lead Inventory	-	-	-	26	873	-	-	135	1,033	1,033	-	-	328	-	-	-	-	232,673	-	-
4a.2.5	Asbestos Remediation	-	12,982	3	277	-	1,084	-	3,558	17,905	17,905	-	-	-	19,193	-	-	-	249,515	150,230	-
4a.2.6	Disposal of Spare LP Turbine Rotor	-	40	135	30	185	-	-	56	446	446	-	-	5,607	-	-	-	-	298,595	469	-
4a.2.7	Barnwell AC Avoided Cost	-	-	-	-	-	(941)	-	-	(941)	(941)	-	-	-	-	-	-	-	-	-	-
4a.2	Subtotal Period 4a Additional Costs	-	13,022	138	1,698	1,650	15,019	1,421	8,188	41,137	41,137	-	-	7,953	82,973	-	-	-	4,135,859	172,454	-
Period 4a Collateral Costs																					
4a.3.1	Process decommissioning water waste	6	-	12	19	-	34	-	16	88	88	-	-	-	103	-	-	-	6,204	20	-
4a.3.3	Small tool allowance	-	491	-	-	-	-	-	74	565	508	-	56	-	-	-	-	-	-	-	-
4a.3	Subtotal Period 4a Collateral Costs	6	491	12	19	-	34	-	89	652	596	-	56	-	103	-	-	-	6,204	20	-
Period 4a Period-Dependent Costs																					
4a.4.1	Decon supplies	66	-	-	-	-	-	-	17	83	83	-	-	-	-	-	-	-	-	-	-
4a.4.2	Insurance	-	-	-	-	-	-	802	80	882	882	-	-	-	-	-	-	-	-	-	-
4a.4.3	Property taxes	-	-	-	-	-	-	1,046	105	1,150	1,035	-	115	-	-	-	-	-	-	-	-
4a.4.4	Health physics supplies	-	2,482	-	-	-	-	-	620	3,102	3,102	-	-	-	-	-	-	-	-	-	-
4a.4.5	Heavy equipment rental	-	2,970	-	-	-	-	-	445	3,415	3,415	-	-	-	-	-	-	-	-	-	-
4a.4.6	Disposal of DAW generated	-	-	106	20	-	243	-	74	443	443	-	-	-	4,290	-	-	-	85,804	140	-
4a.4.7	Plant energy budget	-	-	-	-	-	-	1,792	269	2,060	2,060	-	-	-	-	-	-	-	-	-	-
4a.4.8	NRC Fees	-	-	-	-	-	-	615	61	676	676	-	-	-	-	-	-	-	-	-	-
4a.4.9	Barnwell Annual Flat Fee	-	-	-	-	-	367	-	-	367	367	-	-	-	-	-	-	-	-	-	-
4a.4.10	Liquid Radwaste Processing Equipment/Services	-	-	-	-	-	-	424	64	487	487	-	-	-	-	-	-	-	-	-	-
4a.4.11	Independent Corporate Oversight Organization	-	-	-	-	-	-	26	4	30	30	-	-	-	-	-	-	-	-	-	-
4a.4.12	Security Staff Cost	-	-	-	-	-	-	4,257	639	4,896	4,896	-	-	-	-	-	-	-	-	-	68,214
4a.4.13	DOC Staff Cost	-	-	-	-	-	-	13,616	2,042	15,659	15,659	-	-	-	-	-	-	-	-	-	150,617
4a.4.14	Utility Staff Cost	-	-	-	-	-	-	24,283	3,642	27,925	27,925	-	-	-	-	-	-	-	-	-	272,857

Table E
Oyster Creek Nuclear Generating Station
SAFSTOR Decommissioning Cost Estimate
(thousands of 2016 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			
4a.4	Subtotal Period 4a Period-Dependent Costs	66	5,451	106	20	-	610	46,861	8,063	61,177	61,062	-	115	-	4,290	-	-	-	85,804	140	491,689
4a.0	TOTAL PERIOD 4a COST	254	43,342	13,912	5,053	7,798	32,834	48,801	39,952	191,947	191,776	-	172	235,205	115,347	1,546	224	1,547	16,991,290	365,534	493,746
PERIOD 4b - Site Decontamination																					
Period 4b Direct Decommissioning Activities																					
4b.1.1	Remove spent fuel racks	768	90	174	262	-	848	-	675	2,818	2,818	-	-	-	13,844	-	-	-	718,790	1,229	-
Disposal of Plant Systems																					
Drywell System Components																					
4b.1.2.1	IAA/IAC	-	409	258	192	179	523	-	315	1,877	1,877	-	-	7,111	8,511	-	-	-	732,325	5,749	-
4b.1.2.2	IBA	-	203	23	19	22	50	-	72	389	389	-	-	880	815	-	-	-	78,098	2,591	-
4b.1.2.3	ICA	-	326	42	32	46	79	-	117	642	642	-	-	1,841	1,275	-	-	-	141,314	4,157	-
4b.1.2.4	IEA	-	88	10	11	23	22	-	34	188	188	-	-	926	355	-	-	-	56,054	1,177	-
4b.1.2.5	RC6	-	81	1	2	11	-	-	22	117	117	-	-	440	-	-	-	-	17,889	989	-
4b.1.2	Totals	-	1,107	334	256	282	674	-	559	3,212	3,212	-	-	11,199	10,957	-	-	-	1,025,680	14,663	-
Reactor Building System Components																					
4b.1.3.1	RB1	-	249	5	11	63	-	-	74	401	401	-	-	2,495	-	-	-	-	101,308	2,991	-
4b.1.3.2	RBB	-	131	3	6	33	-	-	39	211	211	-	-	1,306	-	-	-	-	53,019	1,597	-
4b.1.3.3	RBC	-	134	3	6	37	-	-	40	221	221	-	-	1,485	-	-	-	-	60,294	1,647	-
4b.1.3.4	RBE	-	176	3	6	35	-	-	50	270	270	-	-	1,381	-	-	-	-	56,063	2,156	-
4b.1.3.5	RBF	-	150	17	14	19	35	-	53	288	288	-	-	740	574	-	-	-	59,778	1,912	-
4b.1.3.6	RBO	-	663	22	49	283	-	-	218	1,234	1,234	-	-	11,229	-	-	-	-	456,005	8,678	-
4b.1.3.7	RBS	-	306	26	27	69	50	-	106	584	584	-	-	2,757	808	-	-	-	153,952	3,901	-
4b.1.3.8	RBSW	-	166	3	6	34	-	-	48	256	256	-	-	1,343	-	-	-	-	54,558	2,077	-
4b.1.3.9	RC1/RC3	-	5	0	0	0	-	-	1	7	7	-	-	14	-	-	-	-	577	63	-
4b.1.3.10	RC7	-	111	2	5	28	-	-	33	179	179	-	-	1,106	-	-	-	-	44,917	1,311	-
4b.1.3.11	RCA	-	59	4	3	4	7	-	18	94	94	-	-	147	122	-	-	-	12,295	726	-
4b.1.3.12	RCB	-	86	2	3	13	2	-	24	129	129	-	-	501	31	-	-	-	21,946	1,051	-
4b.1.3.13	RCD	-	434	8	17	100	-	-	127	686	686	-	-	3,974	-	-	-	-	161,384	5,318	-
4b.1.3.14	RCG	-	83	2	5	29	-	-	26	145	145	-	-	1,136	-	-	-	-	46,136	1,041	-
4b.1.3.15	RCJ	-	92	1	3	16	-	-	26	137	137	-	-	617	-	-	-	-	25,044	1,121	-
4b.1.3.16	RCM	-	135	3	6	37	-	-	41	223	223	-	-	1,481	-	-	-	-	60,136	1,694	-
4b.1.3.17	RCN	-	300	4	9	53	-	-	85	451	451	-	-	2,107	-	-	-	-	85,581	3,666	-
4b.1.3.18	RCS	-	108	17	15	16	38	-	43	237	237	-	-	636	623	-	-	-	58,255	1,369	-
4b.1.3.19	RCT	-	70	1	2	12	-	-	20	105	105	-	-	464	-	-	-	-	18,858	858	-
4b.1.3.20	RD8	-	108	78	66	47	188	-	99	586	586	-	-	1,861	3,068	-	-	-	234,860	1,498	-
4b.1.3.21	RDM	-	59	1	1	7	-	-	16	83	83	-	-	268	-	-	-	-	10,870	701	-
4b.1.3.22	REC	-	266	4	8	49	-	-	76	403	403	-	-	1,953	-	-	-	-	79,329	3,190	-
4b.1.3.23	REF	-	124	27	21	17	60	-	54	303	303	-	-	667	972	-	-	-	77,647	1,555	-
4b.1.3.24	REH/REI	-	150	3	6	33	-	-	44	235	235	-	-	1,325	-	-	-	-	53,806	1,846	-
4b.1.3.25	REL	-	267	6	14	83	-	-	82	452	452	-	-	3,286	-	-	-	-	133,445	3,285	-
4b.1.3.26	REM	-	71	1	2	14	-	-	20	108	108	-	-	538	-	-	-	-	21,846	868	-
4b.1.3.27	REO	-	151	25	22	28	56	-	62	344	344	-	-	1,115	918	-	-	-	92,965	1,934	-
4b.1.3.28	REQ	-	209	11	11	33	17	-	64	346	346	-	-	1,311	283	-	-	-	67,964	2,612	-
4b.1.3.29	RER	-	70	5	4	4	11	-	22	117	117	-	-	177	185	-	-	-	16,844	882	-
4b.1.3.30	RET	-	40	1	1	5	1	-	11	59	59	-	-	185	20	-	-	-	8,535	500	-
4b.1.3.31	REW	-	35	0	1	4	-	-	9	49	49	-	-	146	-	-	-	-	5,936	432	-
4b.1.3.32	REX	-	38	0	1	4	-	-	10	54	54	-	-	165	-	-	-	-	6,710	477	-
4b.1.3.33	REY	-	44	0	1	5	-	-	12	62	62	-	-	192	-	-	-	-	7,781	543	-
4b.1.3.34	RFB	-	197	3	7	41	-	-	57	305	305	-	-	1,622	-	-	-	-	65,859	2,449	-
4b.1.3.35	RFC	-	129	14	9	8	24	-	42	226	226	-	-	337	390	-	-	-	34,111	1,651	-
4b.1.3.36	RFF	-	138	2	4	23	-	-	39	206	206	-	-	923	-	-	-	-	37,469	1,696	-
4b.1.3.37	RFH	-	188	30	22	17	61	-	71	389	389	-	-	692	992	-	-	-	79,790	2,343	-
4b.1.3.38	RFJ	-	165	27	21	17	59	-	64	354	354	-	-	690	962	-	-	-	78,082	2,057	-
4b.1.3.39	RFL	-	106	1	3	19	-	-	30	159	159	-	-	754	-	-	-	-	30,625	1,337	-
4b.1.3.40	RFN	-	143	2	5	28	-	-	41	219	219	-	-	1,118	-	-	-	-	45,418	1,768	-
4b.1.3.41	RFQ	-	206	2	4	24	-	-	56	291	291	-	-	942	-	-	-	-	38,243	2,456	-
4b.1.3.42	RGC	-	110	1	3	17	-	-	31	162	162	-	-	667	-	-	-	-	27,107	1,368	-
4b.1.3.43	RGD	-	313	9	19	111	-	-	99	550	550	-	-	4,427	-	-	-	-	179,773	3,921	-
4b.1.3.44	RGI	-	66	1	2	10	-	-	18	98	98	-	-	414	-	-	-	-	16,826	835	-
4b.1.3.45	RGL	-	77	1	2	14	-	-	22	117	117	-	-	555	-	-	-	-	22,545	967	-
4b.1.3.46	RGP	-	35	0	1	6	-	-	10	53	53	-	-	238	-	-	-	-	9,661	437	-
4b.1.3.47	RGR	-	235	3	7	41	-	-	66	353	353	-	-	1,633	-	-	-	-	66,314	2,876	-
4b.1.3.48	RGU	-	105	1	2	14	-	-	29	151	151	-	-	547	-	-	-	-	22,199	1,312	-
4b.1.3.49	RH1	-	62	1	1	9	-	-	17	90	90	-	-	339	-	-	-	-	13,754	762	-

Table E
Oyster Creek Nuclear Generating Station
SAFSTOR Decommissioning Cost Estimate
(thousands of 2016 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 Class A Cu. Feet	Burial Volumes Class B Cu. Feet	Burial Volumes Class C Cu. Feet	Burial Volumes GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
Disposal of Plant Systems (continued)																					
4b.1.3.50	RH2	-	45	1	2	14	-	-	14	77	77	-	-	550	-	-	-	-	22,340	572	-
4b.1.3.51	RH3 / RH4 / RH6	-	157	1	3	15	-	-	42	218	218	-	-	592	-	-	-	-	24,061	1,896	-
4b.1.3.52	RHA	-	26	2	2	2	4	-	8	44	44	-	-	83	63	-	-	-	6,655	327	-
4b.1.3.53	RHJ	-	56	1	1	7	-	-	15	80	80	-	-	282	-	-	-	-	11,443	687	-
4b.1.3.54	RHL	-	36	0	1	3	-	-	10	49	49	-	-	121	-	-	-	-	4,913	431	-
4b.1.3.55	RHX	-	67	1	2	11	-	-	19	100	100	-	-	440	-	-	-	-	17,877	814	-
4b.1.3.56	RHY	-	60	1	2	9	-	-	17	89	89	-	-	369	-	-	-	-	14,998	750	-
4b.1.3.57	RMCC	-	121	2	4	25	-	-	35	186	186	-	-	989	-	-	-	-	40,165	1,468	-
4b.1.3	Totals	-	7,932	393	481	1,698	614	-	2,503	13,621	13,621	-	-	67,430	10,011	-	-	-	3,258,874	98,680	-
New Radwaste Building System Components																					
4b.1.4.1	N38	-	213	3	6	35	-	-	60	317	317	-	-	1,392	-	-	-	-	56,536	2,566	-
4b.1.4.2	N48	-	108	1	2	13	-	-	29	154	154	-	-	530	-	-	-	-	21,506	1,308	-
4b.1.4.3	N4A	-	36	2	2	5	4	-	11	61	61	-	-	183	70	-	-	-	11,009	470	-
4b.1.4.4	N4B	-	34	2	2	4	4	-	11	56	56	-	-	162	59	-	-	-	9,599	442	-
4b.1.4.5	N4D	-	113	1	2	12	-	-	30	157	157	-	-	459	-	-	-	-	18,650	1,350	-
4b.1.4.6	N4E	-	8	0	0	0	-	-	2	11	11	-	-	17	-	-	-	-	687	107	-
4b.1.4.7	N4F	-	24	0	0	2	-	-	6	33	33	-	-	98	-	-	-	-	3,986	289	-
4b.1.4.8	N4H	-	28	1	1	5	2	-	9	46	46	-	-	217	26	-	-	-	10,164	365	-
4b.1.4.9	N4K	-	30	0	1	4	-	-	8	43	43	-	-	176	-	-	-	-	7,138	364	-
4b.1.4.10	N4L	-	44	0	1	4	-	-	12	61	61	-	-	177	-	-	-	-	7,195	553	-
4b.1.4.11	N5R	-	94	2	4	26	-	-	28	155	155	-	-	1,029	-	-	-	-	41,782	1,188	-
4b.1.4.12	N5V	-	73	5	5	12	10	-	24	129	129	-	-	482	162	-	-	-	27,689	934	-
4b.1.4.13	N5W	-	11	0	0	0	-	-	3	15	15	-	-	10	-	-	-	-	401	148	-
4b.1.4.14	N5X	-	91	2	4	21	-	-	27	144	144	-	-	842	-	-	-	-	34,176	1,155	-
4b.1.4	Totals	-	909	19	31	145	19	-	260	1,383	1,383	-	-	5,774	318	-	-	-	250,517	11,238	-
Old Radwaste Building System Components																					
4b.1.5.1	ORW Pre D&D Desludge and Decon	-	248	-	-	-	-	-	37	285	285	-	-	-	-	-	-	-	-	2,839	-
4b.1.5.2	PRD	-	19	0	1	4	-	-	5	29	29	-	-	151	-	-	-	-	6,112	245	-
4b.1.5.3	PSB	-	172	2	5	30	-	-	49	259	259	-	-	1,198	-	-	-	-	48,634	2,135	-
4b.1.5.4	PTA	-	47	1	2	9	-	-	14	73	73	-	-	371	-	-	-	-	15,084	601	-
4b.1.5.5	PUA	-	258	3	6	35	-	-	71	372	372	-	-	1,389	-	-	-	-	56,392	3,154	-
4b.1.5.6	PUU	-	174	6	10	46	5	-	54	295	295	-	-	1,825	92	-	-	-	78,644	2,226	-
4b.1.5.7	PVA	-	12	0	0	0	-	-	3	15	15	-	-	13	-	-	-	-	519	148	-
4b.1.5.8	UAB	-	377	5	10	60	-	-	105	556	556	-	-	2,367	-	-	-	-	96,117	4,649	-
4b.1.5.9	UAS	-	258	4	10	57	-	-	75	405	405	-	-	2,277	-	-	-	-	92,465	3,222	-
4b.1.5	Totals	-	1,565	21	43	241	5	-	413	2,288	2,288	-	-	9,590	92	-	-	-	393,967	19,220	-
Turbine Building System Components																					
4b.1.6.1	TD2	-	74	1	2	10	-	-	20	107	107	-	-	390	-	-	-	-	15,850	875	-
4b.1.6.2	TF2	-	401	19	42	243	-	-	145	849	849	-	-	9,646	-	-	-	-	391,743	4,891	-
4b.1.6.3	TFG	-	29	0	1	4	-	-	8	41	41	-	-	150	-	-	-	-	6,106	361	-
4b.1.6.4	TG2	-	293	15	33	190	-	-	108	639	639	-	-	7,564	-	-	-	-	307,179	3,660	-
4b.1.6.5	TH2	-	570	25	55	321	-	-	201	1,172	1,172	-	-	12,740	-	-	-	-	517,385	7,040	-
4b.1.6.6	TKA	-	29	0	0	2	-	-	8	39	39	-	-	74	-	-	-	-	2,996	348	-
4b.1.6.7	TL2	-	123	8	7	13	14	-	38	203	203	-	-	523	223	-	-	-	32,889	1,482	-
4b.1.6.8	TMA	-	75	2	4	23	-	-	23	126	126	-	-	895	-	-	-	-	36,367	921	-
4b.1.6.9	TN2	-	396	9	19	112	-	-	120	656	656	-	-	4,447	-	-	-	-	180,585	4,873	-
4b.1.6.10	TO2	-	212	-	-	-	-	-	32	244	-	-	244	-	-	-	-	-	-	2,826	-
4b.1.6.11	TOA	-	108	2	4	26	-	-	32	171	171	-	-	1,014	-	-	-	-	41,172	1,303	-
4b.1.6.12	TOCR	-	90	3	7	43	-	-	30	174	174	-	-	1,692	-	-	-	-	68,697	1,058	-
4b.1.6.13	TOR	-	80	2	4	23	-	-	24	134	134	-	-	931	-	-	-	-	37,795	994	-
4b.1.6.14	TOV	-	24	0	0	2	-	-	6	33	33	-	-	98	-	-	-	-	3,978	292	-
4b.1.6.15	TOW	-	127	5	11	64	-	-	43	250	250	-	-	2,557	-	-	-	-	103,857	1,547	-
4b.1.6.16	TOX / TOY	-	35	0	1	3	-	-	9	48	48	-	-	124	-	-	-	-	5,052	423	-
4b.1.6.17	TS2	-	248	8	17	98	-	-	80	450	450	-	-	3,875	-	-	-	-	157,362	2,995	-
4b.1.6.18	TTA	-	75	2	4	23	-	-	23	127	127	-	-	899	-	-	-	-	36,508	957	-
4b.1.6.19	TU2	-	229	4	9	53	-	-	67	362	362	-	-	2,096	-	-	-	-	85,139	2,856	-
4b.1.6	Totals	-	3,219	103	219	1,252	14	-	1,018	5,825	5,581	-	244	49,717	223	-	-	-	2,030,661	39,703	-
Augmented Offgas System Components																					
4b.1.7.1	AY8	-	176	3	7	40	-	-	51	277	277	-	-	1,596	-	-	-	-	64,813	2,154	-
4b.1.7.2	AYA	-	37	1	2	13	-	-	12	65	65	-	-	512	-	-	-	-	20,775	459	-
4b.1.7.3	AYB	-	35	1	1	7	-	-	10	54	54	-	-	267	-	-	-	-	10,862	441	-
4b.1.7.4	AYC	-	90	2	4	25	-	-	27	149	149	-	-	1,012	-	-	-	-	41,078	1,127	-
4b.1.7.5	AYE	-	31	0	0	3	-	-	8	43	43	-	-	103	-	-	-	-	4,199	375	-
4b.1.7.6	AZ8	-	67	1	3	15	-	-	20	106	106	-	-	611	-	-	-	-	24,796	824	-

Table E
Oyster Creek Nuclear Generating Station
SAFSTOR Decommissioning Cost Estimate
(thousands of 2016 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 Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
Augmented Offgas System Components (continued)																					
4b.1.7.7	AZA	-	15	0	0	1	-	-	4	21	21	-	-	40	-	-	-	-	1,638	188	-
4b.1.7.8	AZC	-	127	2	5	29	-	-	37	200	200	-	-	1,145	-	-	-	-	46,509	1,555	-
4b.1.7.9	AZD	-	21	0	0	2	-	-	6	29	29	-	-	75	-	-	-	-	3,063	267	-
4b.1.7.10	AZE	-	20	0	0	2	-	-	5	28	28	-	-	70	-	-	-	-	2,856	256	-
4b.1.7.11	AZF	-	19	0	0	2	-	-	5	27	27	-	-	90	-	-	-	-	3,672	239	-
4b.1.7.12	AZI	-	37	1	1	9	-	-	11	58	58	-	-	343	-	-	-	-	13,938	461	-
4b.1.7	Totals	-	676	11	25	148	-	-	196	1,056	1,056	-	-	5,865	-	-	-	-	238,198	8,345	-
Miscellaneous System Components																					
4b.1.8.1	BAA	-	323	6	14	82	-	-	96	521	521	-	-	3,241	-	-	-	-	131,602	3,979	-
4b.1.8.2	BBA	-	109	4	9	55	-	-	37	215	215	-	-	2,183	-	-	-	-	88,656	1,368	-
4b.1.8.3	BDA	-	13	0	0	1	-	-	3	18	18	-	-	27	-	-	-	-	1,083	167	-
4b.1.8.4	CAA	-	763	20	44	258	-	-	238	1,323	1,323	-	-	10,252	-	-	-	-	416,330	9,611	-
4b.1.8.5	DAA	-	79	1	2	9	-	-	21	112	112	-	-	376	-	-	-	-	15,277	1,005	-
4b.1.8.6	DAC	-	187	2	5	31	-	-	52	278	278	-	-	1,230	-	-	-	-	49,940	2,323	-
4b.1.8.7	DGB	-	102	-	-	-	-	-	15	118	-	-	118	-	-	-	-	-	-	1,336	-
4b.1.8.8	DOT	-	18	-	-	-	-	-	3	20	-	-	20	-	-	-	-	-	-	223	-
4b.1.8.9	DPH	-	118	-	-	-	-	-	18	135	-	-	135	-	-	-	-	-	-	1,527	-
4b.1.8.10	DWF	-	27	-	-	-	-	-	4	32	-	-	32	-	-	-	-	-	-	360	-
4b.1.8.11	FWP	-	159	-	-	-	-	-	24	182	-	-	182	-	-	-	-	-	-	2,018	-
4b.1.8.12	GAA / GCA	-	28	-	-	-	-	-	4	33	-	-	33	-	-	-	-	-	-	368	-
4b.1.8.13	INTAKE STRUCTURE	-	248	-	-	-	-	-	37	285	-	-	285	-	-	-	-	-	-	3,218	-
4b.1.8.14	MAA	-	156	3	6	37	-	-	46	248	248	-	-	1,469	-	-	-	-	59,650	1,920	-
4b.1.8.15	MBA	-	63	1	2	10	-	-	18	94	94	-	-	413	-	-	-	-	16,776	764	-
4b.1.8.16	MBS / MBT	-	46	0	0	3	-	-	12	62	62	-	-	108	-	-	-	-	4,371	575	-
4b.1.8.17	MS	-	50	-	-	-	-	-	8	58	-	-	58	-	-	-	-	-	-	676	-
4b.1.8.18	NMB ROOF	-	24	-	-	-	-	-	4	28	-	-	28	-	-	-	-	-	-	312	-
4b.1.8.19	OB	-	364	-	-	-	-	-	55	418	-	-	418	-	-	-	-	-	-	4,806	-
4b.1.8.20	PTB	-	53	-	-	-	-	-	8	61	-	-	61	-	-	-	-	-	-	688	-
4b.1.8.21	RSF ROOF	-	36	0	1	4	-	-	10	51	51	-	-	175	-	-	-	-	7,097	451	-
4b.1.8.22	UYARD	-	2,084	12	27	155	-	-	549	2,827	2,827	-	-	6,162	-	-	-	-	250,262	21,730	-
4b.1.8.23	WAA	-	205	2	5	30	-	-	57	299	299	-	-	1,197	-	-	-	-	48,603	2,479	-
4b.1.8.24	WHS	-	24	-	-	-	-	-	4	28	-	-	28	-	-	-	-	-	-	318	-
4b.1.8.25	YARD AREAS	-	509	-	-	-	-	-	76	585	-	-	585	-	-	-	-	-	-	6,583	-
4b.1.8.26	YDA / YFA / YLA	-	2	0	0	0	-	-	1	4	4	-	-	19	-	-	-	-	783	30	-
4b.1.8	Totals	-	5,791	52	116	676	-	-	1,399	8,035	6,052	-	1,983	26,851	-	-	-	-	1,090,429	68,833	-
4b.1.9	Scaffolding in support of decommissioning	-	1,697	45	11	44	11	-	440	2,249	2,249	-	-	1,586	186	-	-	-	81,027	24,339	-
Decontamination of Site Buildings																					
4b.1.10.1	New Radwaste Building - Systems Removal	0	63	14	156	0	244	-	102	580	580	-	-	6	4,408	-	-	-	382,187	509	-
4b.1.10.2	Old Radwaste Building - Systems Removal	0	5	2	17	0	26	-	10	59	59	-	-	6	468	-	-	-	40,787	48	-
4b.1.10.3	Turbine Building - Systems Removal	-	524	34	376	-	588	-	338	1,860	1,860	-	-	-	10,610	-	-	-	919,350	5,153	-
4b.1.10.4	Augmented Off Gas - Decon	24	145	2	23	1	35	-	61	290	290	-	-	45	639	-	-	-	57,151	1,936	-
4b.1.10.5	LLRW Storage - Decon	13	45	1	14	-	21	-	25	118	118	-	-	-	385	-	-	-	33,330	639	-
4b.1.10.6	Miscellaneous Buildings - Decon	12	60	1	13	-	21	-	28	136	136	-	-	-	378	-	-	-	32,778	816	-
4b.1.10.7	New Radwaste Building - Decon	58	546	9	88	6	136	-	214	1,057	1,057	-	-	235	2,459	-	-	-	222,123	6,909	-
4b.1.10.8	Old Radwaste Building - Decon	-	487	33	359	4	561	-	320	1,764	1,764	-	-	152	10,121	-	-	-	882,864	4,443	-
4b.1.10.9	Stack/Exhaust Tunnels - Remove & Decon	127	614	5	55	-	86	-	247	1,134	1,134	-	-	-	1,545	-	-	-	133,878	8,747	-
4b.1.10.10	Turbine Building 0ft - Decon	88	659	11	88	29	133	-	261	1,269	1,269	-	-	1,144	2,398	-	-	-	252,086	8,612	-
4b.1.10.11	Turbine Building 23ft - Decon	58	472	9	68	28	101	-	187	923	923	-	-	1,109	1,821	-	-	-	200,768	6,072	-
4b.1.10.12	Turbine Building 46ft - Decon	36	149	3	39	-	60	-	76	364	364	-	-	-	1,090	-	-	-	94,413	2,085	-
4b.1.10.13	New Radwaste Building - Contaminated	27	1,711	208	2,101	81	3,278	-	1,609	9,015	9,015	-	-	3,230	59,070	-	-	-	5,237,676	17,170	-
4b.1.10.14	Old Radwaste Building	-	2,747	505	5,591	1	8,745	-	3,762	21,351	21,351	-	-	37	157,695	-	-	-	13,665,710	27,256	-
4b.1.10.15	Drywell - Decon	5	911	45	503	-	787	-	507	2,759	2,759	-	-	-	14,196	-	-	-	1,230,090	9,181	-
4b.1.10.16	Drywell - Liner Removal	2,512	1,483	87	104	557	70	-	1,752	6,566	6,566	-	-	22,108	1,135	-	-	-	957,454	47,934	-
4b.1.10.17	RB0 - Torus Removal	3,368	1,703	129	155	825	104	-	2,296	8,580	8,580	-	-	32,774	1,683	-	-	-	1,419,396	60,660	-
4b.1.10.18	Reactor Building - Systems Removal	-	7	2	27	-	41	-	16	94	94	-	-	-	748	-	-	-	64,800	72	-
4b.1.10.19	Reactor Building -19ft - Decon	40	344	10	44	52	60	-	136	685	685	-	-	2,052	1,068	-	-	-	172,078	4,375	-
4b.1.10.20	Reactor Building 119ft - Decon	538	665	8	24	39	31	-	453	1,758	1,758	-	-	1,563	541	-	-	-	107,660	14,564	-
4b.1.10.21	Reactor Building 23ft - Decon	26	158	3	29	-	45	-	68	329	329	-	-	-	808	-	-	-	70,017	2,109	-
4b.1.10.22	Reactor Building 51ft - Decon	29	165	3	32	-	50	-	73	353	353	-	-	-	901	-	-	-	78,096	2,218	-
4b.1.10.23	Reactor Building 75ft - Decon	10	89	1	11	-	17	-	33	160	160	-	-	-	302	-	-	-	26,136	1,143	-
4b.1.10.24	Reactor Building 91ft - Decon	21	138	2	23	-	36	-	57	277	277	-	-	-	644	-	-	-	55,770	1,822	-
4b.1.10	Totals	6,992	13,888	1,126	9,937	1,623	15,279	-	12,634	61,479	61,479	-	-	64,463	275,112	-	-	-	26,336,600	234,473	-
4b.1	Subtotal Period 4b Activity Costs	7,760	36,873	2,279	11,383	6,109	17,464	-	20,098	101,966	99,739	-	2,227	242,474	310,742	-	-	-	35,424,740	520,722	-

Table E
Oyster Creek Nuclear Generating Station
SAFSTOR Decommissioning Cost Estimate
(thousands of 2016 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 4b Additional Costs																					
4b.2.1	License Termination Survey Planning	-	-	-	-	-	-	1,987	596	2,583	2,583	-	-	-	-	-	-	-	-	-	12,480
4b.2.2	Remedial Action Surveys	-	-	-	-	-	-	2,013	604	2,617	2,617	-	-	-	-	-	-	-	-	30,809	-
4b.2.3	Excavation of Underground Services	-	5,224	-	-	-	-	1,463	1,525	8,212	8,212	-	-	-	-	-	-	-	-	28,000	-
4b.2.4	License Termination ISFSI	-	40	4	372	-	1,043	3,031	1,122	5,612	5,612	-	-	-	10,970	-	-	-	1,590,770	10,102	10,688
4b.2.5	Operational tools & equipment	-	-	21	43	182	-	-	36	281	281	-	-	11,710	-	-	-	-	292,750	32	-
4b.2.6	Contaminated Soil Removal	-	134	3	650	-	6,000	-	1,631	8,419	8,419	-	-	-	106,200	-	-	-	9,345,592	834	-
4b.2	Subtotal Period 4b Additional Costs	-	5,398	28	1,065	182	7,043	8,494	5,515	27,724	27,724	-	-	11,710	117,170	-	-	-	11,229,110	69,777	23,168
Period 4b Collateral Costs																					
4b.3.1	Process decommissioning water waste	15	-	30	48	-	85	-	39	217	217	-	-	-	257	-	-	-	15,398	50	-
4b.3.2	Process decommissioning chemical flush waste	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4b.3.3	Small tool allowance	-	805	-	-	-	-	-	121	926	926	-	-	-	-	-	-	-	-	-	-
4b.3.4	Decommissioning Equipment Disposition	-	-	168	48	167	43	-	60	487	487	-	-	6,000	705	-	-	-	306,624	88	-
4b.3	Subtotal Period 4b Collateral Costs	15	805	198	96	167	128	-	220	1,630	1,630	-	-	6,000	962	-	-	-	322,022	138	-
Period 4b Period-Dependent Costs																					
4b.4.1	Decon supplies	1,350	-	-	-	-	-	-	338	1,688	1,688	-	-	-	-	-	-	-	-	-	-
4b.4.2	Insurance	-	-	-	-	-	-	1,136	114	1,249	1,249	-	-	-	-	-	-	-	-	-	-
4b.4.3	Property taxes	-	-	-	-	-	-	1,481	148	1,629	1,629	-	-	-	-	-	-	-	-	-	-
4b.4.4	Health physics supplies	-	3,883	-	-	-	-	-	971	4,854	4,854	-	-	-	-	-	-	-	-	-	-
4b.4.5	Heavy equipment rental	-	4,319	-	-	-	-	-	648	4,966	4,966	-	-	-	-	-	-	-	-	-	-
4b.4.6	Disposal of DAW generated	-	-	197	38	-	452	-	138	824	824	-	-	-	7,979	-	-	-	159,586	260	-
4b.4.7	Plant energy budget	-	-	-	-	-	-	2,003	300	2,304	2,304	-	-	-	-	-	-	-	-	-	-
4b.4.8	NRC Fees	-	-	-	-	-	-	871	87	958	958	-	-	-	-	-	-	-	-	-	-
4b.4.9	Liquid Radwaste Processing Equipment/Services	-	-	-	-	-	-	600	90	690	690	-	-	-	-	-	-	-	-	-	-
4b.4.10	Independent Corporate Oversight Organization	-	-	-	-	-	-	37	6	43	43	-	-	-	-	-	-	-	-	-	-
4b.4.11	Security Staff Cost	-	-	-	-	-	-	6,029	904	6,934	6,934	-	-	-	-	-	-	-	-	-	96,607
4b.4.12	DOC Staff Cost	-	-	-	-	-	-	18,799	2,820	21,618	21,618	-	-	-	-	-	-	-	-	-	207,126
4b.4.13	Utility Staff Cost	-	-	-	-	-	-	32,624	4,894	37,518	37,518	-	-	-	-	-	-	-	-	-	364,789
4b.4	Subtotal Period 4b Period-Dependent Costs	1,350	8,202	197	38	-	452	63,580	11,457	85,276	85,276	-	-	-	7,979	-	-	-	159,586	260	668,521
4b.0	TOTAL PERIOD 4b COST	9,126	51,278	2,702	12,582	6,458	25,086	72,074	37,289	216,595	214,369	-	2,227	260,184	436,854	-	-	-	47,135,460	590,897	691,689
PERIOD 4f - License Termination																					
Period 4f Direct Decommissioning Activities																					
4f.1.1	ORISE confirmatory survey	-	-	-	-	-	-	170	51	221	221	-	-	-	-	-	-	-	-	-	-
4f.1.2	Terminate license									a											
4f.1	Subtotal Period 4f Activity Costs	-	-	-	-	-	-	170	51	221	221	-	-	-	-	-	-	-	-	-	-
Period 4f Additional Costs																					
4f.2.1	License Termination Survey	-	-	-	-	-	-	9,824	2,947	12,772	12,772	-	-	-	-	-	-	-	-	118,801	6,240
4f.2	Subtotal Period 4f Additional Costs	-	-	-	-	-	-	9,824	2,947	12,772	12,772	-	-	-	-	-	-	-	-	118,801	6,240
Period 4f Collateral Costs																					
4f.3.1	DOC staff relocation expenses	-	-	-	-	-	-	1,308	196	1,504	1,504	-	-	-	-	-	-	-	-	-	-
4f.3	Subtotal Period 4f Collateral Costs	-	-	-	-	-	-	1,308	196	1,504	1,504	-	-	-	-	-	-	-	-	-	-
Period 4f Period-Dependent Costs																					
4f.4.2	Property taxes	-	-	-	-	-	-	753	75	828	828	-	-	-	-	-	-	-	-	-	-
4f.4.3	Health physics supplies	-	720	-	-	-	-	-	180	900	900	-	-	-	-	-	-	-	-	-	-
4f.4.4	Disposal of DAW generated	-	-	9	2	-	20	-	6	36	36	-	-	-	351	-	-	-	7,025	11	-
4f.4.5	Plant energy budget	-	-	-	-	-	-	272	41	312	312	-	-	-	-	-	-	-	-	-	-
4f.4.6	NRC Fees	-	-	-	-	-	-	443	44	488	488	-	-	-	-	-	-	-	-	-	-
4f.4.7	Independent Corporate Oversight Organization	-	-	-	-	-	-	19	3	22	22	-	-	-	-	-	-	-	-	-	-
4f.4.8	Security Staff Cost	-	-	-	-	-	-	1,224	184	1,408	1,408	-	-	-	-	-	-	-	-	-	18,857
4f.4.9	DOC Staff Cost	-	-	-	-	-	-	5,456	818	6,274	6,274	-	-	-	-	-	-	-	-	-	57,357
4f.4.10	Utility Staff Cost	-	-	-	-	-	-	7,275	1,091	8,367	8,367	-	-	-	-	-	-	-	-	-	74,643
4f.4	Subtotal Period 4f Period-Dependent Costs	-	720	9	2	-	20	15,442	2,443	18,635	18,635	-	-	-	351	-	-	-	7,025	11	150,857
4f.0	TOTAL PERIOD 4f COST	-	720	9	2	-	20	26,744	5,637	33,131	33,131	-	-	-	351	-	-	-	7,025	118,812	157,097
PERIOD 4 TOTALS		9,380	95,340	16,623	17,637	14,256	57,941	147,619	82,879	441,674	439,276	-	2,398	495,389	552,552	1,546	224	1,547	64,133,780	1,075,243	1,342,532

Table E
Oyster Creek Nuclear Generating Station
SAFSTOR Decommissioning Cost Estimate
(thousands of 2016 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 - Site Restoration																					
Period 5b Direct Decommissioning Activities																					
Demolition of Remaining Site Buildings																					
5b.1.1.1	Stack/Exhaust Tunnels - Remove & Decon	-	1,144	-	-	-	-	-	172	1,316	-	-	1,316	-	-	-	-	-	-	1,536	-
5b.1.1.2	Administration Building	-	460	-	-	-	-	-	69	529	-	-	529	-	-	-	-	-	-	4,330	-
5b.1.1.3	Augmented Off Gas Building	-	172	-	-	-	-	-	26	198	-	-	198	-	-	-	-	-	-	956	-
5b.1.1.4	Chlorination Building	-	21	-	-	-	-	-	3	24	-	-	24	-	-	-	-	-	-	164	-
5b.1.1.5	Diesel Generator Building	-	71	-	-	-	-	-	11	82	-	-	82	-	-	-	-	-	-	355	-
5b.1.1.6	Dilution Structure	-	119	-	-	-	-	-	18	137	-	-	137	-	-	-	-	-	-	742	-
5b.1.1.7	Domestic Water Facility	-	10	-	-	-	-	-	1	11	-	-	11	-	-	-	-	-	-	95	-
5b.1.1.8	FLEX Buildings	-	193	-	-	-	-	-	29	222	-	-	222	-	-	-	-	-	-	1,001	-
5b.1.1.9	Fire Pump House	-	3	-	-	-	-	-	1	4	-	-	4	-	-	-	-	-	-	33	-
5b.1.1.10	Fresh Water Pump House	-	18	-	-	-	-	-	3	21	-	-	21	-	-	-	-	-	-	165	-
5b.1.1.11	Heating Boiler House	-	34	-	-	-	-	-	5	40	-	-	40	-	-	-	-	-	-	305	-
5b.1.1.12	Intake Structure	-	393	-	-	-	-	-	59	452	-	-	452	-	-	-	-	-	-	2,392	-
5b.1.1.13	Low Level Radwaste Storage	-	198	-	-	-	-	-	30	228	-	-	228	-	-	-	-	-	-	878	-
5b.1.1.14	Machine Shop	-	147	-	-	-	-	-	22	169	-	-	169	-	-	-	-	-	-	1,118	-
5b.1.1.15	Main Gate Security	-	95	-	-	-	-	-	14	109	-	-	109	-	-	-	-	-	-	674	-
5b.1.1.16	Maintenance Building	-	254	-	-	-	-	-	38	292	-	-	292	-	-	-	-	-	-	2,276	-
5b.1.1.17	Materials Warehouse	-	879	-	-	-	-	-	132	1,011	-	-	1,011	-	-	-	-	-	-	6,242	-
5b.1.1.18	Miscellaneous Structures	-	487	-	-	-	-	-	73	560	-	-	560	-	-	-	-	-	-	3,099	-
5b.1.1.19	New Radwaste Building	-	240	-	-	-	-	-	36	276	-	-	276	-	-	-	-	-	-	1,687	-
5b.1.1.20	New Sample Pump House	-	8	-	-	-	-	-	1	9	-	-	9	-	-	-	-	-	-	75	-
5b.1.1.21	Office Building	-	161	-	-	-	-	-	24	185	-	-	185	-	-	-	-	-	-	733	-
5b.1.1.22	Plant Engineering	-	160	-	-	-	-	-	24	184	-	-	184	-	-	-	-	-	-	1,142	-
5b.1.1.23	Pretreatment Building	-	27	-	-	-	-	-	4	31	-	-	31	-	-	-	-	-	-	256	-
5b.1.1.24	Reactor Building	-	3,733	-	-	-	-	-	560	4,293	-	-	4,293	-	-	-	-	-	-	22,813	-
5b.1.1.25	Sample Pool	-	11	-	-	-	-	-	2	13	-	-	13	-	-	-	-	-	-	88	-
5b.1.1.26	Security Modifications	-	910	-	-	-	-	-	137	1,047	-	-	1,047	-	-	-	-	-	-	3,373	-
5b.1.1.27	Site Emergency Building	-	304	-	-	-	-	-	46	350	-	-	350	-	-	-	-	-	-	2,214	-
5b.1.1.28	Tank Pads & Misc. Yard	-	859	-	-	-	-	-	129	987	-	-	987	-	-	-	-	-	-	7,200	-
5b.1.1.29	Turbine Building	-	2,800	-	-	-	-	-	420	3,221	-	-	3,221	-	-	-	-	-	-	19,913	-
5b.1.1.30	Turbine Pedestal	-	277	-	-	-	-	-	42	319	-	-	319	-	-	-	-	-	-	1,243	-
5b.1.1	Totals	-	14,192	-	-	-	-	-	2,129	16,320	-	-	16,320	-	-	-	-	-	-	87,101	-
Site Closeout Activities																					
5b.1.2	Remove Rubble	-	825	-	-	-	-	-	124	949	-	-	949	-	-	-	-	-	-	3,517	-
5b.1.3	Grade & landscape site	-	590	-	-	-	-	-	88	678	-	-	678	-	-	-	-	-	-	1,304	-
5b.1.4	Final report to NRC	-	-	-	-	-	-	207	31	238	238	-	-	-	-	-	-	-	-	-	1,560
5b.1	Subtotal Period 5b Activity Costs	-	15,607	-	-	-	-	207	2,372	18,185	238	-	17,948	-	-	-	-	-	-	91,922	1,560
Period 5b Additional Costs																					
5b.2.1	Concrete Crushing	-	780	-	-	-	-	11	119	909	-	-	909	-	-	-	-	-	-	3,056	-
5b.2.2	Construction Debris	-	-	-	-	-	-	768	115	883	-	-	883	-	-	-	-	-	-	-	-
5b.2.3	Install Cofferdams - Intake & Dilution	-	1,125	-	-	-	-	-	169	1,294	-	-	1,294	-	-	-	-	-	-	8,591	-
5b.2.4	Site Restoration ISFSI	-	1,396	-	-	-	-	128	229	1,753	-	-	1,753	-	-	-	-	-	-	6,508	160
5b.2	Subtotal Period 5b Additional Costs	-	3,301	-	-	-	-	908	631	4,839	-	-	4,839	-	-	-	-	-	-	18,155	160
Period 5b Collateral Costs																					
5b.3.1	Small tool allowance	-	165	-	-	-	-	-	25	190	-	-	190	-	-	-	-	-	-	-	-
5b.3	Subtotal Period 5b Collateral Costs	-	165	-	-	-	-	-	25	190	-	-	190	-	-	-	-	-	-	-	-
Period 5b Period-Dependent Costs																					
5b.4.2	Property taxes	-	-	-	-	-	-	1,552	155	1,708	-	-	1,708	-	-	-	-	-	-	-	-
5b.4.3	Heavy equipment rental	-	6,217	-	-	-	-	-	933	7,149	-	-	7,149	-	-	-	-	-	-	-	-
5b.4.4	Plant energy budget	-	-	-	-	-	-	280	42	322	-	-	322	-	-	-	-	-	-	-	-
5b.4.5	Security Staff Cost	-	-	-	-	-	-	2,524	379	2,903	-	-	2,903	-	-	-	-	-	-	-	38,880
5b.4.6	DOC Staff Cost	-	-	-	-	-	-	10,797	1,620	12,417	-	-	12,417	-	-	-	-	-	-	-	110,160
5b.4.7	Utility Staff Cost	-	-	-	-	-	-	6,092	914	7,006	-	-	7,006	-	-	-	-	-	-	-	63,180
5b.4	Subtotal Period 5b Period-Dependent Costs	-	6,217	-	-	-	-	21,246	4,042	31,505	-	-	31,505	-	-	-	-	-	-	-	212,220
5b.0	TOTAL PERIOD 5b COST	-	25,289	-	-	-	-	22,360	7,070	54,720	238	-	54,482	-	-	-	-	-	-	110,077	213,940
PERIOD 5 TOTALS		-	25,289	-	-	-	-	22,360	7,070	54,720	238	-	54,482	-	-	-	-	-	-	110,077	213,940
TOTAL COST TO DECOMMISSION		**19,795**	**133,070**	**17,208**	**18,294**	**14,256**	**59,476**	**940,478**	**207,907**	**1,410,484**	**1,077,728**	**274,794**	**57,962**	**495,389**	**563,685**	**1,546**	**224**	**1,547**	**64,489,180**	**1,302,505**	**7,712,223**

Table E
Oyster Creek Nuclear Generating Station
SAFSTOR Decommissioning Cost Estimate
(thousands of 2016 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			

TOTAL COST TO DECOMMISSION WITH 17.29% CONTINGENCY:	**$1,410,484**	**thousands of 2016 dollars**
TOTAL NRC LICENSE TERMINATION COST IS 76.41% OR:	**$1,077,728**	**thousands of 2016 dollars**
SPENT FUEL MANAGEMENT COST IS 19.48% OR:	**$274,794**	**thousands of 2016 dollars**
NON-NUCLEAR DEMOLITION COST IS 4.11% OR:	**$57,962**	**thousands of 2016 dollars**
TOTAL LOW-LEVEL RADIOACTIVE WASTE VOLUME BURIED (EXCLUDING GTCC):	**565,455**	**cubic feet**
TOTAL GREATER THAN CLASS C RADWASTE VOLUME GENERATED:	**1,547**	**cubic feet**
TOTAL SCRAP METAL REMOVED:	**23,586**	**tons**
TOTAL CRAFT LABOR REQUIREMENTS:	**1,302,505**	**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

APPENDIX F

ISFSI DECOMMISSIONING

Table F-1
Oyster Creek Nuclear Generating Station
ISFSI Decommissioning Cost Estimate
DECON and SAFSTOR Decommissioning Alternatives
(thousands of 2016 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)	-	-	-	-	250	250	-	-	1,096
Decontamination (overpack disposition)	40	4	372	1,043	14	1,473	10,970	252	-
License Termination (radiological surveys)	-	-	-	-	1,233	1,233	-	9,850	-
Subtotal	**40**	**4**	**372**	**1,043**	**1,498**	**2,956**	**10,970**	**10,102**	**1,096**
Supporting Costs									
NRC and NRC Contractor Fees and Costs	-	-	-	-	395	395	-	-	776
Insurance	-	-	-	-	75	75	-	-	-
Property Taxes	-	-	-	-	331	331	-	-	-
Plant Energy	-	-	-	-	60	60	-	-	-
Security Staff Cost	-	-	-	-	317	317	-	-	5,013
Oversight Staff	-	-	-	-	354	354	-	-	3,803
Subtotal	-	-	-	-	**1,533**	**1,533**	-	-	**9,592**
Total (w/o contingency)	**40**	**4**	**372**	**1,043**	**3,031**	**4,489**	**10,970**	**10,102**	**10,688**
Total (w/25% contingency)						**5,612**			

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)

Table F-2
Oyster Creek Nuclear Generating Station
ISFSI Decommissioning Cost Estimate
Delayed DECON Decommissioning Alternatives
(thousands of 2016 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)	-	-	-	-	182	182	-	-	976
Decontamination (overpack disposition)	40	4	372	1,043	14	1,473	10,970	252	-
License Termination (radiological surveys)	-	-	-	-	804	804	-	6,007	-
Subtotal	**40**	**4**	**372**	**1,043**	**1,001**	**2,459**	**10,970**	**6,259**	**976**
Supporting Costs									
NRC and NRC Contractor Fees and Costs	-	-	-	-	391	391	-	-	776
Insurance	-	-	-	-	75	75	-	-	-
Property Taxes	-	-	-	-	331	331	-	-	-
Plant Energy	-	-	-	-	60	60	-	-	-
Security Staff Cost	-	-	-	-	317	317	-	-	5,013
Oversight Staff	-	-	-	-	354	354	-	-	3,803
Subtotal	-	-	-	-	**1,529**	**1,529**	-	-	**9,592**
Total (w/o contingency)	**40**	**4**	**372**	**1,043**	**2,529**	**3,988**	**10,970**	**6,259**	**10,568**
Total (w/25% contingency)						**4,985**			

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)

APPENDIX G

WORK DIFFICULTY FACTOR ADJUSTMENTS

GUIDELINES FOR APPLYING WORK DURATION ADJUSTMENT FACTORS

TLG has historically applied work duration adjustment factors in determining unit cost factors to account for working in a radiologically controlled environment. In performing an area-by-area decommissioning estimate, the work duration factors are applied on an "area" basis based on the nominal area conditions. Where practical, areas are established based on similar working conditions.

The WDFs fall into five categories: access, respiratory protection, ALARA, protective clothing (PC), and work breaks. The guidelines of how these factors are assessed for each area is described below. Table G-1 details the WDFs used for each of the seven unit cost factor sets contained in the estimates. Table G-2 outlines the unit cost factors used for each area of the Oyster Creek plant.

1) Access Factor:

Controlling Variables:
- Height of the component above the working floor
- Difficulty in working around the component (restricted access)

Source of Variable Information:
- Estimators observation or judgment
- Plant drawings

Range of Access Factor Adjustments:

0% - Components are accessible and located near a working level floor or platform

10% - Scaffolding (component less than <12 feet above floor) is required to access the majority of the components *or* the area around the components is congested.

20% - Scaffolding (component less than <12 feet above floor) is required to access the majority of the components *and* the area around the components is congested.

30% - Scaffolding (component between 12 - 20 feet above floor) is required to access the majority of the components *or* the area around the components are extremely congested.

40% - Scaffolding (component between 20 - 45 feet above floor) is required to access the majority of the components).

50% - Scaffolding (component greater than 45 feet above floor) is required to access the majority of the components).

2) Respiratory Protection Factor:

Controlling Variables:
- Component surface contamination levels (internal or external)
- Type of work (potential to create an airborne problem)
- General area surface contamination levels
- Site specific requirements for maintaining respirator qualifications (initial qualification, requalification, etc.)
- Personal air sampler requirements

Sources of Variable Information:
- Radiation Work Permit Requirements
- Area Survey Maps
- Site Radiation Protection Program Manual

Range of Respiratory Protection Factor Adjustments:
0% - Respiratory protection is not required (clean system or loose surface contamination has been removed).
25% - Respiratory protection is only required during limited segments of the work (i.e., physical cutting)
50% - Respiratory protection is continuously required while working on the component.

3) Radiation/ALARA Factor:

Controlling Variables:
- Component contact dose rate
- General area dose rate
- Site specific requirements for maintaining radiation worker qualification (initial qualification, requalification, etc.)
- Dosimetry requirements

Sources of Variable Information:
- Area Survey Maps
- Site Radiation Protection Program Manual
- Radiation Work Permit Requirements

Range of Radiation/ALARA Factor Adjustments:
(Note that surface contamination levels are principally accounted for in protective clothing requirements and respiratory protection requirements)

0% - The component is clean and is not located in a radiologically controlled area

10% - The component is located in a radiologically controlled area (General Area Radiation field < 2 .5 mrem/hr).

20% - The component is located in a radiologically controlled area (General Area Radiation field between 2. 5 to 15 mrem/hr).

40% - The component is located in a radiologically controlled area (General Area Radiation field between 16 and 99 mrem/hr).

100% - The component is located in a radiologically controlled area (General Area Radiation field > 100 mrem/hr).

4) Protective Clothing Factor:

Controlling Variables:
- Component surface contamination levels (internal or external)
- General area surface contamination levels
- Type of activity (wet/dry work, potential to create a surface contamination problem)
- Site specific work schedule arrangements

Sources of Variable Information:
- Radiation Work Permit Requirements
- Area Survey Maps
- Site Radiation Protection Program Manual

Range of Protective Clothing Factor Adjustments (alternate site-specific schedules may dictate alternate adjustments):

0% - The component is clean and is not located in a radiologically controlled area.

30% - The component is clean or contaminated and is located in a surface contamination controlled area. Work is to be completed in accordance with the requirements of an RWP, which specifies a single or double set of "PCs", or "PCs" with plastics.

50% - The components is located in a surface contamination controlled area. Work is to be completed in accordance with the requirements of an RWP, which specifies "plastics" in addition to double PCs for protective clothing.

100% - The component is located in a surface contamination controlled area. Work is to be completed in accordance with the requirements of an RWP, which specifies double "PCs" and double "plastics". (For extremely wet or humid working environment).

5) Work Break Factor:

Controlling Variables:

- Site specific work schedule arrangements

Sources of Variable Information:

- Typical site work schedule

Range of Work Break Factor Adjustments:

8.33% - Workday schedule outlined in AIF/NESP-036 (alternate site-specific schedules may dictate alternate adjustments).

TABLE G-1

UNIT COST FACTOR SETS AND THEIR WORK DIFFICULTY ADJUSTMENT FACTORS

	DECON / Clean				DECON / Contaminated			
	Percentage				Percentage			
UCF Set ID	Access	Resp.	PCs	ALARA	Access	Resp.	PCs	ALARA
1	10	0	0	10	10	0	0	10
2	20	0	30	10	20	0	30	10
3	20	25	30	30	20	25	30	30
4	30	25	50	30	30	25	50	30
5	50	25	50	40	50	25	50	40
6	30	25	50	100	30	25	50	100
7	20	0	0	0	20	25	30	30

	SAFSTOR / Clean				SAFSTOR / Contaminated			
	Percentage				Percentage			
UCF Set ID	Access	Resp.	PCs	ALARA	Access	Resp.	PCs	ALARA
1	10	0	0	10	10	0	0	10
2	20	0	30	10	20	0	30	10
3	20	25	30	10	20	25	30	10
4	30	25	50	10	30	25	50	10
5	50	25	50	10	50	25	50	10
6	30	25	50	10	30	25	50	10
7	20	0	0	0	20	25	30	10

TABLE G-2

OYSTER CREEK STN DESIGNATIONS AND ASSOCIATED UNIT COST FACTORS

AREA	AREA DESCRIPTION	UCF SET
Drywell System Components		
IAA	DRYWELL RECIRC LOOP	5
IAC	DRYWELL EL. 13 - SUB PILE ROOM	5
ICA	DRYWELL EL. 51 & 75'	5
IEA	DRYWELL EL. 95	4
RC6	DRYWELL LABRYNTH	3
Reactor Building System Components		
RB1	REACTOR BUILDING - 19' GENERAL	3
RBB	19' NE	3
RBC	19' SE	3
RBE	CRD SYSTEM PUMP ROOM	3
RBF	REACTOR BUILDING EQUIPMENT DRAIN TANK ROOM	3
RBO	19' INSIDE TORUS	4
RBS	TOP OF TORUS SEGMENT N/E	4
RBSW	REACTOR BUILDING SWITCHGEAR ROOM	2
RC1	SOUTHEAST AIRLOCK	3
RC7	SW RAD MONITOR ENCLOSURE	2
RCA	NORTH SCRAM DISCHARGE VOLUME	3
RCB	LAUNDRY & LAB DRAIN TANKS/PUMPS	3
RCD	NORTH BANK HCU's	3
RCG	NORTH CONTAINMENT SPRAY HEAT EXCHANGERS	3
RCJ	CRD SYSTEM FILTER/VALVING AREA	3
RCM	SOUTH BANK CSS HEAT EXCHANGERS	3
RCN	SOUTH BANK CONTROL ROD DRIVE MODULES	3
RCS	SOUTH SCRAM DISCHARGE VOLUME (RCS15VM)	3
RCT	REACTOR BUILDING EL.23-6 - ALL AREAS GENERAL	3
RD8	RX33' SHUTDOWN COOLING RM GENERAL ALL AREAS	3
RDM	TIP DRIVE ROOM WEST	3
REC	CORE SPRAY BOOSTER PUMPS	3
REF	SHUTDOWN COOLING HEAT EXCHANGER ROOM	1
REH	NITROGEN COMPRESSOR AREA	3
REI	REACTOR 51' TOOL CRIB	3
REL	RBCCW HEAT EXCHANGER/PUMP AREA	3
REM	SOUTHEAST ACCESS AREA	3
REO	CLEANUP SYSTEM HEAT EXCHANGER ROOM	4
REQ	CLEANUP SYSTEM PUMP AREA	3
RER	CLEANUP SYSTEM VALVE NEST EL.64	5
RET	CLEANUP FILTER SLUDGE PUMP HALLWAY	6
REW	INSTRUMENT RACK RK01	3

TABLE G-2

OYSTER CREEK STN DESIGNATIONS AND ASSOCIATED UNIT COST FACTORS (continued)

AREA	AREA DESCRIPTION	UCF SET
Reactor Building System Components (continued)		
REX	INSTRUMENT RACK RK02 AREA	3
REY	REACTOR BUILDING 51' GENERAL ALL AREAS	3
RFB	SOUTH EAST GENERAL AREA (C.U. SURGE TANK)	3
RFC	RWCU VALVE AISLE AND CONTROL AREA	5
RFF	CLEANUP SYSTEM FILTER AID/PRECOAT TANK AREA	3
RFH	OLD FUEL POOL HEAT EXCHANGERS & PUMPS AREA	3
RFJ	ASFP HEAT EXCHANGERS/PUMPS AREA	3
RFL	CONTROL ROD DRIVE REBUILD ROOM	3
RFN	EMERGENCY CONDENSER VALVE AREA	3
RFQ	REACTOR BUILDING 75' GENERAL ALL AREAS	3
RGC	NORTHEAST ACCESS AREA	3
RGD	"B" EMERGENCY CONDENSER NE01-B	3
RGI	SOUTHEAST ACCESS AREA	3
RGL	SOUTHWEST ACCESS AREA	3
RGP	CLEANUP DEMINERALIZER VAULT (RGP16FM)	4
RGR	LIQUID POISON TANK/PUMPS AREA	3
RGU	REACTOR BUILDING EL.95 - GENERAL ALL AREAS	3
RH1	NORTH FLOOR AREA	3
RH2	WEST FLOOR AREA	3
RH3	RB EL119 ALL AREAS	3
RH4	REACTOR BUILDING CRANE	3
RH6	ELEVATOR CONTROL EQUIP AREA	3
RHA	REACTOR CAVITY	6
RHJ	CASK WASHDOWN / DECONTAMINATION AREA	3
RHL	BRIDGE CRANE AND TRACKS	3
RHX	SOUTH FLOOR AREA	3
RHY	SOUTH EAST FLOOR AREA	3
RMCC	REACTOR BUILDING MCC ROOM	2
New Radwaste Building System Components		
7EB	NRW TUNNEL GENERAL ALL AREAS	5
N2G	NRW BUILDING GENERAL ALL ELEVATIONS	3
N2P	NRW BUILDING PENTHOUSE	3
N38	NRW 23' GENERAL ALL AREAS	3
N3A	NRW TRUCK BAY	3
N3D	NEW RADWASTE FILL AISLE	4
N3I	NRW #2 SUMP ROOM	4
N3N	NRW SOUTH OPERATING GALLERY EAST	4

TABLE G-2

OYSTER CREEK STN DESIGNATIONS AND ASSOCIATED UNIT COST FACTORS (continued)

AREA	AREA DESCRIPTION	UCF SET
New Radwaste Building System Components (continued)		
N3P	NRW HIGH PURITY PUMP ROOM	3
N3Q	NRW WC-P-1B WASTE CHEM PUMP ROOM	3
N3R	NRW VALVE AREA WEST	3
N3S	NRW WC-P-1A WASTE CHEM PUMP ROOM	4
N3T	NRW #1 SUMP ROOM	4
N3U	NRW CONCENTRATOR SKID ROOM 'A'	4
N3W	NRW CONCENTRATOR SKID ROOM 'B'	4
N3Y	NRW HEAT EXCHANGER BUILDING	3
N48	NRW 38' GENERAL ALL AREAS	3
N4A	NRW 'A' HOLD-UP TANK SL-T-3A ROOM	5
N4B	B' HOLD-UP TANK SL-T-3B ROOM	5
N4D	LARGE CONTAINER FILL SKID ROOM SL-Y-6	4
N4E	NRW LARGE CONTAINER FILL SKID ROOM	3
N4F	CLW PROCESS AREA	4
N4H	SPENT RESIN TRANSFER PIPING	4
N4K	NRW SPENT RESIN VALVE GALLERY	4
N4L	PIPE GALLERY WEST	4
N51	NRW HP-D-1A DEMINERALIZER ROOM	5
N52	NRW HP-F-2A RESIN TRAP ROOM	5
N53	NRW HP-D-1B DEMINERALIZER ROOM	5
N54	NRW HP-F-2B RESIN TRAP ROOM	5
N55	NRW MEZZANINE/VALVING AREA	4
N56	NRW 48-0 ELEVATION GENERAL ALL AREAS	3
N5A	NRW "A" CONCENTRATED LIQUID WASTE TANK ROOM SL-T-1A	5
N5B	NRW "B" CONCENTRATED LIQUID WASTE TANK ROOM SL-T-1B	5
N5C	NRW CHEMICAL WASTE FILTER ROOM 1A	4
N5D	NRW HIGH PURITY FILTER ROOM 1A	4
N5E	NRW CHEMICAL WASTE FILTER ROOM 1B	4
N5F	NRW HIGH PURITY FILTER ROOM 1B	4
N5G	NRW CONCENTRATED LIQUID WASTE PUMP SL-P-1A ROOM	5
N5H	NRW VALVE GALLERY EAST	4
N5I	NRW CONCENTRATED LIQUID WASTE PUMP SL-P-1B ROOM	5
N5J	NRW SAMPLE SINK AREA	3
N5K	NRW NEUTRALIZATION FEED SKID AREA	3
N5N	NRW LAUNDRY/DECON AREA	3
N5O	NRW FILTER PRECOAT/BODY FEED ROOM	3
N5P	NRW SL-T-2A SPENT RESIN TANK	5
N5Q	NRW SL-T-2B SPENT RESIN TANK	5
N5R	NRW CONTROL ROOM	3

TABLE G-2

OYSTER CREEK STN DESIGNATIONS AND ASSOCIATED UNIT COST FACTORS (continued)

AREA	AREA DESCRIPTION	UCF SET
New Radwaste Building System Components (continued)		
N5S	NRW BUILDING HVAC ROOM	3
N5T	NRW CHEM WASTE/FLR DRAIN TANK ROOM WC-T-1A	5
N5U	NRW CHEM WASTE/FLR DRAIN TANK ROOM WC-T-1B	5
N5V	NRW CHEM WASTE/FLR DRAIN TANK ROOM WC-T-1C	5
N5W	NRW CRANE BAY-STORAGE/LAYDOWN ROOM	3
N5X	NRW HIGH PURITY TANK & ROOM 1A	5
N5Y	NRW WC-D-1A DEMISTER ROOM	5
N5Z	NRW WC-D-1B DEMISTER ROOM	5
PAA	OLD RADWASTE BUILDING GENERAL ALL AREAS	3
Old Radwaste Building System Components		
7BA	1-12 SUMP AREA GENERAL	4
7DA	ORW TUNNEL GENERAL ALL AREAS	4
7FA	ORW AIR FILTER ROOM	5
PBA	ORW SMALL PUMP ROOM	5
PDA	ORW 35' & 45' CENTRIFUGE AND HOPPER	5
PMA	ORW OVERBOARD DISCHARGE MONITOR	3
PRA	ORW ROOF GENERAL ALL AREAS	4
PRD	ORW FUEL POOL FILTERS / KELLY BUILDING	4
PSB	ORW CONTROL ROOM OPERATION AREA	3
PTA	ORW COMPACTOR AREA	3
PTK	ORW - NORTH ANNEX	3
PTP	DRUM STORAGE AREA GENERAL	3
PUA	ORW LARGE PUMP ROOM	4
PUU	ORW INSIDE TANK ROOM GENERAL	4
PVA	ORW NORTH ANNEX KELLY BUILDING	2
UAB	ORW OUTSIDE TANKS & MOAT AREA	4
UAS	ORW SURGE TANK & PUMP AREA	4
ORW	ORW PRE D&D DESLUDGE AND DECON	4
Turbine Building System Components		
7CA	TURBINE TUNNEL GENERAL ALL AREAS	5
TB2	TURBINE BUILDING BASEMENT GENERAL ALL AREAS	3
TB23	TB23 HALLWAY AREA	1
TB38	TB38 HALLWAY AREA	1
TC2	CONDENSER BAY OVERHEAD GENERAL ALL AREAS	3
TD2	CONDENSER BAY DRAIN TANK PIT	3

TABLE G-2

OYSTER CREEK STN DESIGNATIONS AND ASSOCIATED UNIT COST FACTORS (continued)

AREA	AREA DESCRIPTION	UCF SET
Turbine Building System Components (continued)		
TE2	SPARE EXCITER GENERAL ALL AREAS	2
TEE	4160 VOLT ROOM	3
TEG	RCA EXIT	1
TF2	FEED PUMP ROOM GENERAL ALL AREAS	3
TFG	OFF GAS SAMPLE AREA	3
TG2	CONDENSATE PUMP PIT	3
TH2	HEATER BAY AREA	3
TKA	TB EAST AND WEST PASSAGEWAY	2
TL2	HI-LO CONDUCTIVITY ROOM	3
TMA	MECHANICAL VACUUM PUMP ROOM	3
TN2	TB BASEMENT NORTH	3
TO2	OPERATING FLOOR	3
TOA	HEATER BAY ROOF	3
TOCR/DCA	TURBINE BUILDING CONTROL ROOM	1
TOR	TURBINE BYPASS VALVE AREA	3
TOV	CONTAMINATED INSTRUMENT SHOP EL.55-4	2
TOW	EL.46-6 WEST ROOF AREA	3
TOX	TURBINE RAGEMS II BUILDING	3
TOY	TURBINE REPAIR OFFICE	3
TP2	CONDENSATE DEMINERALIZER AREA	3
TP3	CONDENSATE DEMINERALIZER TANK ROOM	4
TPE	REGEN TANK ROOM ENTRANCE AREA	3
TS2	STEAM JET AIR EJECTOR ROOM	3
TTA	TRUNNION ROOM GENERAL ALL AREAS	4
TU2	TB NORTH MEZZANINE	3
Augmented Offgas System Components		
AY8	AOG NORTH ACCESS AREA (AYFOGZI)	3
AYA	RECOMBINER ROOM 'A'	3
AYB	RECOMBINER ROOM 'B'	3
AYC	CHARCOAL ADSORBER ROOM	3
AYE	AOG PIPE TUNNEL & SUMP AREA	4
AZ8	REFRIGERATION EQOT AREA ALL AREAS	3
AZA	HEPA FILTER ROOM 'A'	3
AZC	AOG CONTROL ROOM AREA	3
AZD	WATER REMOVAL TRAIN #1 ROOM	3
AZE	WATER REMOVAL TRAIN #2 ROOM	3
AZF	WATER REMOVAL TRAIN #3 ROOM	3

TABLE G-2

OYSTER CREEK STN DESIGNATIONS AND ASSOCIATED UNIT COST FACTORS (continued)

AREA	AREA DESCRIPTION	UCF SET
Augmented Offgas System Components (continued)		
AZI	AOG BUILDING HVAC ROOM	3
Miscellaneous System Components		
BAA	BOILER HOUSE ALL AREAS	3
BBA	STACK ALL AREAS	3
BDA	RAGEMS I BUILDING	3
CAA	CONDENSATE STORAGE TANK	3
DAA	CHEMISTRY LA GENERAL ALL AREAS	3
DAC	CABLE SPREADING ROOM EL.36-0	3
DGB	DIESEL GENERATOR #1 & #2 W/ STORAGE TANK	1
DOT	DIRTY OIL TANK	1
DPH14-6	DILUTION PUMP HOUSE	1
DPH6-0	DILUTION PUMP HOUSE	1
DWF	DOMESTIC WATER FACILITY	1
FWP	FRESH WATER PUMP HOUSE	1
GAA	NORTH GUARD HOUSE AND PARKING LOT	1
GCA	MAIN GATE SECURITY BUILDING AND PARKING LOT	1
MAA	NMB ;HOT MACHINE SHOP	3
MBA	NMB RWP OFFICE	2
MBS	NMB HOT TOOL ROOM	2
MBT	RESP MAINT FACILITY	2
MS23-6	MACHINE SHOP	1
MS34-6	HEALTH PHYSICS STORAGE AREA	1
MSROOF	MACHINE SHOP ROOF	1
NMBROOF	HOT MACHINE SHOP ROOF AREA	1
OB35-0	OFFICE BUILDING A/B BATTERY ROOM	1
OB46-6	OFFICE BUILDING	1
OBROOF	OFFICE BUILDING ROOF	1
PTB23-6	PRETREATMENT BLDG	1
RSFROOF	SERVICE HEAD ROOF	2
WAA	LLRWSF	2
WHS	CONTROL ROOM	1
YDA	DRYWELL PROCESSING FACILITY	2
YFA	YARD LAUNDRY TRAILER	2
YLA	YARD RADWASTE SHIPPING CENTER	2
INTAKE STR	INTAKE STRUCTURE	1
UYARD	YARD	2
YARD AREAS	YARD AREAS	1

APPENDIX H

WORK AREA DESIGNATION

GPU SURVEY TRACKING NUMBER (STN) INDEX

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REACTOR BUILDING

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REACTOR BUILDING

23' ELEVATION - CONTINUED

38' ELEVATION

51' ELEVATION

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(continued)

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REACTOR BUILDING - CONTINUED

75' ELEVATION

RFB	SE GENERAL AREA (CLEANUP SURGE TANK IN OVERHEAD)
RFC	CLEANUP VALVE AISLE & CONTROL AREA
RFF	CLEANUP SYSTEM FILTER TANK/RK-05 INSTRUMENT RACK/TANK AREA
RFH	OLD FUEL POOL HEAT EXCHANGER & PUMP AREA
RFJ	AUGMENTED (NEW) SPENT FUEL POOL HEAT EXCHANGER & PUMP AREA
RFL	CONTROL ROD DRIVE (CRD) REBUILD ROOM/ WASH TANK AREA
RFN	EMERGENCY CONDENSER VALVE (OVERHEAD) AREA/CRD STORAGE & STAGING AREA
RFQ	75' ELEVATION-GENERAL ALL AREAS
REW	RK-01 INSTRUMENT RACK-SEE 51' RX BLDG. MAP

95' ELEVATION

RGA	LICENSED SOURCE STORAGE CAGE
RGC	NE ACCESS AREA/REACTOR BLDG. CLOSED COOLING WATER (RBCCW) SURGE TANK
RGD	"A" & "B" EMERGENCY CONDENSER AREA
RGF	RECIRC SEAL REBUILD ROOM
RGI	SOUTH EAST AREA
RGL	SOUTH WEST AREA
RGP	CLEANUP DEMINERALIZER VAULT
RGR	LIQUID POISON TO NORTH CORRIDOR
RGU	95' ELEVATION-GENERAL ALL AREAS

119' ELEVATION

RH1	NORTH FLOOR AREA/SKIMMER SURGE TANK/ OBSERVATION TOWER
RH2	WEST FLOOR AREA
RH3	119' ELEVATION-GENERAL ALL AREAS

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REACTOR BUILDING

119' ELEVATION - CONTINUED

RH4	RX BLDG. CRANE
RH5	RX BLDG. ROOF
RH6	ELEVATOR CONTROL/EQUIPMENT LANDING AREA
RHA	REACTOR CAVITY
RHB	SPENT FUEL POOL
RHC	NEW FUEL STORAGE
RHD	EQUIPMENT STORAGE POOL (ESP)
RHJ	CASK WASHDOWN/DECONTAMINATION/ NORTH EAST FLOOR AREA
RHX	SOUTH FLOOR AREA
RHY	SOUTH EAST FLOOR AREA
RHL	REFUEL BRIDGE

DRYWELL

IGA	DRYWELL-GENERAL ALL AREAS
IAA	13' ELEVATION-ALL AREAS ***EXCEPT CRD ROOM***
IAC	13' ELEVATION - CRD ROOM
IBA	23' ELEVATION
IBB	DRYWELL AIRLOCK
ICA	46' ELEVATION
IEA	82' ELEVATION
RC6	DRYWELL LABYRINTH & FRONT OF DRYWELL SHIELD DOORS

TURBINE BUILDING

TAA	TURBINE BLDG.-GENERAL ALL AREAS
TB2	BASEMENT SOUTH-GENERAL ALL AREAS
TC2	CONDENSER BAY-GENERAL ALL AREAS
TE2	SPARE EXCITER AREA-GENERAL ALL AREAS
TEE	4160 VOLT ROOM
TEG	RAD CON COUNT ROOM/TURBINE BLDG. EXIT
TF2	FEEDPUMP ROOM-GENERAL ALL AREAS

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TURBINE BUILDING - CONTINUED

TFG	OFF GAS SAMPLE AREA
TG2	CONDENSATE PUMP PIT-GENERAL ALL AREAS
TH2	HEATER BAY-GENERAL ALL AREAS
TKA	NE PASSAGEWAY & NE HALLWAY
TL2	HI/LO CONDUCTIVITY ROOM-GENERAL ALL AREAS
TMA	MECHANICAL VACUUM PUMP ROOM
TN2	BASEMENT NORTH-GENERAL ALL AREAS
TO2	TURBINE BLDG. OPERATING FLOOR (TBOF)-GENERAL ALL AREAS
TOW	WEST & NORTH WEST ROOF AREA
TOX	TURBINE RAGEMS BUILDING
TOY	TURBINE REPAIR OFFICE
TOA	HEATER BAY ROOF
TOS	TURBINE FLOOR TOOL ROOM
TOV	CONTAMINATED (HOT) I & C SHOP
TOR	BYPASS VALVE AREA BELOW TBOF
TP2	CONDENSATE DEMINERALIZER CONTROL ROOM-ALL AREAS
TP3	CONDENSATE DEMINERALIZER TANK ROOM-ALL AREAS
TPE	CONDENSATE DEMINERALIZER REGEN TANK ROOM-ALL AREAS
TS2	STEAM JET AIR EJECTOR ROOM-ALL AREAS
TTA	TRUNNION ROOM-GENERAL ALL AREAS
TU2	NORTH MEZZANINE-ALL AREAS

NEW RAD WASTE

N2G	NEW RAD WASTE-GENERAL ALL AREAS
N2P	PENTHOUSE & ROOF

23' ELEVATION

N38	23' ELEVATION-GENERAL ALL AREAS
N3A	TRUCK BAY & CATALYST/PROCESSING ROOM
N3D	FILL AISLE/LINER STORAGE & RB2 CONTROL PANEL

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NEW RAD WASTE

23' ELEVATION - CONTINUED

38' ELEVATION

48' & 58' ELEVATIONS

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(continued)

INDEX

NEW RAD WASTE

48' & 58' ELEVATIONS - CONTINUED

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(continued)

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OLD RAD WASTE

PAA	OLD RAD WASTE-GENERAL ALL AREAS
PBA	SMALL PUMP ROOM - ALL AREAS
PDA	35' & 45' ELEVATION-CENTRIFUGE & HOPPER ROOMS -ALL AREAS
PMA	OVERBOARD DISCHARGE MONITOR
PRD	KELLY BLDG. /NV-37 FUEL POOL FILTERS
PRA	ROOF-ALL AREAS
PSB	CONTROL ROOM (OLD RAD WASTE) & PRECOAT ROOM-ALL AREAS
PTA	COMPACTOR ROOM-ALL AREAS
PTK	NORTH ACCESS OPERATING AISLE
PTP	DRUM STORAGE & SCAFFOLD PLANNING-ALL AREAS
PUA	LARGE PUMP ROOM & MEZZANINE-ALL AREAS
PUU	TANK ROOM-ALL AREAS
PVA	NORTH ANNEX KELLY BLDG.

AUGMENTED OFF GAS (AOG)

23' ELEVATION

AXA	AOG -GENERAL ALL AREAS
AY8	23' ELEVATION-GENERAL ALL AREAS
AYA	"A" RECOMBINER ROOM
AYB	"B" RECOMBINER ROOM
AYC	CHARCOAL ABSORBER ROOM
AYE	PIPE TUNNEL & SUMP AREA

38' ELEVATION

AZ8	38' ELEVATION-GENERAL ALL AREAS
AZA	HEPA FILTER ROOM
AZC	CONTROL ROOM (AOG)
AZD	#1 WATER REMOVAL TRAIN ROOM
AZE	#2 WATER REMOVAL TRAIN ROOM
AZF	#3 WATER REMOVAL TRAIN ROOM

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AUGMENTED OFF GAS (AOG)

38' ELEVATION - CONTINUED

AZH	FLAME ARRESTOR ROOM
AZI	HVAC ROOM
AZJ	38' STAIRWELL & LANDING AREA

YARD

YAA	YARD-GENERAL ALL AREAS
YDA	DRYWELL (DW) PROCESS FACILITY & BRIEF AREA
YFA	LAUNDRY TRAILERS
YHA	RCT/GATE 20 TRAILER
YKA	SCAFFOLD STORAGE SHED
YLA	SHIPPING SURVEYS
BAA	BOILER HOUSE-ALL AREAS
BBA	STACK - ALL AREAS
BCA	STACK PAD - ALL AREAS
BDA	RAGEMS BUILDING-GENERAL ALL AREAS
PPA	NRW PUMP HOUSE - ALL AREAS
UAB	ORW OUTSIDE TANK MOAT AREA (HP-T-2A/2B & WC-T-3A/3B)
UAS	ORW SURGE TANK NV-04 & PUMP AREA
7BA	1-12 SUMP AREA - GENERAL ALL AREAS
7CA	TURBINE & RX BLDG. TUNNELS-GENERAL ALL AREAS
7DA	ORW TUNNEL-GENERAL ALL AREAS
7EB	NRW TUNNEL-GENERAL ALL AREAS & 1-3 SUMP
7FA	HEPA FILTER ROOM UNDER ORW
7EB	NRW 1-3 SUMP

CONDENSATE TRANSFER/TORUS WATER STORAGE

CAA	CONDENSATE WATER STORAGE TANK/ TORUS WATER STORAGE TANK (TWST) - GENERAL ALL AREAS

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CONDENSATE TRANSFER/TORUS WATER STORAGE - CONTINUED

CBA	CONDENSATE TRANSFER PUMP HOUSE - GENERAL ALL AREAS

MAC/NEW MAINTENANCE BUILDING

MAA	HOT MACHINE SHOP
MAB	CLEAN TOOL ROOM
MBA	RWP OFFICE/MAC
MBS	HOT TOOL ROOM
MBT	RESPIRATOR MAINTENANCE FACILITY
MGG	NEW MAINTENANCE BLDG.-GENERAL ALL AREAS

LOW LEVEL RAD WASTE

WAA	LOW LEVEL RAD WASTE STORAGE FACILITY

MAIN OFFICE/SERVICE BUILDING

DAA	CHEM LAB/PASS ROOM
DBA	480 VOLT ROOM
DCA	CONTROL ROOM
DDA	THIRD FLOOR M&C/EXIT
DEA	MAIN OFFICE BLDG. ROOF
DFA	OLD CABLE SPREADING ROOM
DQQ	BATTERY ROOM/MG SET ROOM/ NEW CABLE SPREADING ROOM/OPS COORDINATION OFFICE/OFFICE BLDG./ SERVICE BLDG.-GENERAL ALL AREAS

MISCELLANEOUS

GAA	NORTH GATE GUARD HOUSE & NORTH PARKING LOT

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(continued)

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MISCELLANEOUS - CONTINUED

GCA	MAIN GATE GUARD HOUSE & MAIN PARKING LOT
XEA	AUXILIARY OFFICE BUILDING (AOB) RAD CON & SAFETY
XFA	BLDG. 3 - STATION SERVICES (SS)/ INSTRUMENT & CALIBRATION (I&C) SHOP/ FIRE PROTECTION DEPT.-*NOT INCLUDING COUNT ROOM/TURBINE BLDG. EXIT)*
XGA	SITE EMERGENCY BUILDING (SEB)
XIA	TOOL CALIBRATION TRAILER (OLD SS TRAILER)
XJA	REFUEL CAFE
XLA	MAINTENANCE FAB SHOPS
XMA	WAREHOUSE
YCA	AUXILIARY OFFICE BLDG. (AOB) CHEMISTRY LAB
YJA	BLDG. 4/MECHANICAL WELDING SHOP
YSA	RADIAC TRAILER
ZFA	CONTRACTOR TRAILERS 90-105 @ NORTH GATE
ZHA	TRAILER 300 COMPLEX @ NORTH GATE
ZJA	FORKED RIVER SITE
QQQ	MISCELLANEOUS - GENERAL ALL AREAS