Nebraska Public Power District
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NLS2008098
December 15, 2008

U.S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, D.C. 20555-0001

Subject: Decommissioning Cost Analysis
Cooper Nuclear Station, Docket No. 50-298, DPR-46

Reference: Letter from Stewart B. Minahan (Nebraska Public Power District) to the U.S. Nuclear Regulatory Commission dated September 24, 2008, "License Renewal Application" (NLS2008071)

Dear Sir or Madam:

The purpose of this correspondence is to transmit the Nebraska Public Power District's (NPPD) Decommissioning Cost Analysis pursuant to the requirements of 10 CFR 50.75(f)(3), "Reporting and Recordkeeping for Decommissioning Planning."

NPPD submitted a License Renewal Application for Cooper Nuclear Station (CNS) (Reference). Although NPPD is seeking license renewal, the Preliminary Decommissioning Cost Estimate is submitted based on the current operating license expiration date of January 18, 2014. When the license for CNS is renewed, this 2008 Decommissioning Cost Estimate for the 2014 plant shutdown scenario would no longer be applicable.

Should you have any questions concerning this matter, please contact me at (402) 825-2904.

Sincerely,

David W. Van Der Kamp
Licensing Manager

/jo

Enclosure

A136

NRR

COOPER NUCLEAR STATION
P.O. Box 98 / Brownville, NE 68321-0098
***Telephone:** (402) 825-3811 / **Fax:** (402) 825-5211*
www.nppd.com

cc: Regional Administrator w/enclosure
USNRC - Region IV

Cooper Project Manager w/enclosure
USNRC - NRR Project Directorate IV-1

Senior Resident Inspector w/enclosure
USNRC - CNS

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ATTACHMENT 3 LIST OF REGULATORY COMMITMENTS©

Correspondence Number: NLS2008098

The following table identifies those actions committed to by Nebraska Public Power District (NPPD) in this document. Any other actions discussed in the submittal represent intended or planned actions by NPPD. They are described for information only and are not regulatory commitments. Please notify the Licensing Manager at Cooper Nuclear Station of any questions regarding this document or any associated regulatory commitments.

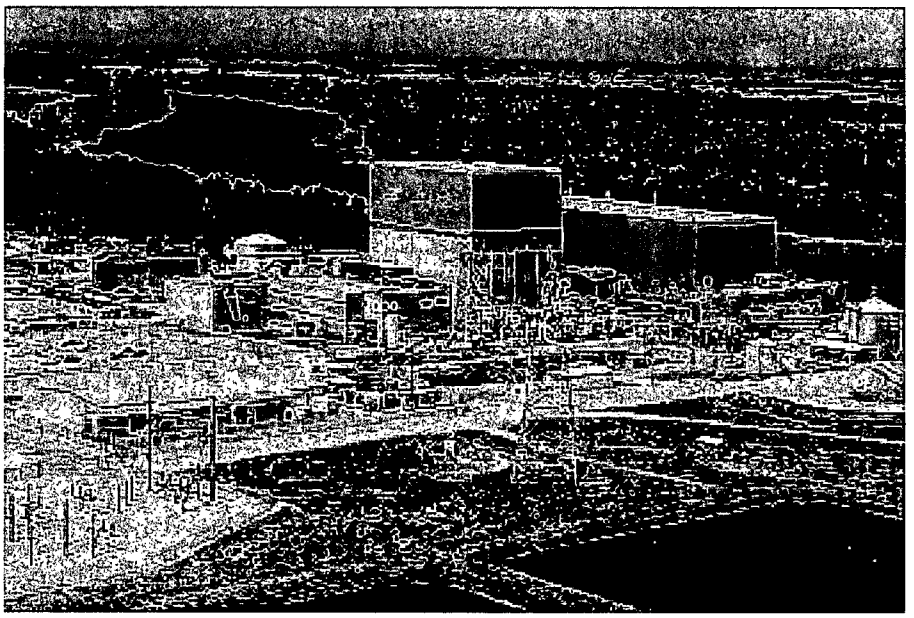
COMMITMENT	COMMITMENT NUMBER	COMMITTED DATE OR OUTAGE
None		

Document N01-1590-002, Rev. 1

DECOMMISSIONING COST ANALYSIS

for the

COOPER NUCLEAR STATION



prepared for the

NEBRASKA PUBLIC POWER DISTRICT

prepared by

TLG Services, Inc.
Bridgewater, Connecticut

December 2008

APPROVALS

Project Manager	William A. Cloutier, Jr.	12/04/2008
	William A. Cloutier, Jr.	**Date**
Project Engineer	William J. Dietz	12/8/2008
	William J. Dietz	**Date**
Technical Manager	Francis W. Seymore	12/8/08
	Francis W. Seymore	**Date**
Quality Assurance Manager	Joseph J. Adler	12/8/08
	Joseph J. Adler	**Date**

TABLE OF CONTENTS

SECTION - PAGE

TABLE OF CONTENTS
(continued)

SECTION - PAGE

TABLES

TABLE OF CONTENTS
(continued)

SECTION - PAGE

TABLES (continued)

FIGURES

APPENDICES

REVISION LOG

No.	CRA No.	Date	Item Revised	Reason for Revision
0		10-08-08		Original Issue
1	T73-0804	12-08-08	Pages xvii-xviii Tables 3.1 through 3.6 Tables 6.1 and 6.2 Tables C-1, C-2, C-3 Tables D-1, D-2, D-3	Corporate Overhead Costs Revised

EXECUTIVE SUMMARY

This report presents estimates of the cost to decommission the Cooper Nuclear Station (Cooper) for the selected decommissioning scenarios following a scheduled cessation of plant operations. The estimates are designed to provide Nebraska Public Power District (NPPD) with the information needed to assess its financial obligations as they pertain to the eventual decommissioning of the nuclear station. This report is also designed to meet the requirements of 10 CFR 50.75(f)(3) in that it includes an assessment of the major factors that could affect the cost to decommission.

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 cost analysis recognizes that spent fuel will be stored at the site in the plant's storage pool and/or in an independent spent fuel storage installation (ISFSI) until such time that it can be transferred to the U.S. Department of Energy (DOE). Consequently, the estimates also include those costs to manage and subsequently decommission these interim storage facilities.

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. The estimates incorporate a minimum cooling period for the spent fuel that resides in the storage pool when operations cease. Any residual fuel remaining in the pool after the cooling period is transferred directly to the DOE or relocated to the ISFSI for interim storage. The estimates also include the dismantling of site structures and non-essential facilities and the limited restoration of the site.

Alternatives and Regulations

The Nuclear Regulatory Commission (NRC) provided general decommissioning guidance in a rule adopted on June 27, 1988.[1] In this rule, the NRC set forth technical and financial criteria for decommissioning licensed nuclear 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

[1] 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, Federal Register Volume 53, Number 123 (p 24018 et seq.), June 27, 1988

property to be released for unrestricted use shortly after cessation of operations."[2]

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."[3] Decommissioning is required to be completed within 60 years, although longer time periods will be considered when necessary to protect public health and safety. The safe-storage periods in the Delayed DECON analyses are selected to coincide with the removal of spent fuel from the site.

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."[4] 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 pending the completion of additional research studies (e.g., on engineered barriers).

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.[5] The amendments allow for greater public participation and better define the transition process from operations to decommissioning. Regulatory Guide 1.184, issued in July 2000, further described the methods and procedures that are acceptable to the NRC

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2 Ibid. Page FR24022, Column 3
3 Ibid.
4 Ibid. Page FR24023, Column 2
5 U.S. Code of Federal Regulations, Title 10, Parts 2, 50, and 51, "Decommissioning of Nuclear Power Reactors," Nuclear Regulatory Commission, Federal Register Volume 61, (p 39278 et seq.), July 29, 1996

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.

Decommissioning Scenarios

The following alternatives were evaluated and are representative of the alternatives available to the owner:

1. DECON: The plant is decommissioned shortly after the permanent cessation of plant operations. Spent fuel, that is not transferred directly to the DOE, is relocated to the ISFSI for interim storage. Spent fuel storage operations continue at the site until the transfer of the fuel to the DOE is completed.

2. Delayed DECON: In the second scenario, the unit is prepared for an abbreviated period of storage. As in the first scenario, spent fuel storage operations continue at the site until the transfer of the fuel to the DOE is completed. Once completed, decommissioning operations are initiated.

3. SAFSTOR: The third scenario is similar to the second scenario in that the unit is placed in safe-storage with concurrent spent fuel storage operations. However, in this scenario, decommissioning is deferred beyond the fuel storage period to the maximum extent possible; termination of the license would conclude within the maximum required 60-year period.

Six scenarios were identified for evaluation. As shown below, the six scenarios evaluate a combination of shutdown dates (scheduled and anticipated) and decommissioning alternative (prompt or deferred).

Scenario	Shutdown Date	Option	Spent Fuel Transfer Completed	Operating License Terminated
1	2014	DECON	2046	2020
2	2014	Delayed DECON	2046	2053
3	2014	SAFSTOR	2046	2074
4	2034	DECON	2061	2040
5	2034	Delayed DECON	2061	2068
6	2034	SAFSTOR	2061	2094

Methodology

The methodology used to develop the estimates described within this document follows the basic approach originally presented in the cost estimating guidelines[6] 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.

The estimates are area-based estimates, i.e., the plant inventory has been correlated with site-specific area working conditions, and the plant work activities organized into discrete areas to better reflect the manner in which the decommissioning will be conducted. The areas were determined on the basis of "common" conditions or attributes. Each area was evaluated for work difficulty, including affects of radiation, external surface contamination, and access. This evaluation was used to adjust the work difficulty factors for removing equipment in a given area. A data base was constructed and identified the installed equipment in each area. This data base contains a list of components that have a unique identifier, such as valves, tanks, electrical equipment, and heat exchangers. It also contains bulk commodities such as piping, ventilation ductwork, cable tray, electrical conduit, and supports.

The inventory was organized according to its proposed disposition. There were three primary waste streams identified for the Cooper inventory: (1) clean material (expected to meet the release criteria without any decontamination), (2) contaminated material with recovery potential or requiring additional processing for disposal (expected to be sent to an off-site waste processor), and (3) contaminated material designated for direct disposal at a controlled low-level radioactive waste disposal site (i.e., material expected to exceed waste processor acceptance criteria or uneconomical to process).

An activity duration critical path was used to determine the total decommissioning program schedule. This was required for estimating the project costs, including program management, administration, field engineering, equipment rental, quality assurance, and security.

This analysis reflects lessons learned from TLG's involvement in the Shippingport Station decommissioning, 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, Connecticut Yankee,

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

and San Onofre-1 nuclear units have provided additional insight into the process, the regulatory aspects, and the technical challenges of decommissioning commercial nuclear units.

Contingency

Consistent with standard 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."[7] 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 the passage of the "Low-Level Radioactive Waste Disposal Act" in 1980 and its Amendments of 1985,[8] the states became ultimately responsible for the disposition of low-level radioactive waste generated within their own borders.

Until recently, there were two facilities available to NPPD for the disposal of low-level radioactive waste generated by Cooper. As of July 1, 2008, however, the facility in Barnwell, South Carolina was closed to generators outside the Atlantic Compact (comprised of the states of Connecticut, New Jersey and South Carolina). This leaves the facility in Clive, Utah, operated by EnergySolutions, as the only available destination for low-level radioactive waste requiring controlled disposal.

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

8 "Low-Level Radioactive Waste Policy Amendments Act of 1985," Public Law 99-240, 1/15/86

For the purpose of this analysis, the EnergySolutions' facility is used as the basis for estimating the disposal cost for the majority of the radioactive waste (Class A [9]). EnergySolutions 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. As a proxy, the disposal cost for this material is based upon the last published rate schedule for non-compact waste for 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. As such, the GTCC radioactive waste has been packaged and disposed of as high-level waste, at a cost equivalent to that envisioned for the spent fuel.

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 eliminate the portion of waste that does not require disposal as radioactive waste, compaction, incineration or metal melt. The estimates for Cooper reflect the savings from waste recovery/volume reduction.

High-Level Radioactive Waste Management

Congress passed the "Nuclear Waste Policy Act"[10] (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.

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

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

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 breach of contract.

Operation of DOE's yet-to-be constructed repository is contingent upon the review and approval of the facility's license application by the NRC and the successful resolution of pending litigation. The DOE submitted its license application to the NRC on June 3, 2008, seeking authorization to construct the repository at Yucca Mountain, Nevada. Assuming a timely review, and adequate funding, the DOE expects that receipt of fuel could begin by 2020.[11]

It is generally necessary that spent fuel be actively cooled and stored for a minimum period at the generating site prior to transfer. As such, the NRC requires that licensees 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, pursuant to 10 CFR Part 50.54(bb).[12] This funding requirement is fulfilled 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 ISFSI.

At shutdown, the spent fuel pool is expected to contain freshly discharged assemblies (from the most recent refueling cycles) as well as the final reactor core. Over the following 5½ years the assemblies are packaged into multipurpose canisters for transfer to the DOE or to the ISFSI. It is assumed that this period provides the necessary cooling for the final core to meet the storage system requirements and/or transport system requirements for decay heat.

DOE's contracts with utilities generally order the acceptance of spent fuel from utilities based upon the oldest fuel receiving the highest priority. For purposes of this analysis, acceptance of commercial spent fuel by the DOE is expected to begin in 2020.

NPPD has 1,054 spent fuel assemblies from Cooper in storage at General Electric's wet-pool ISFSI in Morris, Illinois. This analysis assumes that this inventory is preferentially transferred to the DOE, starting in 2022. The first assemblies removed from the Cooper site are assumed to be in 2027. With an estimated rate of transfer of 3,000 metric tons of uranium (MTU)/year, completion of the removal of fuel from the site is projected to be in the year 2046 for a 2014 shutdown and year 2061 for a 2034

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11 "Testimony of Edward Sproat, Director, Office of Civilian Radioactive Waste Management, before a U.S. House of Representatives subcommittee on the status of Yucca Mountain, July 15, 2008

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

shutdown. Consequently, costs are included within the estimates for the long-term caretaking of the spent fuel at the Cooper site until the transfer is completed.

An ISFSI, which can be operated under a separate and independent license, has been constructed to support continued plant operations and future decommissioning. As such, the facility will be designed to accommodate the dry storage modules needed to off-load the wet storage pool so that dismantling activities can proceed. Once emptied, the Reactor Building can be either decontaminated and dismantled or prepared for long-term storage.

NPPD's position is that the DOE has a contractual obligation to accept Cooper'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, at this time, including the cost of storing spent fuel in this study is the most reasonable approach because it insures the availability of sufficient decommissioning funds at the end of the station's life if, contrary to its contractual obligation, the DOE has not performed earlier.

Site Restoration

Prompt dismantling of site structures (once the facilities are decontaminated) 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 cost to dismantle site structures with a work force already mobilized on site is more efficient than if the process is deferred. Site facilities quickly degrade without maintenance, adding additional expense and creating potential hazards to the public and the demolition work force. Consequently, this study assumes that site structures are removed to a nominal depth of three feet below the local grade level wherever possible. The site is then to be graded and stabilized.

Summary

The costs to decommission Cooper assumes the removal of all contaminated and activated plant components and structural materials such that the owner may then have unrestricted use of the site with no further requirements for an operating license. Low-level radioactive waste, other than GTCC waste, is sent to a commercial processor for treatment/conditioning or to a controlled disposal facility.

Decommissioning 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 is complete. Once emptied, the storage facilities are also decommissioned.

The decommissioning scenarios 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 and D. The major cost components are also identified in the cost summary provided at the end of this section.

The cost elements in the estimates are assigned to one of three subcategories: NRC License Termination, 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 Part 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 "Spent Fuel Management" subcategory contains costs associated with the containerization and transfer of spent fuel to the ISFSI and the management of the ISFSI until such time that the transfer of all fuel from this facility to an off-site location (e.g., geologic repository) is completed.

"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.

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, an owner 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 2008 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 reactor or during the decommissioning period.

COST SUMMARY
2014 Cessation of Operations
(thousands of 2008 dollars)

Cost Element	DECON	Delayed DECON	SAFSTOR
Decontamination	12,832	18,547	18,399
Removal	73,606	74,005	75,346
Packaging	13,340	9,827	9,577
Transportation	8,571	6,672	6,346
Waste Disposal	75,482	43,839	44,260
Off-site Waste Processing	35,573	42,626	42,743
Program Management [1]	360,232	426,204	490,053
Corporate A&G	15,657	10,100	10,100
Spent Fuel Management [2]	77,077	69,839	69,839
Insurance and Regulatory Fees	53,616	62,853	76,914
Energy	6,141	10,408	12,641
Characterization and Licensing Surveys	16,568	16,568	16,568
Miscellaneous Equipment	23,364	31,112	34,923
Total [3]	772,058	822,600	907,708

Cost Element			
License Termination	506,078	475,790	674,963
Spent Fuel Management	231,584	309,463	195,398
Site Restoration	34,396	37,347	37,347
Total [3]	772,058	822,600	907,708

[1] Includes engineering and security costs
[2] Excludes program management costs (staffing) but includes costs for spent fuel loading/packaging/spent fuel pool O&M and EP fees
[3] Columns may not add due to rounding

COST SUMMARY
2034 Cessation of Operations
(thousands of 2008 dollars)

Cost Element	DECON	Delayed DECON	SAFSTOR
Decontamination	12,832	18,581	18,438
Removal	74,270	74,184	76,329
Packaging	13,342	9,820	9,871
Transportation	8,571	6,704	6,578
Waste Disposal	75,618	46,649	44,999
Off-site Waste Processing	35,573	42,626	42,743
Program Management [1]	340,929	400,786	479,929
Corporate A&G	15,657	10,100	10,100
Spent Fuel Management [2]	53,484	47,535	47,535
Insurance and Regulatory Fees	46,578	54,706	72,081
Energy	6,141	9,875	12,641
Characterization and Licensing Surveys	16,568	16,568	16,568
Miscellaneous Equipment	23,408	30,280	34,989
Total [3]	722,972	768,414	872,803

Cost Element			
License Termination	506,207	476,185	676,510
Spent Fuel Management	182,368	254,881	158,945
Site Restoration	34,396	37,348	37,348
Total [3]	722,972	768,414	872,803

[1] Includes engineering and security costs
[2] Excludes program management costs (staffing) but includes costs for spent fuel loading/packaging/spent fuel pool O&M and EP fees
[3] Columns may not add due to rounding

1. INTRODUCTION

This report presents estimates of the costs to decommission the Cooper Nuclear Plant (Cooper) following a scheduled cessation of plant operations. The estimates are designed to provide Nebraska Public Power District (NPPD), the plant's owner, with the information needed to assess its financial obligations, as they pertain to the eventual decommissioning of the nuclear station. It is not a detailed engineering document, but a financial analysis prepared in advance of the detailed engineering that will be required to carry out the decommissioning.

1.1 OBJECTIVES OF STUDY

The objectives of this study were to prepare comprehensive estimates of the costs to decommission Cooper, to provide a sequence or schedule for the associated activities, and to develop waste stream projections from the decontamination and dismantling activities.

The construction permit for Cooper was issued in June of 1968, with commercial operation in July of 1974. For the purposes of this study, two shutdown dates were evaluated: the current license expiration date of January 18, 2014 and a projected date assuming license renewal of January 18, 2034. These dates were used in scheduling the decommissioning activities.

1.2 SITE DESCRIPTION

Cooper is a single unit facility located on the west bank of the Missouri River between the villages of Brownville and Nemaha, Nebraska. The nuclear station is owned and operated by NPPD, a public corporation and political subdivision of the state of Nebraska engaging in generation, transmission, distribution, and sale of electric energy.

The station is comprised of a single cycle, forced circulation, boiling water reactor designed by the General Electric Company, producing steam for direct use in the steam turbine. The original supporting facilities were engineered and constructed by Burns and Roe, Inc. The Multi-Purpose Facility, Office Building Addition, Warehouses, Flammable Liquid Storage Building and other on-site structures were designed and built by others.

The reactor vessel and the recirculation piping system are contained within the drywell of a pressure suppression system housed within the Reactor Building. The pressure suppression system consists of a drywell, a pressure suppression chamber which stores a large volume of water and a connecting submerged

vent system between the drywell and water pool, isolation valves, containment cooling systems and other service equipment. The Reactor Building encloses the primary containment system thereby providing a secondary containment.

Heat produced in the reactor is converted to electrical energy by the power conversion system. A turbine-generator system converts the thermal energy of the steam produced in the reactor into mechanical shaft power and then into electrical energy. The turbine consists of one high-pressure, double-flow turbine element, and two low-pressure, double-flow turbine elements all aligned in tandem. The generator is a direct-driven, 1,800 rpm hydrogen-cooled synchronous generator. The turbine is operated in a closed feedwater cycle, which condenses the steam; the heated feedwater is returned to the reactor. The heat rejected to the main condenser is removed by the circulating water system. Based upon the recent power uprate, Cooper's generating capacity will be approximately 836 Megawatts electric (MWe).

The circulating water system provides the heat sink required for removal of waste heat in the power plant's thermal cycle. The system has the principal function of removing heat by absorbing this energy in the main condenser. Circulating water is drawn from the Missouri River with heated cooling water returned to the river.

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.[1]* 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,"[2] 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.

* References provided in Section 7 of the document

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 SAFSTOR, 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 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,[3] the NRC has re-evaluated this alternative. 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. However, 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.[4] 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.[5] When the decommissioning regulations were 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 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 the decision to cease 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 an application to the NRC to terminate the license, which will include a license termination plan (LTP).

1.3.1 Nuclear Waste Policy Act

Congress passed the "Nuclear Waste Policy Act"[6] (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 breach of contract.

Operation of DOE's yet-to-be constructed repository is contingent upon the review and approval of the facility's license application by the NRC and the successful resolution of pending litigation. The DOE submitted its license application to the NRC on June 3, 2008, seeking authorization to construct the repository at Yucca Mountain, Nevada. Assuming a

timely review, and adequate funding, the DOE expects that receipt of fuel could begin by 2020.[7]

It is generally necessary that spent fuel be actively cooled and stored for a minimum period at the generating site prior to transfer. As such, the NRC requires that licensees 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, pursuant to 10 CFR Part 50.54(bb).[8] This funding requirement is fulfilled through inclusion of certain cost elements in the decommissioning estimate, for example, associated with the isolation and continued operation of the spent fuel pool and ISFSI.

At shutdown, the spent fuel pool is expected to contain freshly discharged assemblies (from the most recent refueling cycles) as well as the final reactor core. Over the following 5½ years the assemblies are packaged into multipurpose canisters for transfer to the DOE or to the ISFSI. It is assumed that this period provides the necessary cooling for the final core to meet the storage system requirements and/or transport system requirements for decay heat.

DOE's contracts with utilities generally order the acceptance of spent fuel from utilities based upon the oldest fuel receiving the highest priority. For purposes of this analysis, acceptance of commercial spent fuel by the DOE is expected to begin in 2020.

NPPD has 1,054 spent fuel assemblies from Cooper in storage at General Electric's wet-pool ISFSI in Morris, Illinois. This analysis assumes that this inventory is preferentially transferred to the DOE, starting in 2022. The first assemblies removed from the Cooper site are assumed to be in 2027. With an estimated rate of transfer of 3,000 metric tons of uranium (MTU)/year from the commercial generators, completion of the removal of fuel from the Cooper site is projected to be in the year 2046 for a 2014 shutdown and year 2061 for a 2034 shutdown. Consequently, costs are included within the estimates for the long-term caretaking of the spent fuel at the Cooper site until the transfer is completed.

An ISFSI, which can be operated under a separate and independent license, is constructed to support plant operations and decommissioning. As such, the facility will be designed to accommodate the dry storage modules needed to off-load the wet storage pool so that dismantling

activities can proceed. Once emptied, the Reactor Building can be either decontaminated and dismantled or prepared for long-term storage.

NPPD's position is that the DOE has a contractual obligation to accept Cooper'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, at this time, including the cost of storing spent fuel in this study is the most reasonable approach because it insures the availability of sufficient decommissioning funds at the end of the station's life if, contrary to its contractual obligation, the DOE has not performed earlier.

1.3.2 Low-Level Radioactive Waste Acts

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,[9] and its Amendments of 1985,[10] the states became ultimately responsible for the disposition of low-level radioactive waste generated within their own borders.

Until recently, there were two facilities available to NPPD for the disposal of low-level radioactive waste generated by Cooper. As of July 1, 2008, however, the facility in Barnwell, South Carolina was closed to generators outside the Atlantic Compact (comprised of the states of Connecticut, New Jersey and South Carolina). This leaves the facility in Clive, Utah, operated by EnergySolutions, as the only available destination for low-level radioactive waste requiring controlled disposal.

For the purpose of this analysis, the EnergySolutions' facility is used as the basis for estimating the disposal cost for the majority of the radioactive waste (Class A[11]). EnergySolutions does not have a license to dispose of the more highly radioactive waste (Class B and C), for example, generated in the dismantling of the reactor vessel. As a proxy, the disposal costs for this material are based upon the last published rate schedule for non-compact waste for 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. As such, the GTCC radioactive waste has been packaged and disposed of as high-level waste, at a cost equivalent to that envisioned for the spent fuel.

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 eliminate the portion of waste that does not require disposal as radioactive waste, compaction, incineration or metal melt. The estimates for Cooper 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,"[12] amending 10 CFR Part 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 assume that the Cooper site will be remediated to a residual level consistent with the NRC-prescribed level.

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).[13] An additional and separate limit of 4 millirem per year, as defined in 40 CFR §141.16, is applied to drinking water.[14]

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)[15] 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 the Cooper nuclear unit for the scenarios described below. Although they differ with respect to technique, process, cost, and schedule, they attain the same result: the ultimate release of the site for unrestricted use.

The following alternatives were evaluated (for both a 2014 and 2034 cessation of plant operations) and are representative of the alternatives available to the owner:

1. DECON: The plant is decommissioned shortly after the permanent cessation of plant operations. Spent fuel, that is not transferred directly to the DOE, is relocated to the ISFSI for interim storage. Spent fuel storage operations continue at the site until the transfer of the fuel to the DOE is completed.

2. Delayed DECON: In the second scenario, the unit is prepared for an abbreviated period of storage. As in the first scenario, spent fuel storage operations continue at the site until the transfer of the fuel to the DOE is completed. Once completed, decommissioning operations are initiated.

3. SAFSTOR: The third scenario is similar to the second scenario in that the unit is placed in safe-storage with concurrent spent fuel storage operations. However, decommissioning is deferred beyond the fuel storage period to the maximum extent possible; termination of the license would conclude within the maximum required 60-year period.

Six scenarios were identified for evaluation. As shown below, the six scenarios evaluate a combination of shutdown dates (scheduled and anticipated) and decommissioning alternative (prompt or deferred).

Scenario	Shutdown Date	Option	Spent Fuel Transfer Completed	Operating License Terminated
1	2014	DECON	2046	2020
2	2014	Delayed DECON	2046	2053
3	2014	SAFSTOR	2046	2074
4	2034	DECON	2061	2040
5	2034	Delayed DECON	2061	2068
6	2034	SAFSTOR	2061	2094

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 facility 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 is then 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 Cooper 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.

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 within two years of the notice to cease operations, provides a description of the licensee's planned decommissioning activities, a timetable, 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 hearing 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, i.e., without specific 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, 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 sacrificial 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. The pool will remain operational for approximately 5½ years following the cessation of operations before the inventory resident at shutdown can be transferred to the ISFSI.
- 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 termination of the 10 CFR §50 operating license. 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 for the disposition of low-level radioactive waste.
- 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.
- Disconnection of the control blades from the drives on the vessel lower head. Blades are transferred to the spent fuel pool for packaging.
- Transfer of the steam separator and dryer assemblies to the dryer-separator pool for segmentation. Segmentation will maximize the loading of the shielded transport casks, i.e., by weight and activity. The operations are conducted under water using remotely operated tooling and contamination controls.
- 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 will be packaged in a modified fuel canister for geologic disposal. Interim storage can be in the pool, as space permits, or in the ISFSI.
- Removal and segmentation of the remaining internals including the jet pump assemblies, fuel support castings and core plate assembly.
- Draining and decontamination of the reactor well and permanently sealing of the spent fuel transfer gate. Install shielded platform for segmentation of 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 supporting structure will then be 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 hearing. 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.

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)."[16] This document incorporates the statistical approaches to survey design and data interpretation used by the EPA. It also identifies state-of-the-art, 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 final termination of the license.

The NRC will terminate the operating license 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, safe manner, blasting, coring, drilling, scarification (surface removal), and the other decontamination activities will substantially degrade power block structures including the reactor, augmented radwaste, radwaste and turbine 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.

Prompt dismantling of site structures 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 cost 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 separate and independent license (10 CFR §72) following the termination of the §50 operating license. Assuming the DOE starts accepting fuel from commercial generators in 2020, transfer of spent fuel from the ISFSI to the DOE would begin in 2027, with the transfer completed by 2046 for a 2014 shutdown and year 2061 for a 2034 shutdown.

At the conclusion of the spent fuel transfer process, the ISFSI will be decommissioned. The Commission will terminate the §72 license when 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.

The assumed design for the ISFSI is based upon the use of a multi-purpose canister and a horizontal concrete module for pad storage. For purposes of this cost analysis, it is assumed that once the inner canisters containing the spent fuel assemblies have been removed, any required decontamination performed on the storage modules (some minor activation is assumed), and the license for the facility terminated, the modules can be dismantled using conventional techniques for the demolition of reinforced concrete. The concrete storage pad is then removed and the area regraded.

2.2 SAFSTOR AND DELAYED DECOMMISSIONING

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 is 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 length of the dormancy period. In the Delayed DECON scenario, decommissioning operations are assumed to begin once fuel is off site. By contrast, in the SAFSTOR scenario, the plant remains in safe-storage 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.
- Relocation of the spent fuel from the spent fuel storage pool to the ISFSI.
- 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 conducted primarily to prevent unauthorized entry and to protect the public from the consequences of its 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. After an optional period of storage (such that license terminations are accomplished within 60 years of final shutdown), it is required that the licensee submit applications to terminate the license, along with an 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 facilities located within the Reactor Building for decommissioning.

Variations in the length of the dormancy period are expected to have little effect upon the quantities of radioactive wastes generated from system and structure removal operations. Given the levels of radioactivity and spectrum of radionuclides expected from forty to sixty 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. However, 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 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 deferred scenarios. 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. If the site structures are to be dismantled, dismantling as a continuation of the decommissioning process is clearly the most appropriate and cost-effective option, as described in Section 2.1.3. The basis for the dismantling cost in the deferred scenarios 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 estimates prepared for decommissioning Cooper consider the unique features of the site, including the nuclear steam system supply, electric power generating systems, structures, and supporting 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 current estimates are area-based estimates, i.e., the plant inventory has been correlated with site-specific area working conditions, and the plant work activities organized into discrete areas to better reflect the manner in which the decommissioning will take place. The areas were determined on the basis of "common" conditions or attributes. Each area was evaluated for work difficulty, including affects of radiation, external surface contamination, and access. This evaluation was used to adjust the work difficulty factors for removing equipment in a given area.

3.2 METHODOLOGY

The methodology used to develop the estimates follows the basic approach originally presented in the cost estimating guidelines developed by the Atomic Industrial Forum (now Nuclear Energy Institute). The "Guidelines for Producing Commercial Nuclear Power Plant Decommissioning Cost Estimates," (AIF/NESP-036) [17] and the DOE "Decommissioning Handbook."[18] describe a unit cost factor method for estimating decommissioning activity costs. The unit cost factors used in this analysis were developed using these guidance documents, updated for more recent decommissioning experience and modified to incorporate site-specific costs.

The activity-dependent costs were then estimated with the item quantities (cubic yards and tons), developed from plant drawings and plant design information. A data base was constructed identifying the installed equipment in each designated work area. This data base contains a list of components that have a unique identifier, such as valves, tanks, electrical equipment, and heat exchangers. It also contains bulk commodities such as piping, ventilation ductwork, cable tray, electrical conduit, and supports. Data base categories were consistent with unit cost factors described previously.

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.[19]

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.

The inventory was also organized according to its proposed disposition. There were three primary waste streams identified for the Cooper inventory: (1) clean material (expected to meet the release criteria without any decontamination), (2) contaminated material with recovery potential or requiring additional processing for disposal (expected to be sent to an off-site waste processor), and (3) contaminated material designated for direct disposal at a controlled low-level radioactive waste disposal site (i.e., material expected to exceed waste processor acceptance criteria or uneconomical to process).

An activity duration critical path was 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.

This analysis reflects lessons learned from TLG's involvement in the Shippingport Station decommissioning, 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, Connecticut Yankee, and San Onofre-1 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 are assigned to each unique set of unit factors, commensurate with the working conditions. The ranges used for the WDFs are as follows:

• Access Factor	0% to 30%
• Respiratory Protection Factor	0% to 50%
• 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 originally developed in conjunction with the AIF/NESP-036 study. The factors (and their suggested application) are discussed in more detail in Appendix E.

Scheduling Program Durations

Area activity durations are used to develop the total decommissioning program schedule. The unit cost factors, adjusted for WDFs as described above, are applied against the inventory of materials to be removed in each defined work area. The work area is then evaluated for the most efficient number of workers/crews for the identified decommissioning activities. The adjusted unit cost factors are then compared against the available manpower so that an overall duration for removal of components and piping from each work area can be calculated.

The schedule is used to assign carrying costs, which include program management, administration, field engineering, equipment rental, and support services such as quality control and security.

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).

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.

3.3.1 Contingency

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"[20] 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, contingency is included. 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.

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%

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 and D).

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, for example, 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, 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.

It has been TLG's experience that the results of a risk analysis, when compared with the base case estimate for decommissioning, indicate that the chances of the base decommissioning estimate's being too high is a low probability, and the chances that the estimate is too low is a higher probability. This is mostly due to the pricing uncertainty for low-level radioactive waste burial, and to a lesser extent due to schedule increases from changes in plant conditions and to pricing variations in the cost of labor (both craft and staff). This cost study, however, 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 impact of the considerations identified below is included in this cost study.

3.4.1 Spent Fuel Management

The cost to dispose the spent fuel generated from plant operations is not reflected within the estimates to decommission Cooper. 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 is financed by a 1 mill/kWhr surcharge paid into

the DOE's waste fund during operations. However, the NRC requires 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 funding requirement is fulfilled through inclusion of certain high-level waste cost elements within the estimates, as described below.

Completion of the decommissioning process is highly dependent upon the DOE's ability to remove spent fuel from the site. The timing for removal of spent fuel from the site is based upon the DOE's most recently published annual acceptance rates of 400 MTU/year for year 1, 3,800 MTU total for years 2 through 4 and 3,000 MTU/year for year 5 and beyond.[21] The DOE contracts provide mechanisms for altering the oldest fuel first allocation scheme, including emergency deliveries, exchanges of allocations amongst utilities and the option of providing priority acceptance from permanently shutdown nuclear reactors. Because it is unclear how these mechanisms may operate once DOE begins accepting spent fuel from commercial reactors, this study assumes that DOE will accept spent fuel in an oldest fuel first order.

Morris Wet-Pool Storage Facility

NPPD has 1,054 spent fuel assemblies from Cooper in storage at General Electric's wet-pool ISFSI in Morris, Illinois. This analysis assumes that this inventory is preferentially transferred to the DOE, starting in 2022. Completion of the transfer would be in year 2027. At that time, the transfer of spent fuel would be exclusively from the Cooper site.

ISFSI

The ISFSI, constructed to support plant operations, will continue to operate throughout decommissioning, and beyond the termination of the operating license in the DECON decommissioning scenario, until such time that the transfer of spent fuel to the DOE can be completed. Assuming that DOE commences repository operation in 2020, and Morris fuel is transferred first, spent fuel from the Cooper site is projected to be removed beginning in 2027. The process is expected to be completed by the year 2046 for a 2014 shutdown and year 2061 for a 2034 shutdown. The process is similar for the Delayed DECON and SAFSTOR scenarios; however, based upon the expected completion date for fuel transfer, the ISFSI will be emptied prior to the commencement of decommissioning operations.

Operation and maintenance costs for the ISFSI are included within the estimate and address the cost for staffing the facility, as well as security, insurance, and licensing fees. The estimates include the costs to purchase, load, and transfer the fuel storage canisters. Costs are also provided for the final disposition of the facility once the transfer is complete.

Storage Canister Design

The design and capacity of the ISFSI is based upon the NUHOMS system, with a 61 fuel assembly capacity. A unit cost of $785,000 is used for pricing the internal multi-purpose canister (MPC) and the horizontal concrete storage module.

Canister Loading and Transfer

An average cost of $440,000 is used for the labor and equipment to seal each spent fuel canister once it is loaded and for the labor to transfer the spent fuel canister from the pool into a DOE transport cask or onto the ISFSI pad. For estimating purposes, 50% of this cost is used to estimate the cost to transfer the fuel from the ISFSI into a DOE transport cask.

Operations and Maintenance

An annual cost (excluding labor) of approximately $746,000 and $85,000 are used for operation and maintenance of the spent fuel pool and the ISFSI, respectively. Pool operations are expected to continue approximately 5½ years after the cessation of operations. ISFSI operating costs are based upon expectations of DOE performance, as described previously.

ISFSI Design Considerations

A multi-purpose (storage and transport) dry shielded storage canister with a horizontal, reinforced concrete storage module is used as a basis for the cost analysis. The final core off load, equivalent to 8 modules, 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). The steel support structure is assumed to be removed from these modules for controlled disposal. The cost of the disposition of this material, as well as the demolition of the ISFSI facility, is included in the estimates.

GTCC

The dismantling of the reactor internals 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. Although there are strong arguments that GTCC waste is covered by the spent fuel contact with DOE and the fees being paid pursuant to that contract, DOE has taken the position that GTCC waste is not covered by that contract or its fees and that utilities will have to pay an additional fee for the disposal of their GTCC waste. However, to date, the federal government has not identified a cost for disposing of GTCC or a schedule for acceptance. As such, the GTCC radioactive waste has been packaged and disposed of as high-level waste, at a cost equivalent to that envisioned for the spent fuel.

For purposes of this study, GTCC is packaged in the same canisters used to store spent fuel. Disposal costs are based upon a cost equivalent to that envisioned for the spent fuel. It is not anticipated that the DOE would 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 with the spent fuel in the ISFSI at the Cooper site (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 has been removed from the site prior to the start of decommissioning and the ISFSI deactivated.

3.4.2 Reactor Vessel and Internal Components

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 currently being 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 the Cooper unit 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. Consequently, the study assumes the reactor vessel will require segmentation, as a bounding condition. With lower levels of activation, the vessel shell can be packaged more efficiently than the curie-limited internal components. This will allow the use of more conventional waste packages rather than shielded casks for transport (although some shielded casks are still required).

3.4.3 Primary System Components

In the DECON scenario, the reactor recirculation system components are assumed to be decontaminated using chemical agents prior to the start of dismantling operations. This type of decontamination can be

expected to have a significant ALARA impact, since in this scenario the removal work is done within the first few years of shutdown. A decontamination factor (average reduction) of 10 is assumed for the process. Disposal of the decontamination solution effluent is included within the estimate as a "process liquid waste" charge. In the SAFSTOR scenario, radionuclide decay is expected to provide the same benefit and, therefore, a chemical decontamination is not included.

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) drops below the nozzle zone. The piping is boxed and shipped by shielded van. The reactor recirculation pumps and motors are lifted out intact, packaged, and transported for processing or disposal.

3.4.4 Main Turbine and Condenser

The main turbine is dismantled using conventional maintenance procedures. The turbine rotors and shafts are removed to a laydown area. The lower turbine casings are removed from their anchors by controlled demolition. The main condensers are also disassembled and moved to a laydown area. Material is then prepared for transportation to an off-site recycling facility where it is surveyed and designated for either decontamination or volume reduction, conventional disposal, or controlled disposal. Components are 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.[22] 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.

Transportation costs for material requiring controlled disposal are based upon the mileage to the EnergySolutions facility in Clive, Utah. Transportation costs for off-site waste processing are based upon the mileage to Memphis, Tennessee. Truck transport costs are estimated using published tariffs from Tri-State Motor Transit.[23]

3.4.6 Low-Level Radioactive Waste Conditioning and 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 and D, 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, 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.

Disposal fees are based upon estimated charges, with surcharges added for the highly activated components, for example, generated in the segmentation of the reactor vessel. The cost to dispose of the majority of the material generated from the decontamination and dismantling activities is based upon the current cost for disposal at EnergySolutions facility in Clive, Utah. Disposal costs for the higher activity waste (Class B and C) were based upon the last published rate schedule for non-compact waste for the Barnwell facility (as a proxy).

3.4.7 Site Conditions Following Decommissioning

The NRC will terminate (or amend) the site 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 ends at this point. Building codes and state environmental regulations dictate the next step in the decommissioning process, as well as the owner's own future plans for the site.

Structures are removed to a nominal depth of three feet below grade. Concrete rubble generated from demolition activities is processed and made available as clean fill. The Intake Structure is assumed to be removed back to the riverbank. The riverbank and the station grounds will be regraded such that the site will have a final contour consistent with adjacent surroundings, i.e., the configuration of the Missouri River levee will be maintained. The large underground tunnels between the water intake and Turbine Building will be isolated, sealed, and abandoned in place. Site utilities 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 removed.

The existing electrical switchyard and access roads will remain in support of the electrical transmission and distribution system. The site access road will be left intact.

The estimates do not assume the remediation of any 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 assumptions were made in the development of the estimates for decommissioning the Cooper unit.

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

The craft labor required to decontaminate and dismantle the nuclear unit is acquired through standard site contracting practices. The current cost of labor at the site is used as an estimating basis.

NPPD, as the licensee, will continue to provide site operations support, including decommissioning program management, licensing, radiological protection, and site security. A Decommissioning Operations Contractor (DOC) will provide the supervisory staff needed to oversee the labor subcontractors, consultants, and specialty contractors needed to perform the work required for the decontamination and dismantling effort. The DOC will also provide the engineering services needed to develop

activity specifications, detailed procedures, detailed activation analyses, and support field activities such as structural modifications.

Personnel costs are based upon average salary information provided by NPPD. Overhead costs are included for site and corporate support, reduced commensurate with the staffing of the project.

Security, while reduced from operating levels, is maintained throughout the decommissioning for access control, material control, and to safeguard the spent fuel.

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.[24] Actual estimates are derived from the curie/gram values contained therein and adjusted for the different mass of the Cooper components, projected operating life, and different periods of decay. Additional short-lived isotopes were derived from CR-0130[25] and CR-0672,[26] and benchmarked to the long-lived values from CR-3474.

The disposal cost for the control blades removed from the vessel with the final core load is included within the estimates. Disposition of any blades stored in the pools from operations is considered an operating expense and therefore not accounted for in the decommissioning estimates.

Activation of the Reactor Building structures is confined to the area around the sacrificial shield. More extensive activation (at very low levels) of the interior structures within containment has been detected at several reactors and the owners have elected to dispose of the affected material at a controlled facility rather than reuse the material as fill on site or sending it to a landfill. The ultimate disposition of the material removed from the Reactor Building will depend upon the site release criteria applied, as well as the designated end use for the site.

3.5.4 General

Transition Activities

Existing warehouses are cleared of non-essential material and remain for use by NPPD and its subcontractors. The plant's operating staff performs 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.
- Process 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. NPPD 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 value that an owner 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 more than 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 is removed at no cost or credit to the decommissioning project. Disposition may include relocation to other facilities. Spare parts are also made available for alternative use.

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 to calculate the cost of energy consumed during decommissioning for tooling, lighting, ventilation, and essential services.

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 the guidance and the limits for coverage defined in the NRC's proposed rulemaking "Financial Protection Requirements for Permanently Shutdown Nuclear Power Reactors."[27] The NRC's financial protection requirements are based on various reactor (and spent fuel) configurations.

Taxes

The only tax payment (or fee) included in the estimates is associated with the river levee maintenance costs.

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 3.6. The tables delineate the cost contributors by year of expenditures as well as cost contributor (e.g., labor, materials, and waste disposal).

Decommissioning costs are reported in 2008 dollars. Costs are not inflated, escalated, or discounted over the period of expenditure (or projected lifetime of the plant). The schedules are based upon the detailed activity costs reported in Appendices C and D, along with the timelines presented in Section 4.

In the appendices, 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.

The "Spent Fuel Management" subcategory contains costs associated with the construction of an ISFSI, the containerization and transfer of spent fuel to the ISFSI over the five and one-half years of post-shutdown pool operations, and the management of the ISFSI until such time that the transfer of all fuel from this facility to an off-site location (e.g., geologic repository) 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.

TABLE 3.1
2014 DECON
SCHEDULE OF TOTAL ANNUAL EXPENDITURES
(thousands, 2008 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2014	47,079	9,874	1,016	87	7,982	66,039
2015	63,173	21,674	1,573	22,361	13,287	122,069
2016	49,998	21,848	1,004	41,033	9,480	123,362
2017	44,806	11,549	799	12,824	6,767	76,745
2018	44,806	11,549	799	12,824	6,767	76,745
2019	39,861	10,474	617	13,219	5,473	69,643
2020	25,445	3,467	181	49	2,123	31,266
2021	16,129	6,815	107	0	1,730	24,781
2022	9,078	3,166	44	0	1,764	14,052
2023	4,046	562	0	0	1,788	6,397
2024	4,057	564	0	0	1,793	6,414
2025	4,046	562	0	0	1,788	6,397
2026	4,046	562	0	0	1,788	6,397
2027	4,046	562	0	0	1,788	6,397
2028	4,057	564	0	0	1,793	6,414
2029	4,046	562	0	0	1,788	6,397
2030	4,046	562	0	0	1,788	6,397
2031	4,046	562	0	0	1,788	6,397
2032	4,057	564	0	0	1,793	6,414
2033	4,046	562	0	0	1,788	6,397
2034	4,046	562	0	0	1,788	6,397
2035	4,046	562	0	0	1,788	6,397
2036	4,057	564	0	0	1,793	6,414
2037	4,046	562	0	0	1,788	6,397
2038	4,046	562	0	0	1,788	6,397
2039	4,046	562	0	0	1,788	6,397
2040	4,057	564	0	0	1,793	6,414
2041	4,046	562	0	0	1,788	6,397
2042	4,046	562	0	0	1,788	6,397
2043	4,046	562	0	0	1,788	6,397
2044	4,057	564	0	0	1,793	6,414
2045	4,046	562	0	0	1,788	6,397
2046	4,061	1,334	0	1	10,384	15,779

TABLE 3.1 (continued)
2014 DECON
SCHEDULE OF TOTAL ANNUAL EXPENDITURES
(thousands, 2008 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2047	1,819	868	0	68	1,597	4,352
	439,379	115,564	6,141	102,465	108,509	772,058

TABLE 3.2
2014 Delayed DECON
SCHEDULE OF TOTAL ANNUAL EXPENDITURES
(thousands, 2008 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2014	38,591	9,434	1,016	87	7,982	57,111
2015	38,786	10,829	676	1,988	11,278	63,557
2016	12,446	5,991	214	62	3,851	22,564
2017	12,412	5,974	213	62	3,841	22,503
2018	12,412	5,974	213	62	3,841	22,503
2019	9,150	3,617	164	60	2,877	15,869
2020	5,297	824	107	58	1,739	8,025
2021	5,282	822	107	58	1,735	8,003
2022	5,282	822	107	58	1,735	8,003
2023	5,282	822	107	58	1,735	8,003
2024	5,297	824	107	58	1,739	8,025
2025	5,282	822	107	58	1,735	8,003
2026	5,282	822	107	58	1,735	8,003
2027	5,282	822	107	58	1,735	8,003
2028	5,297	824	107	58	1,739	8,025
2029	5,282	822	107	58	1,735	8,003
2030	5,282	822	107	58	1,735	8,003
2031	5,282	822	107	58	1,735	8,003
2032	5,297	824	107	58	1,739	8,025
2033	5,282	822	107	58	1,735	8,003
2034	5,282	822	107	58	1,735	8,003
2035	5,282	822	107	58	1,735	8,003
2036	5,297	824	107	58	1,739	8,025
2037	5,282	822	107	58	1,735	8,003
2038	5,282	822	107	58	1,735	8,003
2039	5,282	822	107	58	1,735	8,003
2040	5,297	824	107	58	1,739	8,025
2041	5,282	822	107	58	1,735	8,003
2042	5,282	822	107	58	1,735	8,003
2043	5,282	822	107	58	1,735	8,003
2044	5,297	824	107	58	1,739	8,025
2045	5,282	822	107	58	1,735	8,003
2046	5,360	824	109	58	1,732	8,082

TABLE 3.2 (continued)
2014 Delayed DECON
SCHEDULE OF TOTAL ANNUAL EXPENDITURES
(thousands, 2008 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2047	33,523	1,412	1,066	77	743	36,822
2048	43,779	15,439	1,042	16,243	6,546	83,049
2049	40,386	14,058	931	25,770	8,761	89,906
2050	39,158	6,342	799	15,542	3,274	65,116
2051	39,158	6,342	799	15,542	3,274	65,116
2052	24,949	3,036	221	819	759	29,785
2053	13,322	6,769	107	0	38	20,236
2054	7,993	4,062	64	0	23	12,141
	508,866	121,495	10,408	77,874	103,957	822,600

TABLE 3.3
2014 SAFSTOR
SCHEDULE OF TOTAL ANNUAL EXPENDITURES
(thousands, 2008 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2014	38,591	9,434	1,016	87	7,982	57,111
2015	38,786	10,829	676	1,988	11,278	63,557
2016	12,446	5,991	214	62	3,851	22,564
2017	12,412	5,974	213	62	3,841	22,503
2018	12,412	5,974	213	62	3,841	22,503
2019	9,150	3,617	164	60	2,877	15,869
2020	5,297	824	107	58	1,739	8,025
2021	5,282	822	107	58	1,735	8,003
2022	5,282	822	107	58	1,735	8,003
2023	5,282	822	107	58	1,735	8,003
2024	5,297	824	107	58	1,739	8,025
2025	5,282	822	107	58	1,735	8,003
2026	5,282	822	107	58	1,735	8,003
2027	5,282	822	107	58	1,735	8,003
2028	5,297	824	107	58	1,739	8,025
2029	5,282	822	107	58	1,735	8,003
2030	5,282	822	107	58	1,735	8,003
2031	5,282	822	107	58	1,735	8,003
2032	5,297	824	107	58	1,739	8,025
2033	5,282	822	107	58	1,735	8,003
2034	5,282	822	107	58	1,735	8,003
2035	5,282	822	107	58	1,735	8,003
2036	5,297	824	107	58	1,739	8,025
2037	5,282	822	107	58	1,735	8,003
2038	5,282	822	107	58	1,735	8,003
2039	5,282	822	107	58	1,735	8,003
2040	5,297	824	107	58	1,739	8,025
2041	5,282	822	107	58	1,735	8,003
2042	5,282	822	107	58	1,735	8,003
2043	5,282	822	107	58	1,735	8,003
2044	5,297	824	107	58	1,739	8,025
2045	5,282	822	107	58	1,735	8,003
2046	5,276	821	107	58	1,732	7,993

TABLE 3.3 (continued)
2014 SAFSTOR
SCHEDULE OF TOTAL ANNUAL EXPENDITURES
(thousands, 2008 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2047	3,063	249	107	56	671	4,146
2048	3,072	249	107	57	673	4,157
2049	3,063	249	107	56	671	4,146
2050	3,063	249	107	56	671	4,146
2051	3,063	249	107	56	671	4,146
2052	3,072	249	107	57	673	4,157
2053	3,063	249	107	56	671	4,146
2054	3,063	249	107	56	671	4,146
2055	3,063	249	107	56	671	4,146
2056	3,072	249	107	57	673	4,157
2057	3,063	249	107	56	671	4,146
2058	3,063	249	107	56	671	4,146
2059	3,063	249	107	56	671	4,146
2060	3,072	249	107	57	673	4,157
2061	3,063	249	107	56	671	4,146
2062	3,063	249	107	56	671	4,146
2063	3,063	249	107	56	671	4,146
2064	3,072	249	107	57	673	4,157
2065	3,063	249	107	56	671	4,146
2066	3,063	249	107	56	671	4,146
2067	3,063	249	107	56	671	4,146
2068	25,078	1,070	801	72	725	27,745
2069	41,529	10,664	1,054	7,391	3,362	64,001
2070	40,733	17,502	981	30,409	11,019	100,644
2071	39,109	6,285	799	15,410	3,229	64,833
2072	39,216	6,303	802	15,453	3,238	65,011
2073	30,623	3,074	387	4,609	1,507	40,200
2074	13,962	6,534	112	3	72	20,683
2075	11,278	5,731	90	0	32	17,131
	572,411	126,422	12,641	78,413	117,822	907,708

TABLE 3.4
2034 DECON
SCHEDULE OF TOTAL ANNUAL EXPENDITURES
(thousands, 2008 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2034	44,992	3,613	1,016	87	7,982	57,690
2035	62,426	19,434	1,573	22,403	13,287	119,124
2036	49,346	19,889	1,004	41,120	9,480	120,838
2037	44,584	10,883	799	12,824	6,767	75,857
2038	44,584	10,883	799	12,824	6,767	75,857
2039	39,850	10,440	617	13,219	5,473	69,598
2040	25,569	3,838	181	49	2,142	31,779
2041	16,225	7,102	107	0	1,793	25,227
2042	9,093	3,211	44	0	1,790	14,139
2043	4,003	435	0	0	1,788	6,226
2044	4,014	436	0	0	1,793	6,243
2045	4,003	435	0	0	1,788	6,226
2046	4,003	435	0	0	1,788	6,226
2047	4,003	435	0	0	1,788	6,226
2048	4,014	436	0	0	1,793	6,243
2049	4,003	435	0	0	1,788	6,226
2050	4,003	435	0	0	1,788	6,226
2051	4,003	435	0	0	1,788	6,226
2052	4,014	436	0	0	1,793	6,243
2053	4,003	435	0	0	1,788	6,226
2054	4,003	435	0	0	1,788	6,226
2055	4,003	435	0	0	1,788	6,226
2056	4,014	436	0	0	1,793	6,243
2057	4,003	435	0	0	1,788	6,226
2058	4,003	435	0	0	1,788	6,226
2059	4,003	435	0	0	1,788	6,226
2060	4,014	436	0	0	1,793	6,243
2061	4,023	1,212	0	1	10,384	15,620
2062	2,269	1,080	0	75	1,664	5,088
	415,076	99,415	6,141	102,601	99,739	722,972

TABLE 3.5
2034 Delayed DECON
SCHEDULE OF TOTAL ANNUAL EXPENDITURES
(thousands, 2008 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2034	36,504	3,172	1,016	87	7,982	48,762
2035	38,173	8,992	676	1,988	11,278	61,108
2036	12,064	4,843	214	62	3,851	21,034
2037	12,031	4,830	213	62	3,841	20,977
2038	12,031	4,830	213	62	3,841	20,977
2039	8,934	2,969	164	60	2,877	15,004
2040	5,276	763	107	58	1,739	7,944
2041	5,262	761	107	58	1,735	7,922
2042	5,262	761	107	58	1,735	7,922
2043	5,262	761	107	58	1,735	7,922
2044	5,276	763	107	58	1,739	7,944
2045	5,262	761	107	58	1,735	7,922
2046	5,262	761	107	58	1,735	7,922
2047	5,262	761	107	58	1,735	7,922
2048	5,276	763	107	58	1,739	7,944
2049	5,262	761	107	58	1,735	7,922
2050	5,262	761	107	58	1,735	7,922
2051	5,262	761	107	58	1,735	7,922
2052	5,276	763	107	58	1,739	7,944
2053	5,262	761	107	58	1,735	7,922
2054	5,262	761	107	58	1,735	7,922
2055	5,262	761	107	58	1,735	7,922
2056	5,276	763	107	58	1,739	7,944
2057	5,262	761	107	58	1,735	7,922
2058	5,262	761	107	58	1,735	7,922
2059	5,262	761	107	58	1,735	7,922
2060	5,276	763	107	58	1,739	7,944
2061	5,339	763	109	58	1,732	8,001
2062	33,523	1,412	1,066	77	743	36,822
2063	43,666	15,393	1,039	17,523	6,519	84,140
2064	40,561	14,137	934	27,554	8,817	92,002
2065	39,319	6,395	799	15,559	3,313	65,385
2066	39,319	6,395	799	15,559	3,313	65,385

TABLE 3.5 (continued)
2034 Delayed DECON
SCHEDULE OF TOTAL ANNUAL EXPENDITURES
(thousands, 2008 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2067	24,928	2,963	221	820	761	29,693
2068	13,393	6,872	107	0	38	20,410
2069	8,014	4,112	64	0	23	12,213
	478,387	104,080	9,875	80,685	95,387	768,414

TABLE 3.6
2034 SAFSTOR
SCHEDULE OF TOTAL ANNUAL EXPENDITURES
(thousands, 2008 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2034	36,504	3,172	1,016	87	7,982	48,762
2035	38,173	8,992	676	1,988	11,278	61,108
2036	12,064	4,843	214	62	3,851	21,034
2037	12,031	4,830	213	62	3,841	20,977
2038	12,031	4,830	213	62	3,841	20,977
2039	8,934	2,969	164	60	2,877	15,004
2040	5,276	763	107	58	1,739	7,944
2041	5,262	761	107	58	1,735	7,922
2042	5,262	761	107	58	1,735	7,922
2043	5,262	761	107	58	1,735	7,922
2044	5,276	763	107	58	1,739	7,944
2045	5,262	761	107	58	1,735	7,922
2046	5,262	761	107	58	1,735	7,922
2047	5,262	761	107	58	1,735	7,922
2048	5,276	763	107	58	1,739	7,944
2049	5,262	761	107	58	1,735	7,922
2050	5,262	761	107	58	1,735	7,922
2051	5,262	761	107	58	1,735	7,922
2052	5,276	763	107	58	1,739	7,944
2053	5,262	761	107	58	1,735	7,922
2054	5,262	761	107	58	1,735	7,922
2055	5,262	761	107	58	1,735	7,922
2056	5,276	763	107	58	1,739	7,944
2057	5,262	761	107	58	1,735	7,922
2058	5,262	761	107	58	1,735	7,922
2059	5,262	761	107	58	1,735	7,922
2060	5,276	763	107	58	1,739	7,944
2061	5,256	760	107	58	1,732	7,912
2062	3,063	249	107	56	671	4,146
2063	3,063	249	107	56	671	4,146
2064	3,072	249	107	57	673	4,157
2065	3,063	249	107	56	671	4,146
2066	3,063	249	107	56	671	4,146

TABLE 3.6 (continued)
2034 SAFSTOR
SCHEDULE OF TOTAL ANNUAL EXPENDITURES
(thousands, 2008 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2067	3,063	249	107	56	671	4,146
2068	3,072	249	107	57	673	4,157
2069	3,063	249	107	56	671	4,146
2070	3,063	249	107	56	671	4,146
2071	3,063	249	107	56	671	4,146
2072	3,072	249	107	57	673	4,157
2073	3,063	249	107	56	671	4,146
2074	3,063	249	107	56	671	4,146
2075	3,063	249	107	56	671	4,146
2076	3,072	249	107	57	673	4,157
2077	3,063	249	107	56	671	4,146
2078	3,063	249	107	56	671	4,146
2079	3,063	249	107	56	671	4,146
2080	3,072	249	107	57	673	4,157
2081	3,063	249	107	56	671	4,146
2082	3,063	249	107	56	671	4,146
2083	3,063	249	107	56	671	4,146
2084	3,072	249	107	57	673	4,157
2085	3,063	249	107	56	671	4,146
2086	3,063	249	107	56	671	4,146
2087	3,063	249	107	56	671	4,146
2088	25,078	1,070	801	72	725	27,745
2089	41,651	10,681	1,054	7,544	3,410	64,340
2090	41,223	17,574	981	30,995	11,207	101,980
2091	39,269	6,326	799	15,413	3,257	65,064
2092	39,376	6,343	802	15,456	3,266	65,243
2093	30,670	3,086	387	4,610	1,515	40,268
2094	13,995	6,615	112	3	72	20,796
2095	11,307	5,802	90	0	32	17,231
	557,843	110,367	12,641	79,152	112,799	872,803

4. SCHEDULE

The schedules for the decommissioning scenarios considered in this analysis follow the general 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.

Schedules or the individual sequence of activities for each scenario are presented in Figures 4.1 through 4.6. The schedules reflect the six scenarios identified in Section 2. The key activities listed in the schedules do not reflect a one-to-one correspondence with those activities in the detailed cost tables (shown in the Appendices C and D), but divide some activities for clarity and combine others for convenience. The schedule was prepared using "Microsoft Project Professional 2003" computer software.[28]

4.1 SCHEDULE ESTIMATE ASSUMPTIONS

The schedules are generated using a precedence network and associated software. Activity durations are based upon the actual man-hour estimates calculated for each area (Appendix F). The schedules are assembled by sequencing the work areas, consider work crew availability and material access/egress. The following assumptions were made in the development of the decommissioning schedule(s).

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

- 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 Appendices C and D are based upon the durations developed in the various schedules for decommissioning. Durations are established between several milestones in each project period; these durations are used to establish a critical path for the entire project. In turn, the critical path duration for each period is used as the basis for determining the period-dependent costs.

Scenario timelines are provided as Figures 4.2 and 4.3. Milestone dates are based on either a 2014 or 2034 shutdown. In all cases, the fuel pool is emptied approximately 5½ years after shutdown, with ISFSI operations continuing at the site until the DOE can complete the transfer of assemblies to its geologic repository.

FIGURE 4.1
2014 DECON
ACTIVITY SCHEDULE

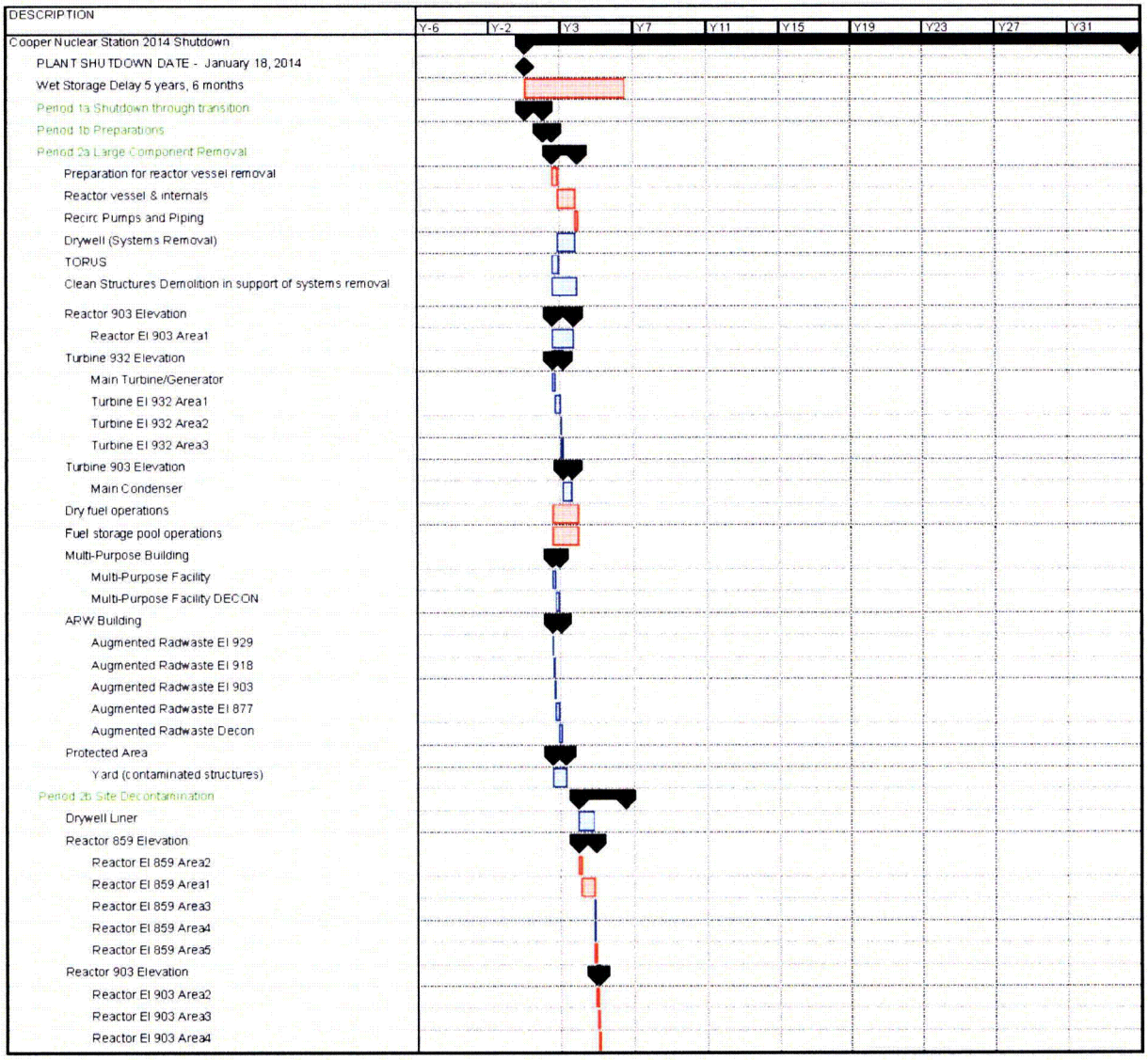


FIGURE 4.1
2014 DECON
ACTIVITY SCHEDULE
(continued)

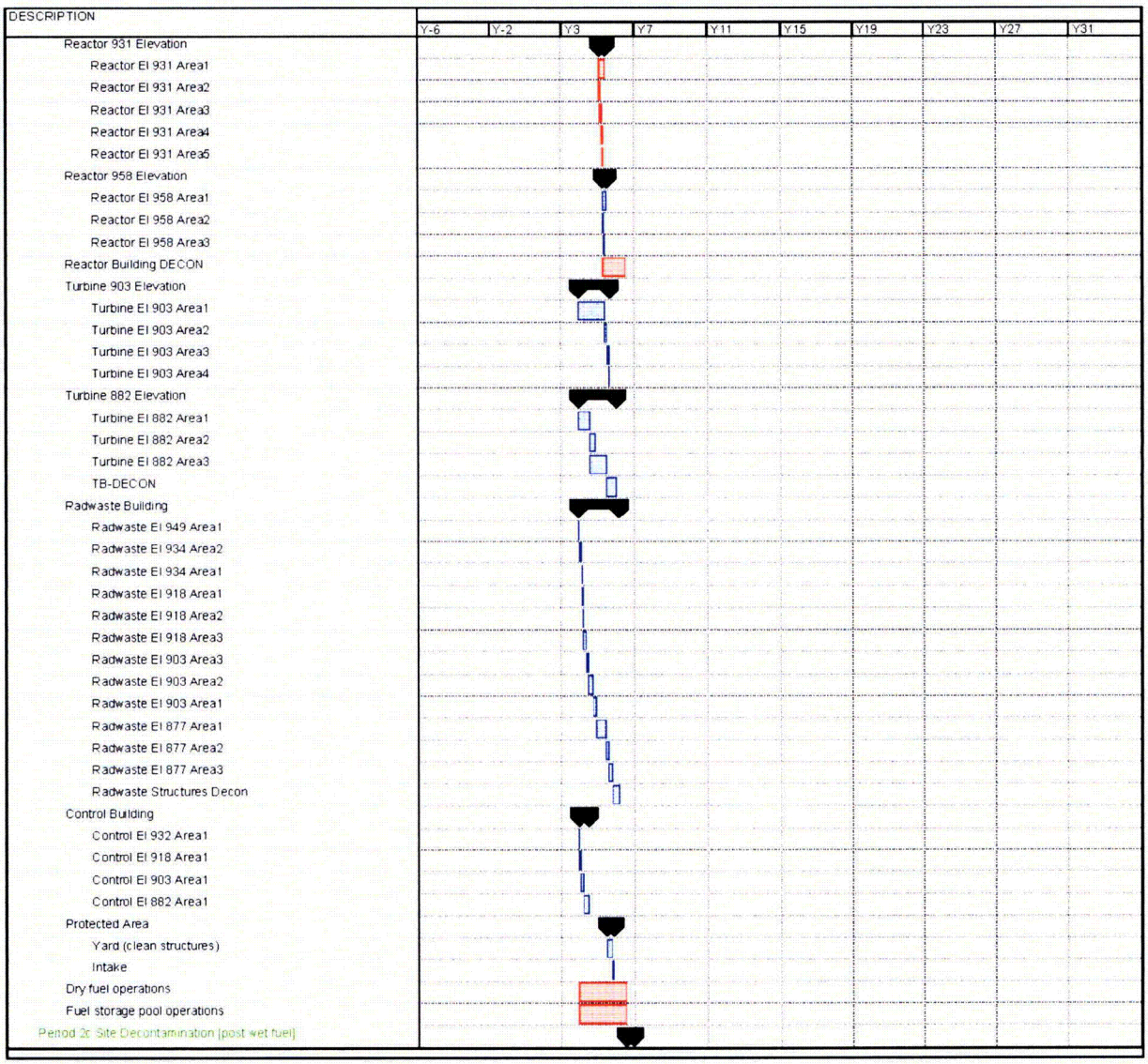


FIGURE 4.1
2014 DECON
ACTIVITY SCHEDULE
(continued)

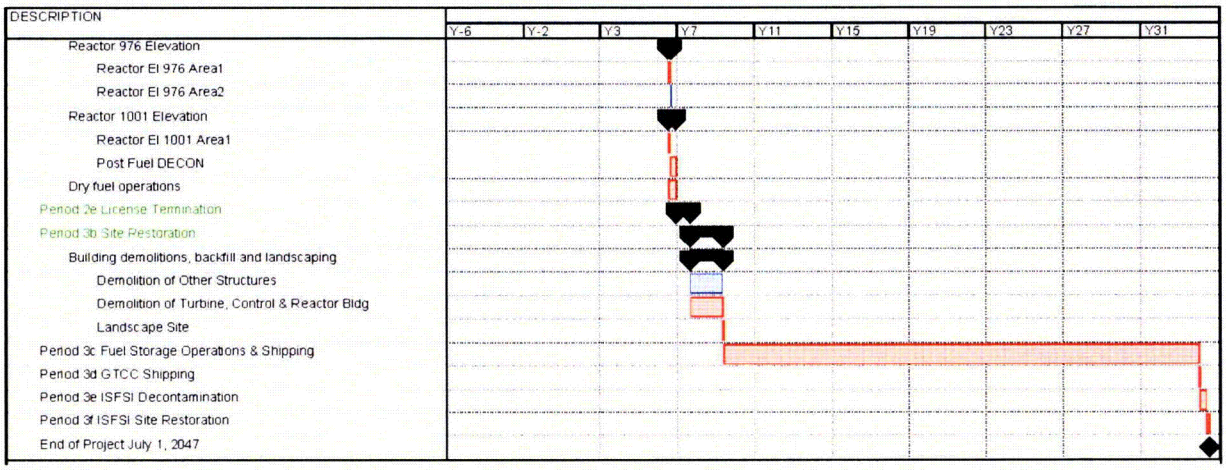


FIGURE 4.2
2014 Delayed DECON
ACTIVITY SCHEDULE

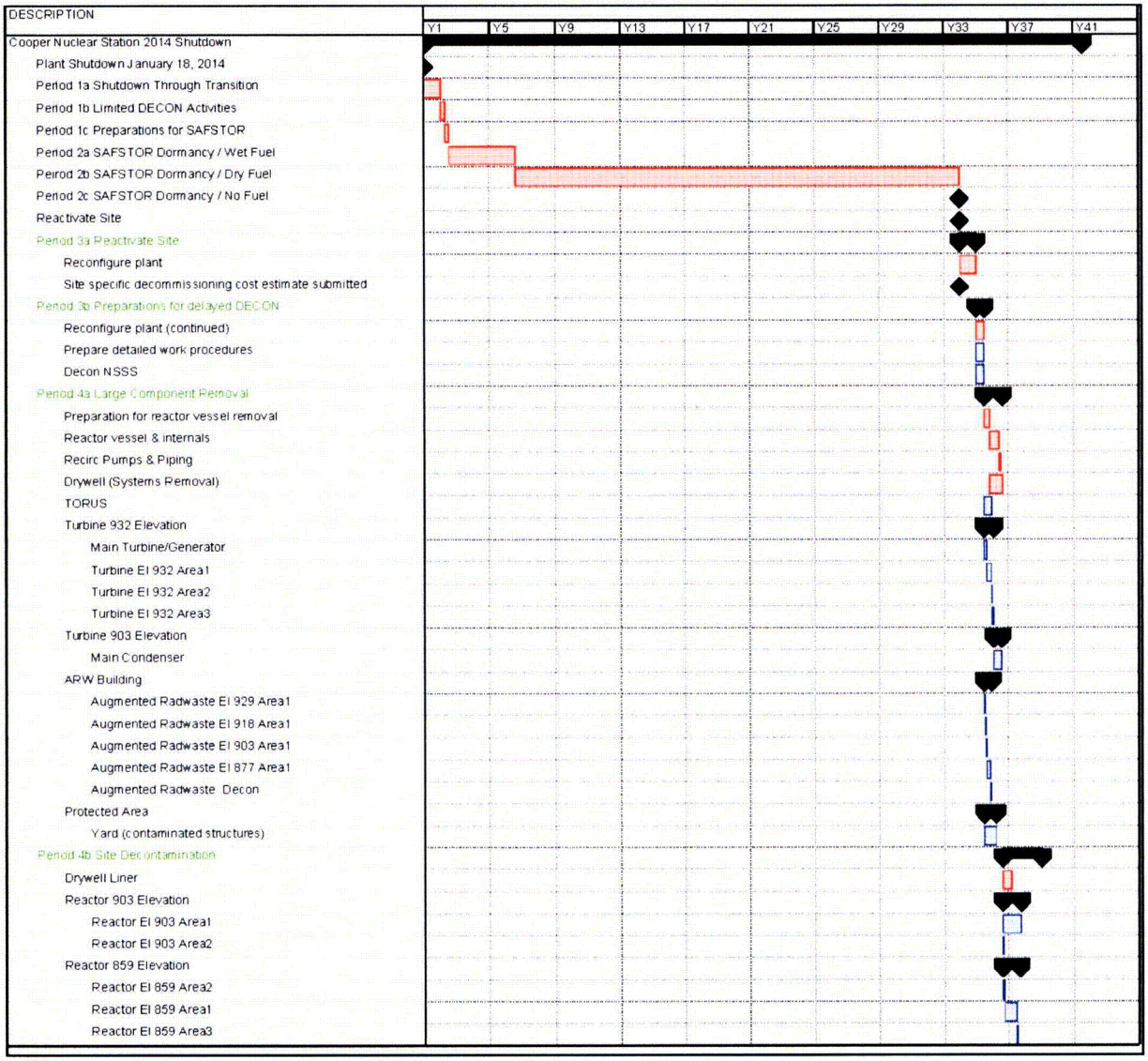


FIGURE 4.2
2014 Delayed DECON
ACTIVITY SCHEDULE
(continued)

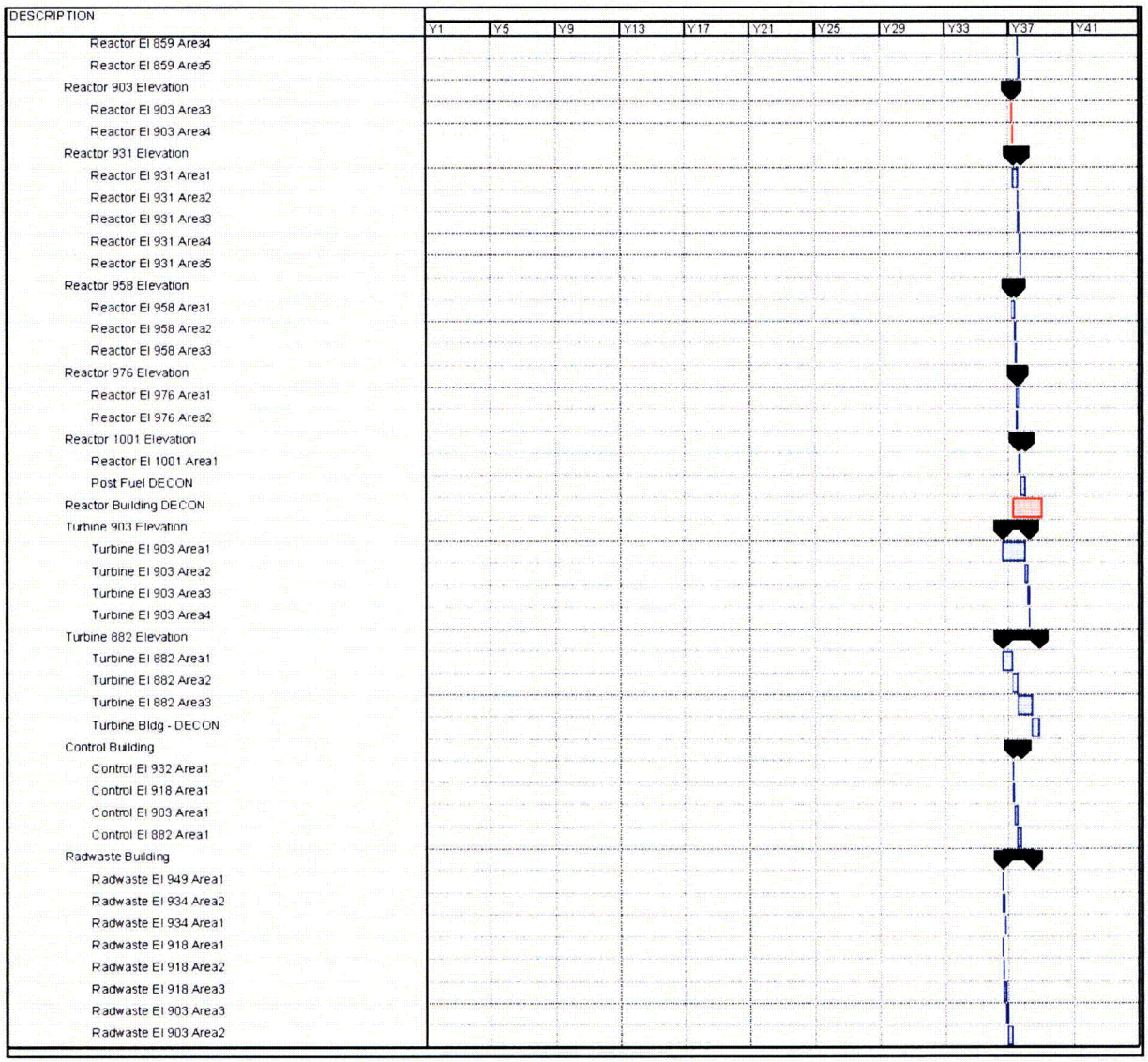


FIGURE 4.2
2014 Delayed DECON
ACTIVITY SCHEDULE
(continued)

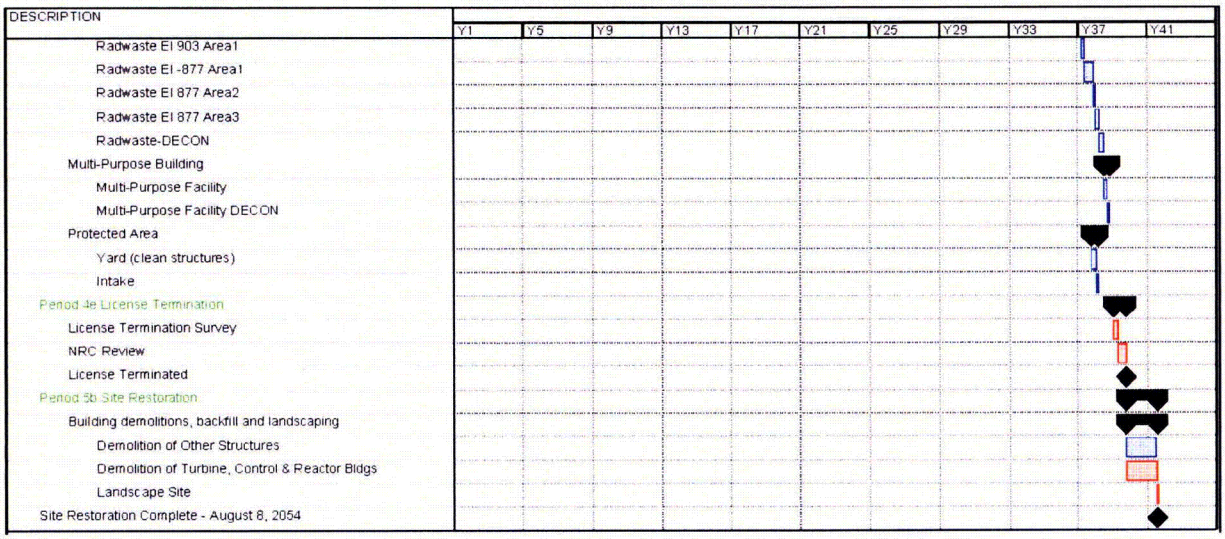


FIGURE 4.3
2014 SAFSTOR
ACTIVITY SCHEDULE

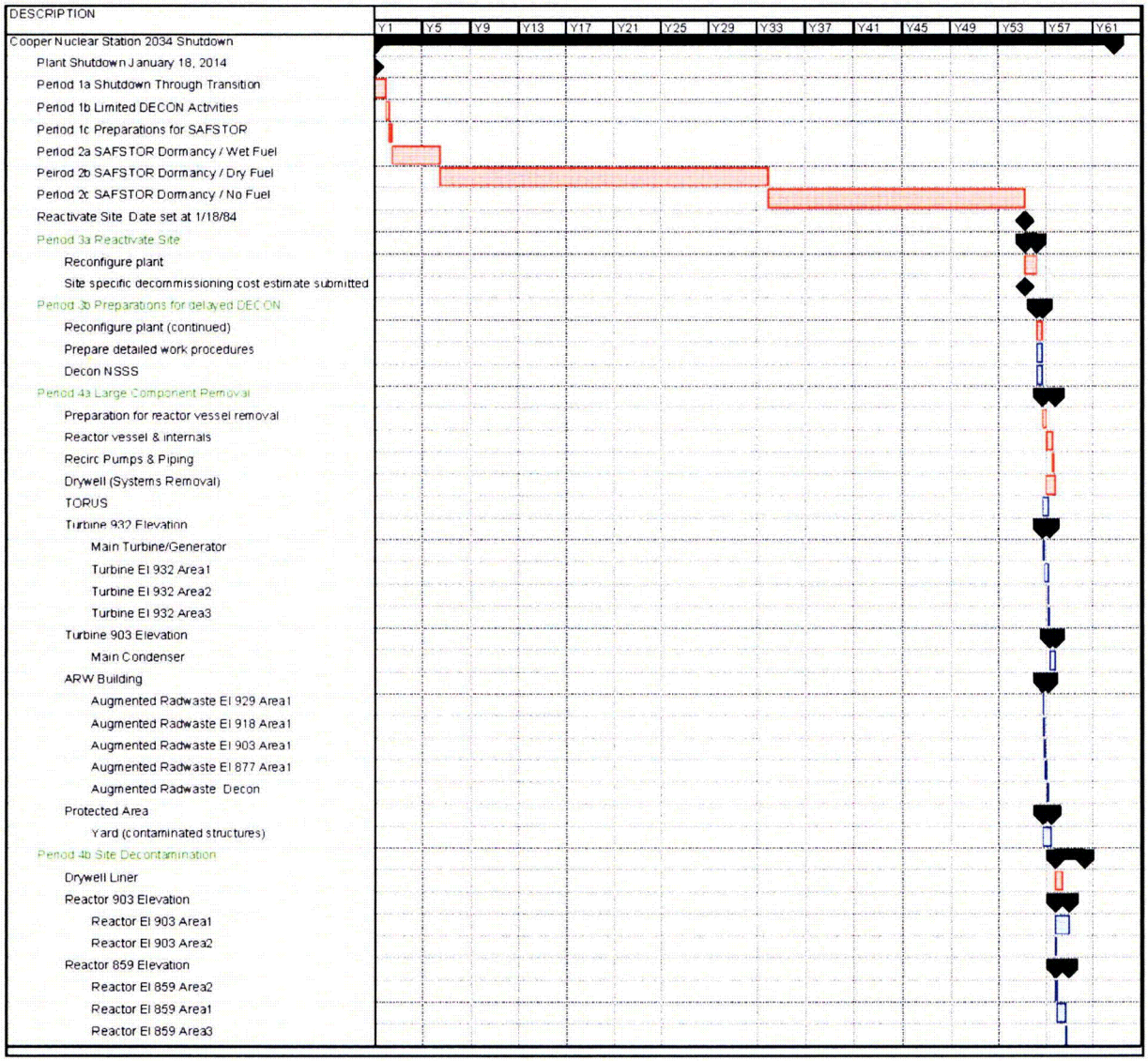


FIGURE 4.3
2014 SAFSTOR
ACTIVITY SCHEDULE
(continued)

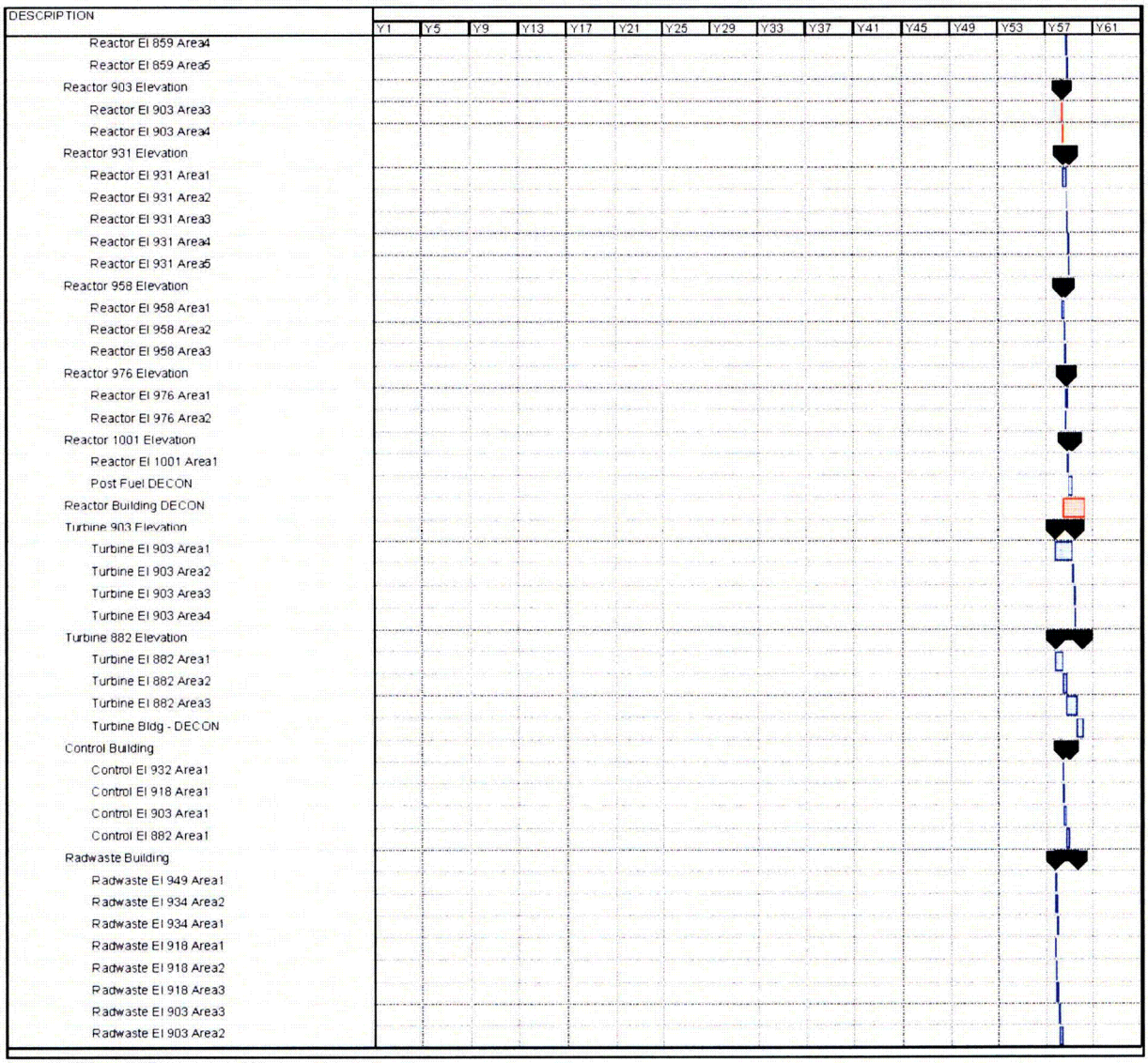


FIGURE 4.3
2014 SAFSTOR
ACTIVITY SCHEDULE
(continued)

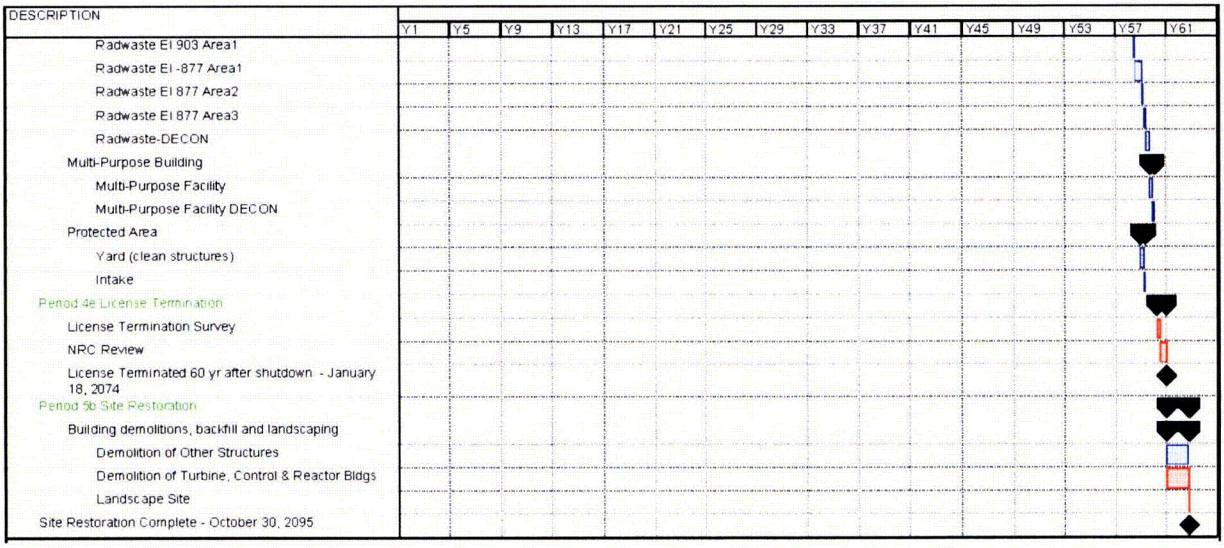


FIGURE 4.4
2034 DECON
ACTIVITY SCHEDULE

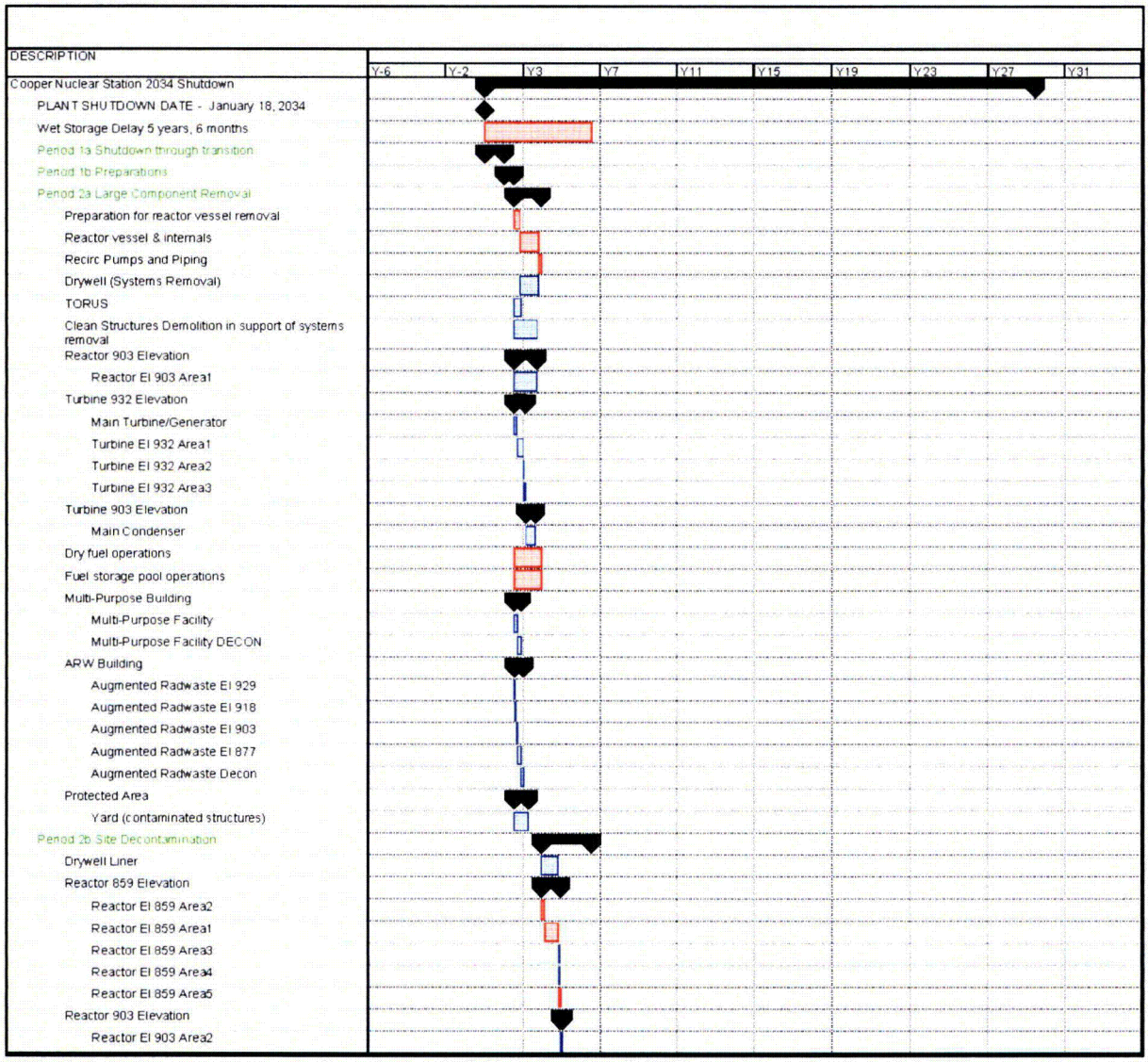


FIGURE 4.4
2034 DECON
ACTIVITY SCHEDULE
(continued)

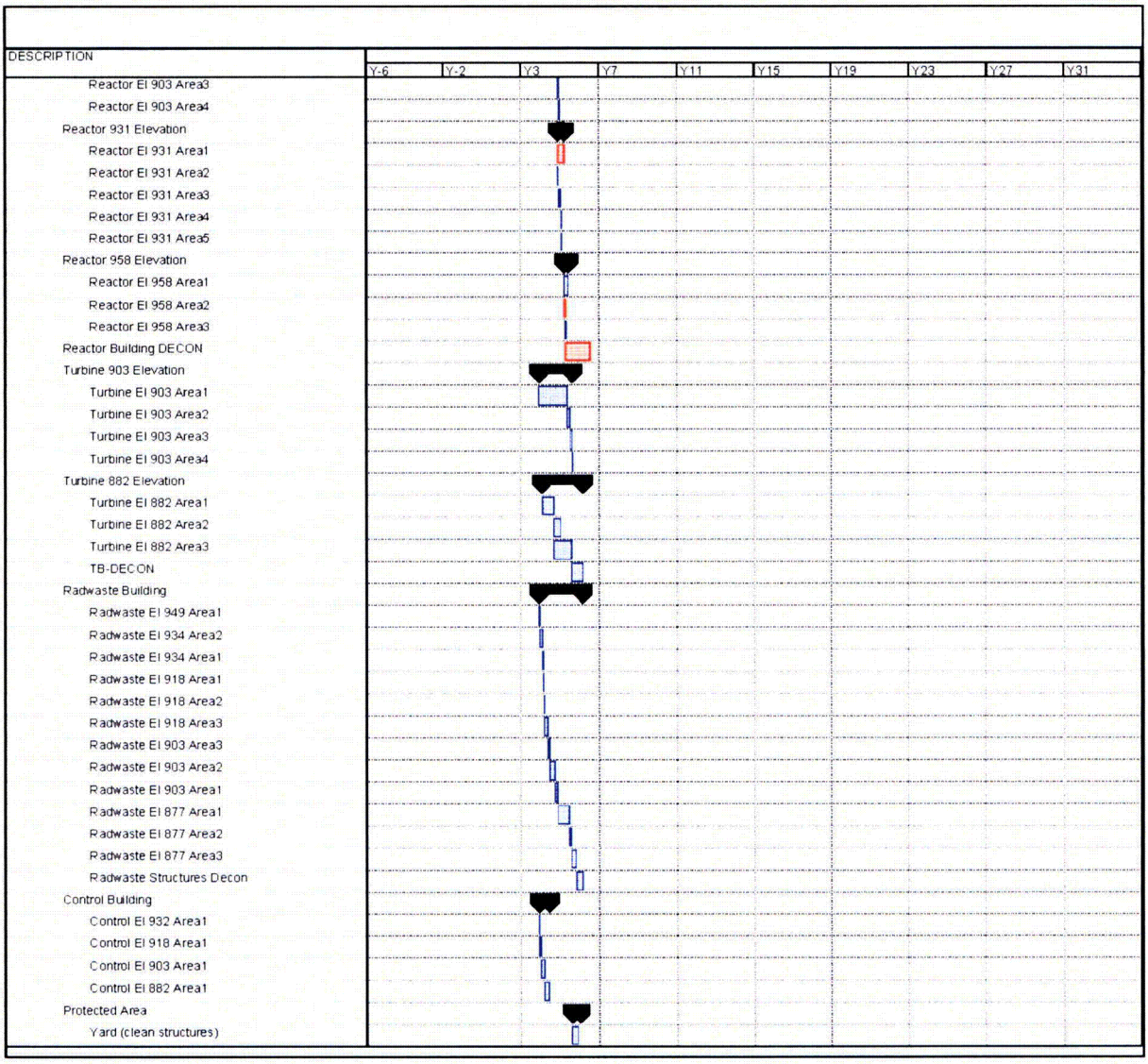


FIGURE 4.4
2034 DECON
ACTIVITY SCHEDULE
(continued)

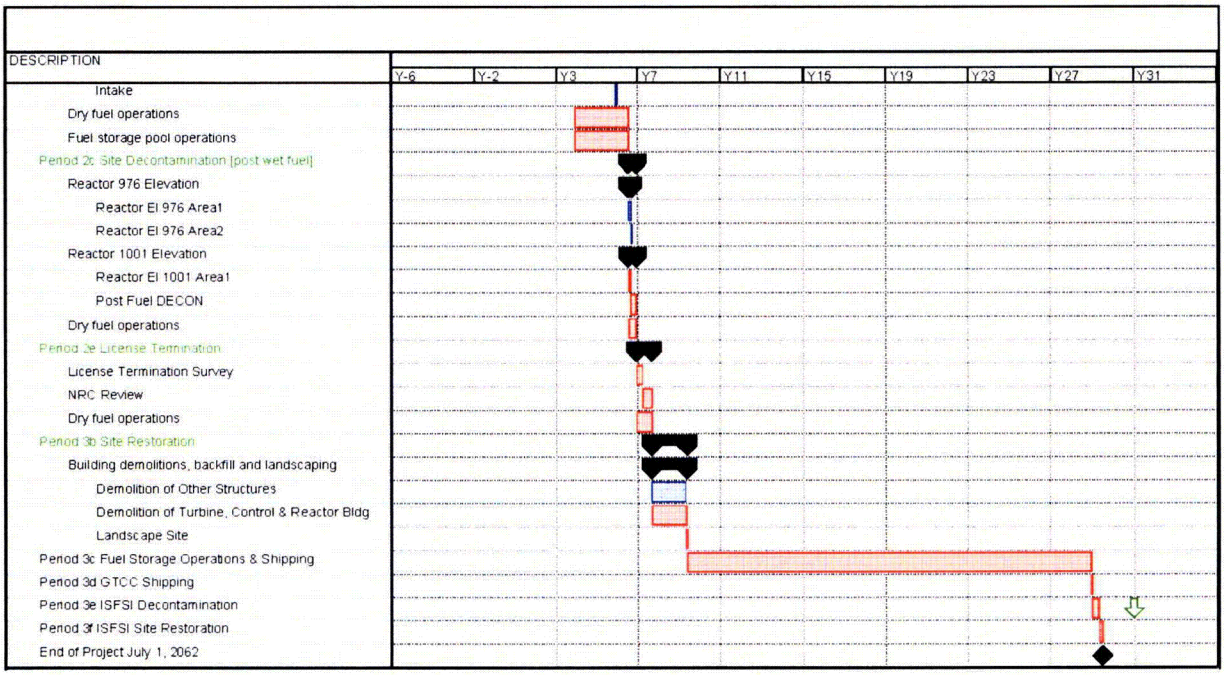


FIGURE 4.5
2034 Delayed DECON
ACTIVITY SCHEDULE

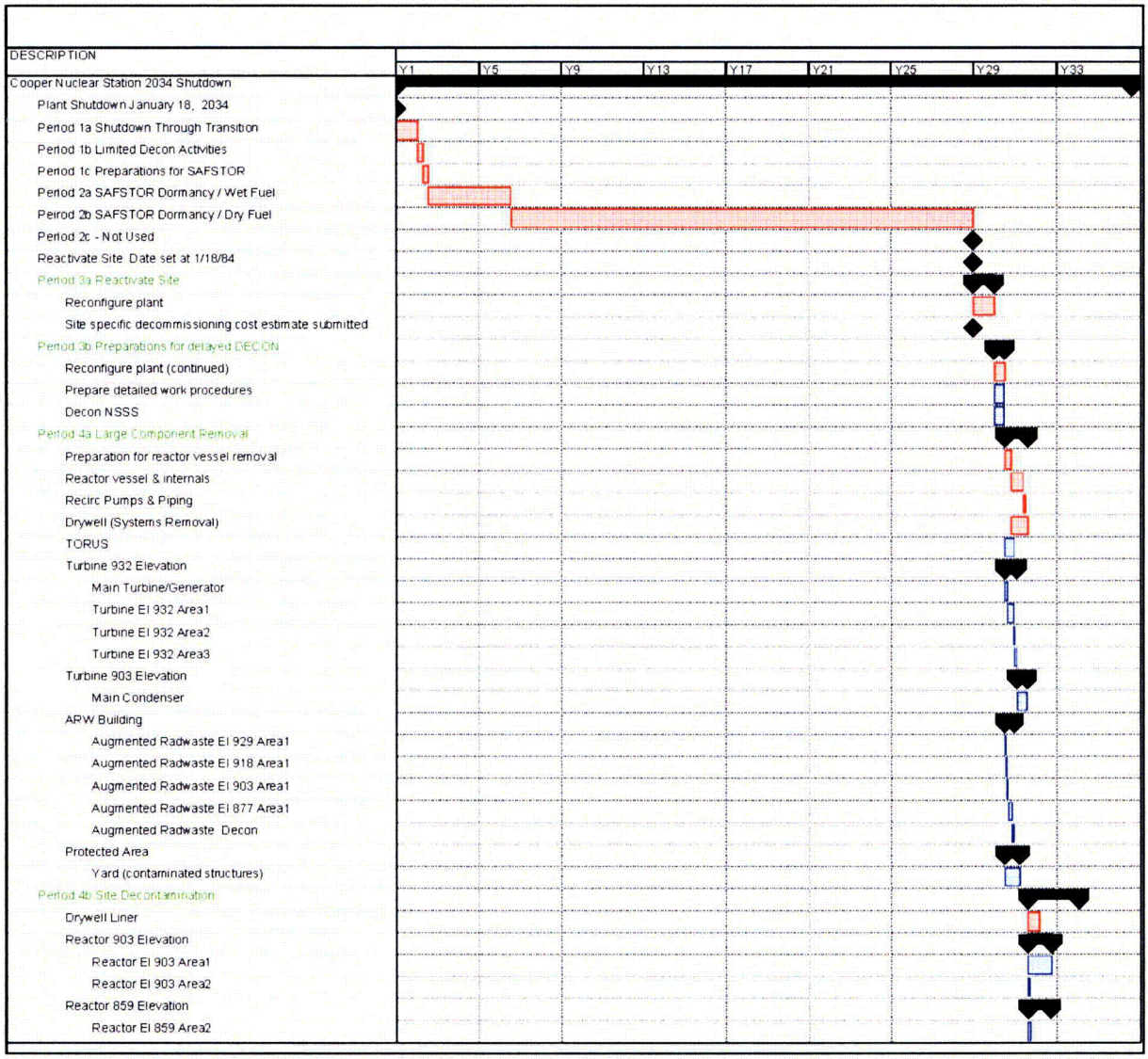


FIGURE 4.5
2034 Delayed DECON
ACTIVITY SCHEDULE
(continued)

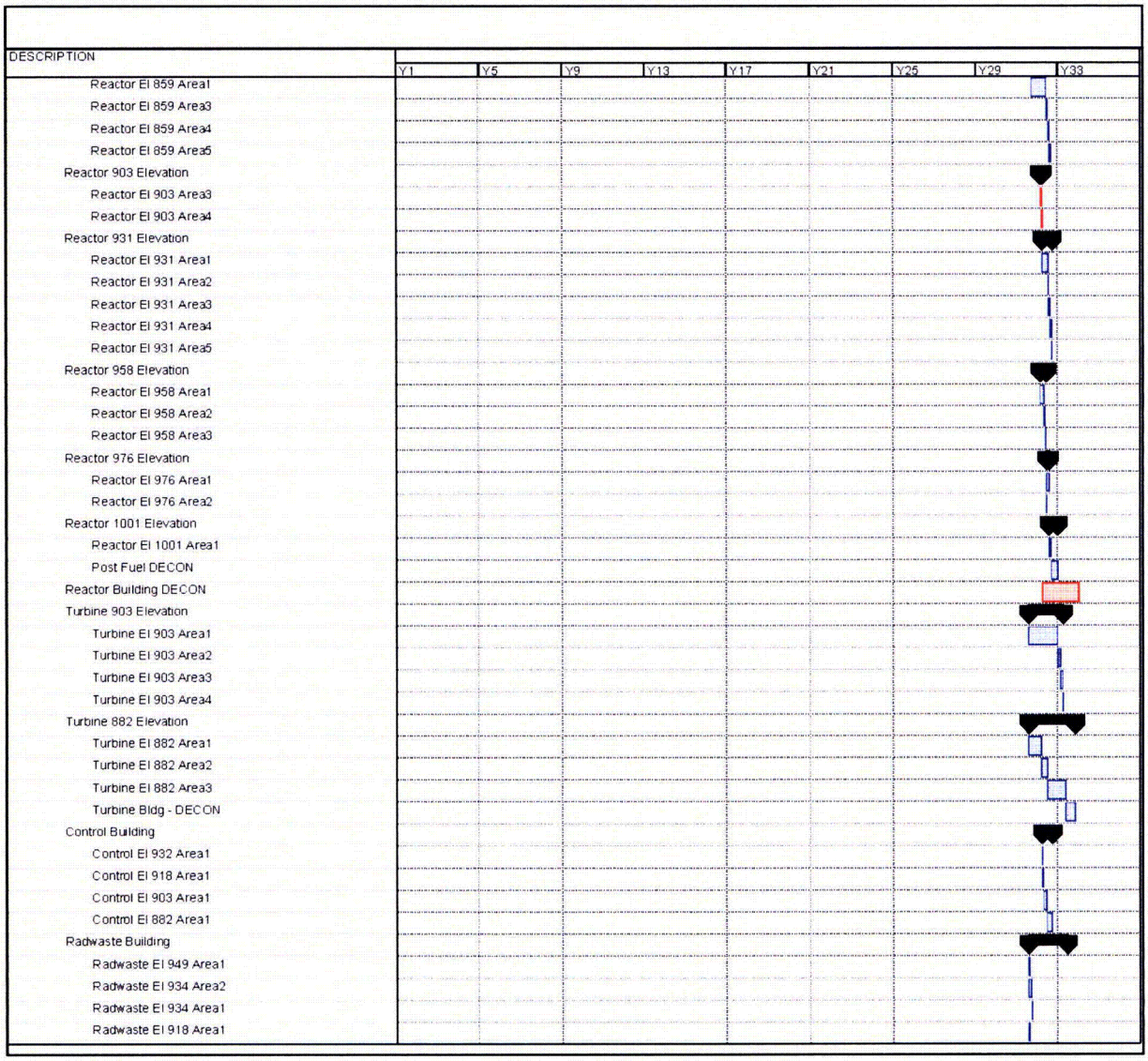


FIGURE 4.5
2034 Delayed DECON
ACTIVITY SCHEDULE
(continued)

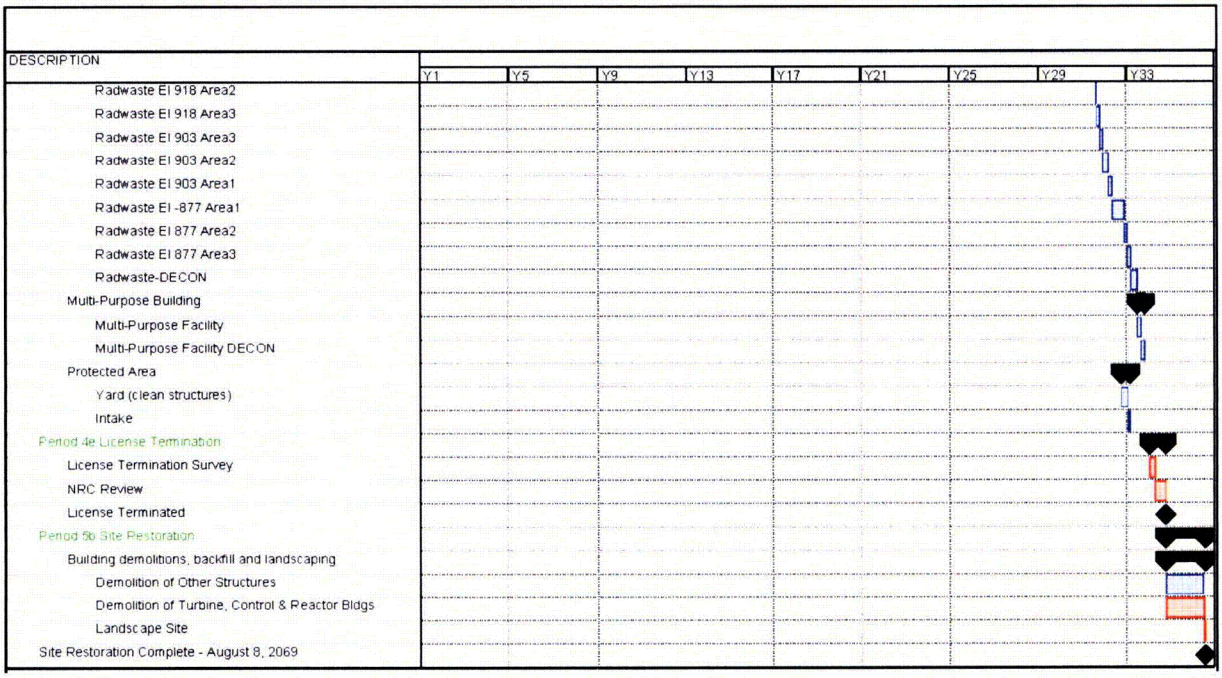


FIGURE 4.6
2034 SAFSTOR
ACTIVITY SCHEDULE

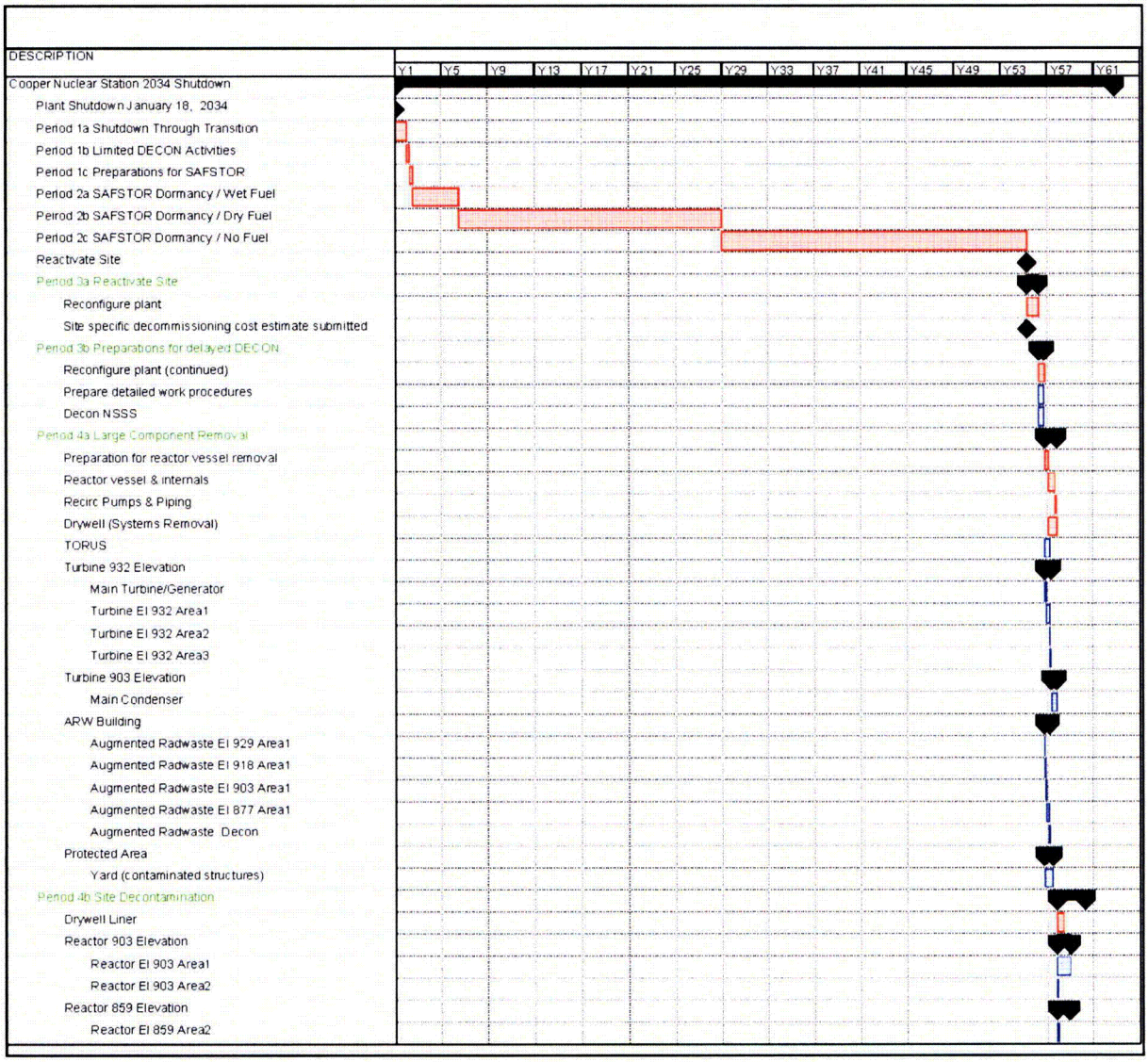


FIGURE 4.6
2034 SAFSTOR
ACTIVITY SCHEDULE
(continued)

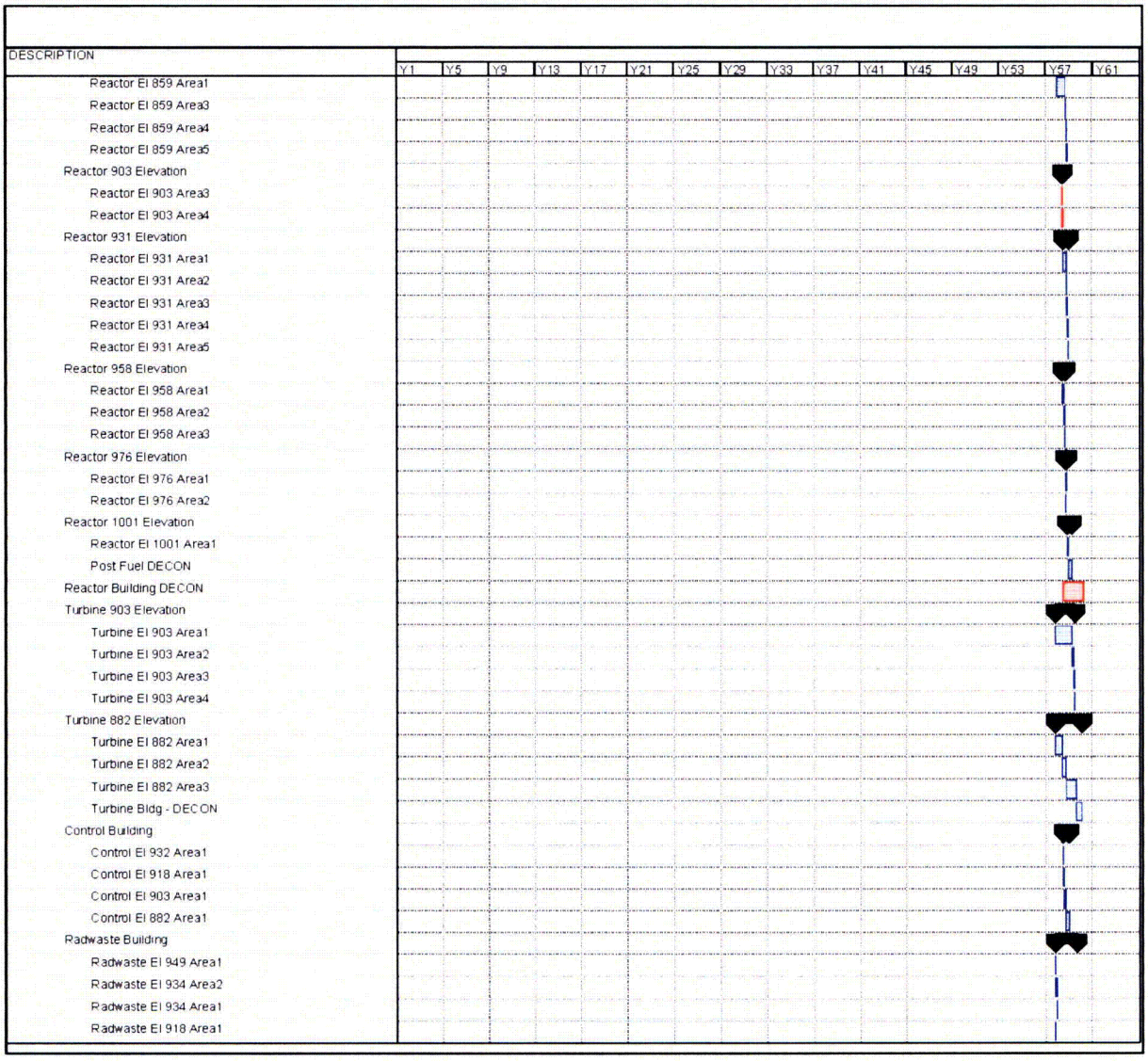


FIGURE 4.6
2034 SAFSTOR
ACTIVITY SCHEDULE
(continued)

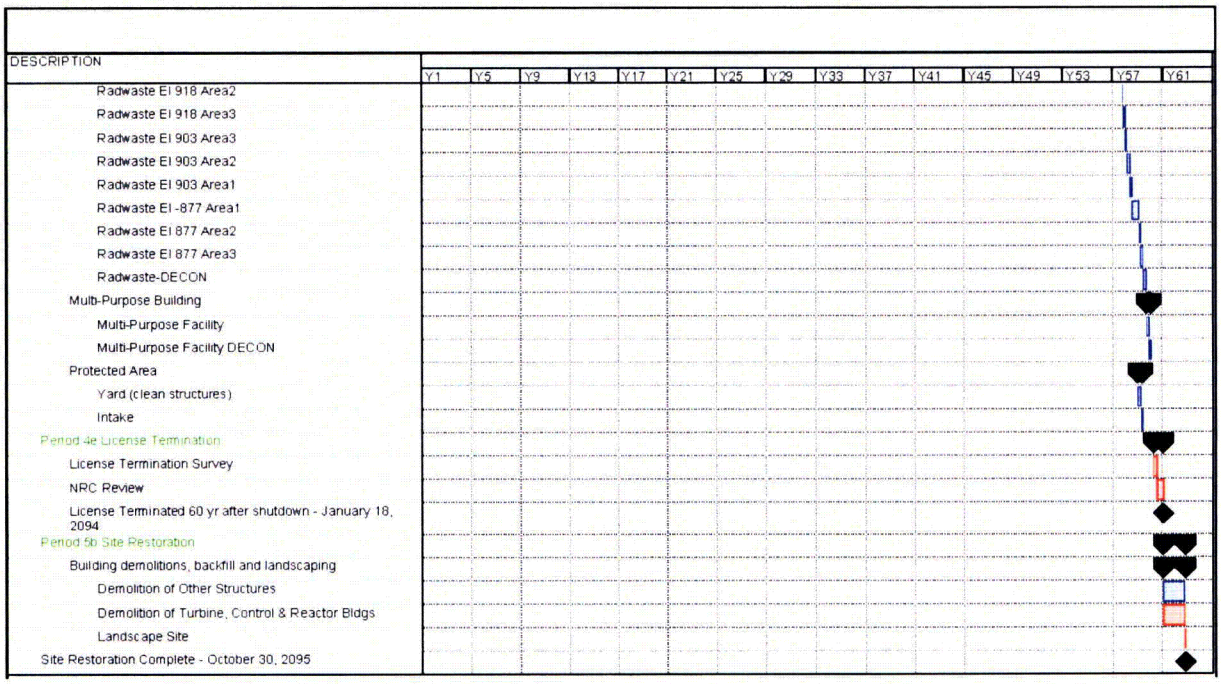


FIGURE 4.7
DECON TIMELINES

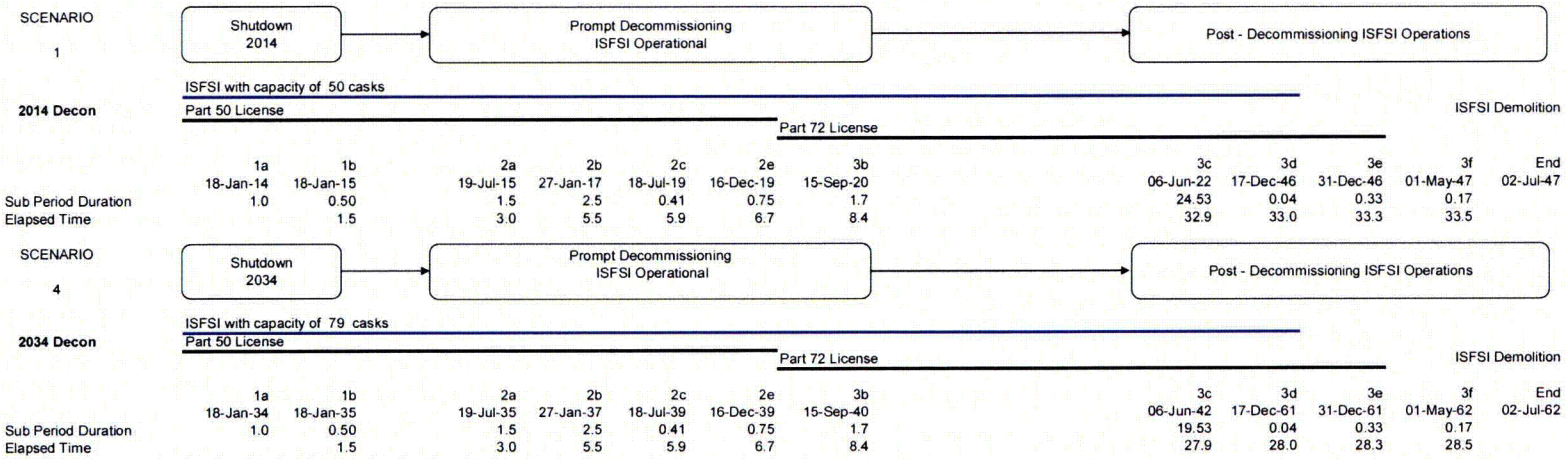
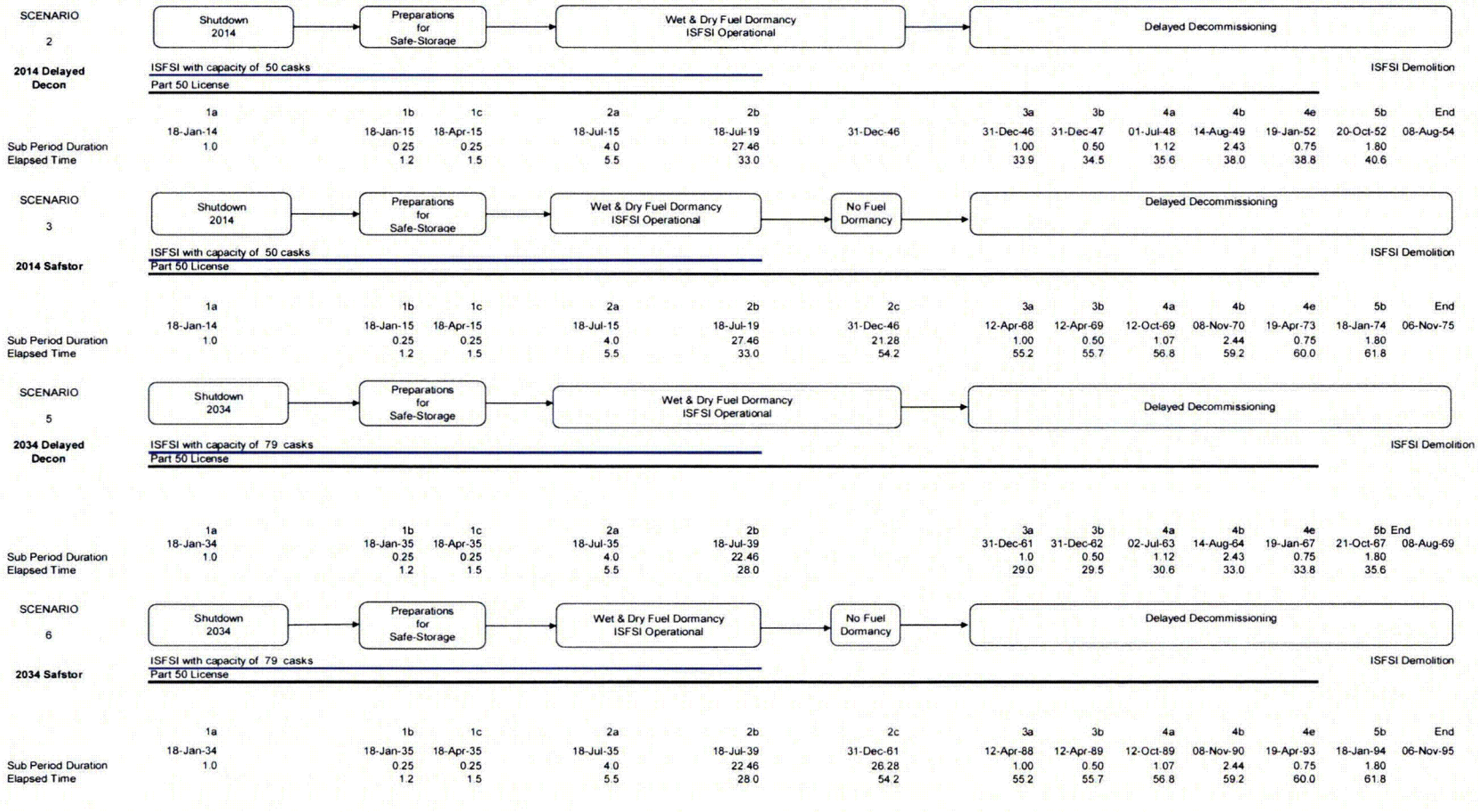


FIGURE 4.8
DELAYED DECON and SAFSTOR TIMELINES



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,[29] the NRC is responsible for protecting the public from sources of ionizing radiation. Title 10 of the Code of Federal Regulations delineates the production, utilization, and disposal of radioactive materials and processes. In particular, Part 71 defines radioactive material as it pertains to transportation and Part 61 specifies its disposition.

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

The volumes of radioactive waste generated during the various decommissioning activities at the site are shown on a line-item basis in Appendices C and D, and summarized in Tables 5.1 through 5.7. The quantified waste volume summaries shown in these tables are consistent with Part 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 produced in the decontamination and dismantling of the nuclear units is primarily generated during Period 2 of DECON and Period 4 of SAFSTOR. Material that is considered potentially contaminated when removed from the radiological controlled area is sent to processing facilities in Tennessee for conditioning and disposal. Heavily contaminated components and activated materials are routed for controlled disposal. The disposal volumes reported in the tables reflect the savings resulting from reprocessing and recycling.

For purposes of constructing the estimates, the cost for disposal at the EnergySolutions facility was used as a proxy for future disposal facilities. Separate rates were used for containerized waste and large components. Demolition debris including miscellaneous steel, scaffolding, and concrete was disposed of at a bulk rate. The decommissioning waste stream also included resins and dry active waste.

Since EnergySolutions is not currently able to receive the more highly radioactive components generated in the decontamination and dismantling of the reactor, disposal costs for the Class B and C material were based upon the last published rate schedule for non-compact waste for the Barnwell facility (as a proxy). Additional surcharges were included for activity, dose rate, and/or handling added as appropriate for the particular package.

TABLE 5.1
DECOMMISSIONING WASTE SUMMARY

		Decommissioning Scenario					
		1	2	3	4	5	6
Waste Stream	Class [1]	Waste Volume (ft^3)	Waste Volume (ft^3)	Waste Volume (ft^3)	Waste Volume (ft^3)	Waste Volume (ft^3)	Waste Volume (ft^3)
Low-Level Radioactive Waste (near-surface disposal)	A	233,906	207,449	277,370	234,031	199,891	227,217
	B	3,877	1,377	1,377	3,647	4,111	1,252
	C	976	344	344	1,205	470	470
Greater than Class C (geologic repository)	GTCC	508	508	508	508	508	508
Processed/Conditioned (off-site recycling center)	A	319,826	384,277	384,676	319,826	384,277	384,676
Total [2]		559,092	593,956	614,276	559,217	589,257	614,123

[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
2014 DECON
DECOMMISSIONING WASTE SUMMARY

Waste	Cost Basis	Class [1]	Waste Volume (cubic feet)	Mass (pounds)
Low-Level Radioactive Waste (near-surface disposal)	EnergySolutions	A	233,906	17,533,514
	Barnwell	B	3,877	505,964
	Barnwell	C	976	68,415
Greater than Class C (geologic repository)	Spent Fuel Equivalent	GTCC	508	89,497
Processed/Conditioned (off-site recycling center)	Recycling Vendors	A	319,826	13,449,330
Total [2]			559,092	31,646,720

[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
2014 Delayed DECON
DECOMMISSIONING WASTE SUMMARY

Waste	Cost Basis	Class [1]	Waste Volume (cubic feet)	Mass (pounds)
Low-Level Radioactive Waste (near-surface disposal)	EnergySolutions	A	207,449	12,564,095
	Barnwell	B	1,377	166,192
	Barnwell	C	344	41,290
Greater than Class C (geologic repository)	Spent Fuel Equivalent	GTCC	508	89,497
Processed/Conditioned (off-site recycling center)	Recycling Vendors	A	384,277	16,115,520
Total [2]			593,956	28,976,594

[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 5.4
2014 SAFSTOR
DECOMMISSIONING WASTE SUMMARY

Waste	Cost Basis	Class [1]	Waste Volume (cubic feet)	Mass (pounds)
Low-Level Radioactive Waste (near-surface disposal)	EnergySolutions	A	227,370	12,678,887
	Barnwell	B	1,377	166,192
	Barnwell	C	344	41,290
Greater than Class C (geologic repository)	Spent Fuel Equivalent	GTCC	508	89,497
Processed/Conditioned (off-site recycling center)	Recycling Vendors	A	384,676	16,159,800
Total [2]			614,276	29,135,666

[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 5.5
2034 DECON
DECOMMISSIONING WASTE SUMMARY

Waste	Cost Basis	Class [1]	Waste Volume (cubic feet)	Mass (pounds)
Low-Level Radioactive Waste (near-surface disposal)	EnergySolutions	A	234,031	17,535,998
	Barnwell	B	3,647	477,867
	Barnwell	C	1,205	96,512
Greater than Class C (geologic repository)	Spent Fuel Equivalent	GTCC	508	89,497
Processed/Conditioned (off-site recycling center)	Recycling Vendors	A	319,826	13,449,330
Total [2]			559,217	31,649,204

[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 5.6
2034 Delayed DECON
DECOMMISSIONING WASTE SUMMARY

Waste	Cost Basis	Class [1]	Waste Volume (cubic feet)	Mass (pounds)
Low-Level Radioactive Waste (near-surface disposal)	EnergySolutions	A	199,891	12,233,558
	Barnwell	B	4,111	444,306
	Barnwell	C	470	59,220
Greater than Class C (geologic repository)	Spent Fuel Equivalent	GTCC	508	89,497
Processed/Conditioned (off-site recycling center)	Recycling Vendors	A	384,277	16,115,520
Total [2]			589,257	28,942,101

[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 5.7
2034 SAFSTOR
DECOMMISSIONING WASTE SUMMARY

Waste	Cost Basis	Class [1]	Waste Volume (cubic feet)	Mass (pounds)
Low-Level Radioactive Waste (near-surface disposal)	EnergySolutions	A	227,217	12,679,105
	Barnwell	B	1,252	148,262
	Barnwell	C	470	59,220
Greater than Class C (geologic repository)	Spent Fuel Equivalent	GTCC	508	89,497
Processed/Conditioned (off-site recycling center)	Recycling Vendors	A	384,676	16,159,800
Total [2]			614,123	29,135,884

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

[2] Columns may not add due to rounding.

6. RESULTS

The estimates described in this report are based on numerous fundamental assumptions, including regulatory requirements, project contingencies, low-level radioactive waste disposal practices, high-level radioactive waste management options, and site restoration requirements. The decommissioning scenarios assume continued operation of the station's spent fuel pool for a minimum of 5½ years following the cessation of operations for continued cooling of the assemblies. An ISFSI will be used to safeguard the spent fuel, once sufficiently cooled, until such time that the DOE can complete the transfer of the assemblies to its repository.

The primary cost contributors, identified in Tables 6.1 and 6.2, are either labor-related or associated with the management and disposition of the radioactive waste. Program management is the largest single contributor to the overall cost. The magnitude of the expense is a function of both the size of the organization required to manage the decommissioning, as well as the duration of the program. It is assumed, for purposes of this analysis, that NPPD will oversee the decommissioning program, using a DOC to manage the decommissioning labor force and the associated subcontractors. The size and composition of the management organization varies with the decommissioning phase and associated site activities. However, once the operating license is 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 5½ 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 5½-year period, the spent fuel will be packaged into transportable canisters for loading into a DOE-provided transport cask. The canisters will be stored in concrete modules at the ISFSI until the DOE is able to receive them. Dry storage of the fuel under a separate license 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 low-level radioactive material required controlled disposal is at the EnergySolutions' facility. Highly activated components, requiring additional

isolation from the environment (GTCC), are packaged for geologic disposal. The cost of geologic disposal is based upon a cost equivalent for spent fuel.

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

Removal costs reflect the labor-intensive nature of the decommissioning process, as well as the management controls required to ensure a safe and successful program. Decontamination and packaging costs also have a large labor component that is based upon prevailing wages. Non-radiological demolition is a natural extension of the decommissioning process. The methods employed in decontamination and dismantling are generally destructive and indiscriminate in inflicting collateral damage. With a work force mobilized to support decommissioning operations, non-radiological demolition can be an integrated activity and a logical expansion of the work being performed in the process of terminating the operating license. Prompt demolition reduces future liabilities and can be more cost effective than deferral, due to the deterioration of the facilities (and therefore the working conditions) with time.

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

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 unit.

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.

TABLE 6.1
COST SUMMARY
2014 Cessation of Operations
(thousands of 2008 dollars)

Cost Element	DECON	Delayed DECON	SAFSTOR
Decontamination	12,832	18,547	18,399
Removal	73,606	74,005	75,346
Packaging	13,340	9,827	9,577
Transportation	8,571	6,672	6,346
Waste Disposal	75,482	43,839	44,260
Off-site Waste Processing	35,573	42,626	42,743
Program Management [1]	360,232	426,204	490,053
Corporate A&G	15,657	10,100	10,100
Spent Fuel Management [2]	77,077	69,839	69,839
Insurance and Regulatory Fees	53,616	62,853	76,914
Energy	6,141	10,408	12,641
Characterization and Licensing Surveys	16,568	16,568	16,568
Miscellaneous Equipment	23,364	31,112	34,923
Total [3]	772,058	822,600	907,708

Cost Element			
License Termination	506,078	475,790	674,963
Spent Fuel Management	231,584	309,463	195,398
Site Restoration	34,396	37,347	37,347
Total [3]	772,058	822,600	907,708

[1] Includes engineering and security costs
[2] Excludes program management costs (staffing) but includes costs for spent fuel loading/packaging/spent fuel pool O&M and EP fees
[3] Columns may not add due to rounding

TABLE 6.2
COST SUMMARY
2034 Cessation of Operations
(thousands of 2008 dollars)

Cost Element	DECON	Delayed DECON	SAFSTOR
Decontamination	12,832	18,581	18,438
Removal	74,270	74,184	76,329
Packaging	13,342	9,820	9,871
Transportation	8,571	6,704	6,578
Waste Disposal	75,618	46,649	44,999
Off-site Waste Processing	35,573	42,626	42,743
Program Management [1]	340,929	400,786	479,929
Corporate A&G	15,657	10,100	10,100
Spent Fuel Management [2]	53,484	47,535	47,535
Insurance and Regulatory Fees	46,578	54,706	72,081
Energy	6,141	9,875	12,641
Characterization and Licensing Surveys	16,568	16,568	16,568
Miscellaneous Equipment	23,408	30,280	34,989
Total [3]	722,972	768,414	872,803

Cost Element			
License Termination	506,207	476,185	676,510
Spent Fuel Management	182,368	254,881	158,945
Site Restoration	34,396	37,348	37,348
Total [3]	722,972	768,414	872,803

[1] Includes engineering and security costs
[2] Excludes program management costs (staffing) but includes costs for spent fuel loading/packaging/spent fuel pool O&M and EP fees
[3] Columns may not add due to rounding

7. REFERENCES

1. 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, Federal Register Volume 53, Number 123 (p 24018 et seq.), June 27, 1988

2. U.S. Nuclear Regulatory Commission, Regulatory Guide 1.159, "Assuring the Availability of Funds for Decommissioning Nuclear Reactors," October 2003

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

4. U.S. Code of Federal Regulations, Title 10, Parts 20 and 50, "Entombment Options for Power Reactors," Advanced Notice of Proposed Rulemaking, Federal Register Volume 66, Number 200, October 16, 2001

5. U.S. Code of Federal Regulations, Title 10, Parts 2, 50 and 51, "Decommissioning of Nuclear Power Reactors," Nuclear Regulatory Commission, Federal Register Volume 61 (p 39278 et seq.), July 29, 1996

6. "Nuclear Waste Policy Act of 1982 and Amendments," U.S. Department of Energy's Office of Civilian Radioactive Management, 1982

7. Testimony of Edward Sproat, Director, Office of Civilian Radioactive Waste Management, before a U.S. House of Representatives subcommittee on the status of Yucca Mountain, July 15, 2008

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

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

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

11. Waste is classified in accordance with U.S. Code of Federal Regulations, Title 10, Part 61.55

12. 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

7. REFERENCES
(continued)

13. "Establishment of Cleanup Levels for CERCLA Sites with Radioactive Contamination," EPA Memorandum OSWER No. 9200.4-18, August 22, 1997

14. U.S. Code of Federal Regulations, Title 40, Part 141.16, "Maximum contaminant levels for beta particle and photon radioactivity from man-made radionuclides in community water systems"

15. "Memorandum of Understanding Between the Environmental Protection Agency and the Nuclear Regulatory Commission: Consultation and Finality on Decommissioning and Decontamination of Contaminated Sites," OSWER 9295.8-06a, October 9, 2002

16. "Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM)," NUREG/CR-1575, Rev. 1, EPA 402-R-97-016, Rev. 1, August 2000

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

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

19. "Building Construction Cost Data 2008," Robert Snow Means Company, Inc., Kingston, Massachusetts

20. Project and Cost Engineers' Handbook, Second Edition, p. 239, American Association of Cost Engineers, Marcel Dekker, Inc., New York, New York, 1984

21. Civilian Radioactive Waste Management System Waste Acceptance System Requirements Document, Revision 5" (DOE/RW-0351) issued May 31, 2007

22. U.S. Department of Transportation, Title 49 of the Code of Federal Regulations, "Transportation," Parts 173 through 178, 2007

23. Tri-State Motor Transit Company, published tariffs, Interstate Commerce Commission (ICC), Docket No. MC-427719 Rules Tariff, March 2004, Radioactive Materials Tariff, February 2006

7. REFERENCES
(continued)

24. J.C. Evans et al., "Long-Lived Activation Products in Reactor Materials" NUREG/CR-3474, Pacific Northwest Laboratory for the Nuclear Regulatory Commission. August 1984

25. R.I. Smith, G.J. Konzek, W.E. Kennedy, Jr., "Technology, Safety and Costs of Decommissioning a Reference Pressurized Water Reactor Power Station," NUREG/CR-0130 and addenda, Pacific Northwest Laboratory for the Nuclear Regulatory Commission. June 1978

26. H.D. Oak, et al., "Technology, Safety and Costs of Decommissioning a Reference Boiling Water Reactor Power Station," NUREG/CR-0672 and addenda, Pacific Northwest Laboratory for the Nuclear Regulatory Commission. June 1980

27. "Financial Protection Requirements for Permanently Shutdown Nuclear Power Reactors," 10 CFR Parts 50 and 140, Federal Register Notice, Vol. 62, No. 210, October 30, 1997

28. "Microsoft Project Professional 2003," Microsoft Corporation, Redmond, WA.

29. "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 (14% of critical duration)	35
Adjusted work duration	354
+ Protective clothing adjustment (30% of adjusted duration)	106
Productive work duration	460
+ Work break adjustment (8.33 % of productive duration)	38
Total work duration (minutes)	498

***** Total duration = 8.30 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	8.300	$19.65	$489.29
Craftsmen	2.00	8.300	$44.85	$744.51
Foreman	1.00	8.300	$46.12	$382.80
General Foreman	0.25	8.300	$47.12	$97.77
Fire Watch	0.05	8.300	$19.67	$8.15
Health Physics Technician	1.00	8.300	$43.95	$364.79
Total Labor Cost				$2087.31

4. EQUIPMENT & CONSUMABLES COSTS

Equipment Costs	none
Consumables/Materials Costs	
-Blotting paper 50 @ $0.45 sq ft {1}	$22.50
-Plastic sheets/bags 50 @ $0.13/sq ft {2}	$6.50
-Gas torch consumables 1 @ $8.02/hr x 1 hr {3}	$8.02
Subtotal cost of equipment and materials	$37.02
Overhead & profit on equipment and materials @ 16.00 %	$5.74
Total costs, equipment & material	$42.76

TOTAL COST:

Removal of contaminated **heat exchanger <3000 pounds:**	**$2,130.07**
Total labor cost:	$2,087.31
Total equipment/material costs:	$42.76
Total craft labor man-hours required per unit:	60.59

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. McMaster-Carr, Item 7193T88, Spill Control
  2. R.S. Means (2008) Division 01 56, Section 13.60-0200, page 20
  3. R.S. Means (2008) Division 01 54 33, Section 40-6360, Reference-10

- Material and consumable costs were adjusted using the regional indices for Lincoln, Nebraska.

APPENDIX B

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

APPENDIX B

DECON UNIT COST FACTOR LISTING
(Power Block Structures Only)

Unit Cost Factor	Cost/Unit($)
Removal of clean instrument and sampling tubing, $/linear foot	0.26
Removal of clean pipe 0.25 to 2 inches diameter, $/linear foot	2.59
Removal of clean pipe >2 to 4 inches diameter, $/linear foot	3.97
Removal of clean pipe >4 to 8 inches diameter, $/linear foot	8.81
Removal of clean pipe >8 to 14 inches diameter, $/linear foot	16.12
Removal of clean pipe >14 to 20 inches diameter, $/linear foot	20.96
Removal of clean pipe >20 to 36 inches diameter, $/linear foot	30.84
Removal of clean pipe >36 inches diameter, $/linear foot	36.64
Removal of clean valve >2 to 4 inches	56.13
Removal of clean valve >4 to 8 inches	88.12
Removal of clean valve >8 to 14 inches	161.25
Removal of clean valve >14 to 20 inches	209.60
Removal of clean valve >20 to 36 inches	308.39
Removal of clean valve >36 inches	366.43
Removal of clean pipe hanger for small bore piping	17.53
Removal of clean pipe hanger for large bore piping	58.45
Removal of clean pump, <300 pound	148.39
Removal of clean pump, 300-1000 pound	437.99
Removal of clean pump, 1000-10,000 pound	1,691.23
Removal of clean pump, >10,000 pound	3,269.60
Removal of clean pump motor, 300-1000 pound	184.32
Removal of clean pump motor, 1000-10,000 pound	704.73
Removal of clean pump motor, >10,000 pound	1,585.64
Removal of clean heat exchanger <3000 pound	908.50
Removal of clean heat exchanger >3000 pound	2,285.25
Removal of clean feedwater heater/deaerator	6,439.66
Removal of clean moisture separator/reheater	13,235.93
Removal of clean tank, <300 gallons	190.93
Removal of clean tank, 300-3000 gallon	602.49
Removal of clean tank, >3000 gallons, $/square foot surface area	5.37

APPENDIX B

DECON UNIT COST FACTOR LISTING
(Power Block Structures Only)

Unit Cost Factor	Cost/Unit($)
Removal of clean electrical equipment, <300 pound	81.09
Removal of clean electrical equipment, 300-1000 pound	300.10
Removal of clean electrical equipment, 1000-10,000 pound	600.21
Removal of clean electrical equipment, >10,000 pound	1,457.82
Removal of clean electrical transformer < 30 tons	1,012.43
Removal of clean electrical transformer > 30 tons	2,915.64
Removal of clean standby diesel generator, <100 kW	1,034.12
Removal of clean standby diesel generator, 100 kW to 1 MW	2,308.21
Removal of clean standby diesel generator, >1 MW	4,778.47
Removal of clean electrical cable tray, $/linear foot	7.57
Removal of clean electrical conduit, $/linear foot	3.31
Removal of clean mechanical equipment, <300 pound	81.09
Removal of clean mechanical equipment, 300-1000 pound	300.10
Removal of clean mechanical equipment, 1000-10,000 pound	600.21
Removal of clean mechanical equipment, >10,000 pound	1,457.82
Removal of clean HVAC equipment, <300 pound	81.09
Removal of clean HVAC equipment, 300-1000 pound	300.10
Removal of clean HVAC equipment, 1000-10,000 pound	600.21
Removal of clean HVAC equipment, >10,000 pound	1,457.82
Removal of clean HVAC ductwork, $/pound	0.28
Removal of contaminated instrument and sampling tubing, $/linear foot	0.74
Removal of contaminated pipe 0.25 to 2 inches diameter, $/linear foot	10.42
Removal of contaminated pipe >2 to 4 inches diameter, $/linear foot	17.53
Removal of contaminated pipe >4 to 8 inches diameter, $/linear foot	30.13
Removal of contaminated pipe >8 to 14 inches diameter, $/linear foot	56.53
Removal of contaminated pipe >14 to 20 inches diameter, $/linear foot	67.65
Removal of contaminated pipe >20 to 36 inches diameter, $/linear foot	92.88
Removal of contaminated pipe >36 inches diameter, $/linear foot	109.76
Removal of contaminated valve >2 to 4 inches	225.71
Removal of contaminated valve >4 to 8 inches	275.44

APPENDIX B

DECON UNIT COST FACTOR LISTING
(Power Block Structures Only)

Unit Cost Factor	Cost/Unit($)
Removal of contaminated valve >8 to 14 inches	531.78
Removal of contaminated valve >14 to 20 inches	675.48
Removal of contaminated valve >20 to 36 inches	895.33
Removal of contaminated valve >36 inches	1,064.12
Removal of contaminated pipe hanger for small bore piping	57.98
Removal of contaminated pipe hanger for large bore piping	175.66
Removal of contaminated pump, <300 pound	474.63
Removal of contaminated pump, 300-1000 pound	1,131.61
Removal of contaminated pump, 1000-10,000 pound	3,609.88
Removal of contaminated pump, >10,000 pound	8,757.44
Removal of contaminated pump motor, 300-1000 pound	494.41
Removal of contaminated pump motor, 1000-10,000 pound	1,474.09
Removal of contaminated pump motor, >10,000 pound	3,326.88
Removal of contaminated heat exchanger <3000 pound	2,130.07
Removal of contaminated heat exchanger >3000 pound	6,206.46
Removal of contaminated feedwater heater/deaerator	15,545.56
Removal of contaminated moisture separator/reheater	33,630.07
Removal of contaminated tank, <300 gallons	790.67
Removal of contaminated tank, >300 gallons, $/square foot	16.09
Removal of contaminated electrical equipment, <300 pound	362.30
Removal of contaminated electrical equipment, 300-1000 pound	899.95
Removal of contaminated electrical equipment, 1000-10,000 pound	1,736.08
Removal of contaminated electrical equipment, >10,000 pound	3,557.00
Removal of contaminated electrical cable tray, $/linear foot	17.95
Removal of contaminated electrical conduit, $/linear foot	8.46
Removal of contaminated mechanical equipment, <300 pound	412.08
Removal of contaminated mechanical equipment, 300-1000 pound	1,027.95
Removal of contaminated mechanical equipment, 1000-10,000 pound	1,985.03
Removal of contaminated mechanical equipment, >10,000 pound	3,557.00
Removal of contaminated HVAC equipment, <300 pound	412.08

APPENDIX B

DECON UNIT COST FACTOR LISTING
(Power Block Structures Only)

Unit Cost Factor	Cost/Unit($)
Removal of contaminated HVAC equipment, 300-1000 pound	1,027.95
Removal of contaminated HVAC equipment, 1000-10,000 pound	1,985.03
Removal of contaminated HVAC equipment, >10,000 pound	3,557.00
Removal of contaminated HVAC ductwork, $/pound	1.13
Removal/plasma arc cut of contaminated thin metal components, $/linear in.	1.97
Additional decontamination of surface by washing, $/square foot	3.85
Additional decontamination of surfaces by hydrolasing, $/square foot	21.10
Decontamination rig hook up and flush, $/ 250 foot length	3,504.89
Chemical flush of components/systems, $/gallon	12.58
Removal of clean standard reinforced concrete, $/cubic yard	53.52
Removal of grade slab concrete, $/cubic yard	60.83
Removal of clean concrete floors, $/cubic yard	254.88
Removal of sections of clean concrete floors, $/cubic yard	751.47
Removal of clean heavily rein concrete w/#9 rebar, $/cubic yard	77.08
Removal of contaminated heavily rein concrete w/#9 rebar, $/cubic yard	1,154.71
Removal of clean heavily rein concrete w/#18 rebar, $/cubic yard	104.43
Removal of contaminated heavily rein concrete w/#18 rebar, $/cubic yard	1,523.99
Removal heavily rein concrete w/#18 rebar & steel embedments, $/cubic yard	327.04
Removal of below-grade suspended floors, $/cubic yard	146.31
Removal of clean monolithic concrete structures, $/cubic yard	626.97
Removal of contaminated monolithic concrete structures, $/cubic yard	1,150.82
Removal of clean foundation concrete, $/cubic yard	493.01
Removal of contaminated foundation concrete, $/cubic yard	1,071.14
Explosive demolition of bulk concrete, $/cubic yard	22.86
Removal of clean hollow masonry block wall, $/cubic yard	56.99
Removal of contaminated hollow masonry block wall, $/cubic yard	159.69
Removal of clean solid masonry block wall, $/cubic yard	56.99
Removal of contaminated solid masonry block wall, $/cubic yard	159.69
Backfill of below-grade voids, $/cubic yard	21.24
Removal of subterranean tunnels/voids, $/linear foot	73.39

APPENDIX B

DECON UNIT COST FACTOR LISTING
(Power Block Structures Only)

Unit Cost Factor	Cost/Unit($)
Placement of concrete for below-grade voids, $/cubic yard	112.21
Excavation of clean material, $/cubic yard	2.30
Excavation of contaminated material, $/cubic yard	24.06
Removal of clean concrete rubble (tipping fee included), $/cubic yard	174.10
Removal of contaminated concrete rubble, $/cubic yard	16.10
Removal of building by volume, $/cubic foot	0.23
Removal of clean building metal siding, $/square foot	0.60
Removal of contaminated building metal siding, $/square foot	1.87
Removal of standard asphalt roofing, $/square foot	1.23
Removal of transite panels, $/square foot	1.45
Scarifying contaminated concrete surfaces (drill & spall), $/square foot	8.02
Scabbling contaminated concrete floors, $/square foot	4.06
Scabbling contaminated concrete walls, $/square foot	10.43
Scabbling contaminated ceilings, $/square foot	35.09
Scabbling structural steel, $/square foot	3.70
Removal of clean overhead crane/monorail < 10 ton capacity	449.46
Removal of contaminated overhead crane/monorail < 10 ton capacity	1,017.50
Removal of clean overhead crane/monorail >10-50 ton capacity	1,078.74
Removal of contaminated overhead crane/monorail >10-50 ton capacity	2,442.15
Removal of polar crane > 50 ton capacity	4,565.92
Removal of gantry crane > 50 ton capacity	18,222.75
Removal of structural steel, $/pound	0.15
Removal of clean steel floor grating, $/square foot	3.51
Removal of contaminated steel floor grating, $/square foot	7.70
Removal of clean free standing steel liner, $/square foot	8.05
Removal of contaminated free standing steel liner, $/square foot	18.86
Removal of clean concrete-anchored steel liner, $/square foot	4.02
Removal of contaminated concrete-anchored steel liner, $/square foot	21.87
Placement of scaffolding in clean areas, $/square foot	11.97
Placement of scaffolding in contaminated areas, $/square foot	16.37

APPENDIX B

DECON UNIT COST FACTOR LISTING
(Power Block Structures Only)

Unit Cost Factor	Cost/Unit($)
Landscaping with topsoil, $/acre	19,274.92
Cost of CPC B-88 LSA box & preparation for use	1,407.31
Cost of CPC B-25 LSA box & preparation for use	1,235.45
Cost of CPC B-12V 12 gauge LSA box & preparation for use	1,209.41
Cost of CPC B-144 LSA box & preparation for use	7,583.15
Cost of LSA drum & preparation for use	102.27
Cost of cask liner for CNSI 14 195 cask	106.24
Cost of cask liner for CNSI 8 120A cask (resins)	5,700.21
Cost of cask liner for CNSI 8 120A cask (filters)	581.58
Decontamination of surfaces with vacuuming, $/square foot	0.41

APPENDIX C

DETAILED COST ANALYSES

2014 CESSATION OF OPERATIONS

Table C-1
Cooper Nuclear Station
2014 DECON Decommissioning Cost Estimate
(thousands of 2008 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
PERIOD 1a - Shutdown through Transition																					
Period 1a Direct Decommissioning Activities																					
1a.1.1	Prepare preliminary decommissioning cost	-	-	-	-	-	-	130	20	150	150	-	-	-	-	-	-	-	-	-	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	-	-	-	-	-	-	200	30	230	230	-	-	-	-	-	-	-	-	-	2,000
1a.1.7	Review plant dwgs & specs.	-	-	-	-	-	-	460	69	529	529	-	-	-	-	-	-	-	-	-	4,600
1a.1.8	Perform detailed rad survey									a											
1a.1.9	Estimate by-product inventory	-	-	-	-	-	-	100	15	115	115	-	-	-	-	-	-	-	-	-	1,000
1a.1.10	End product description	-	-	-	-	-	-	100	15	115	115	-	-	-	-	-	-	-	-	-	1,000
1a.1.11	Detailed by-product inventory	-	-	-	-	-	-	130	20	150	150	-	-	-	-	-	-	-	-	-	1,300
1a.1.12	Define major work sequence	-	-	-	-	-	-	750	113	863	863	-	-	-	-	-	-	-	-	-	7,500
1a.1.13	Perform SER and EA	-	-	-	-	-	-	310	47	357	357	-	-	-	-	-	-	-	-	-	3,100
1a.1.14	Perform Site-Specific Cost Study	-	-	-	-	-	-	500	75	575	575	-	-	-	-	-	-	-	-	-	5,000
1a.1.15	Prepare/submit License Termination Plan	-	-	-	-	-	-	410	61	471	471	-	-	-	-	-	-	-	-	-	4,096
1a.1.16	Receive NRC approval of termination plan									a											
Activity Specifications																					
1a.1.17.1	Plant & temporary facilities	-	-	-	-	-	-	492	74	566	509	-	57	-	-	-	-	-	-	-	4,920
1a.1.17.2	Plant systems	-	-	-	-	-	-	417	63	479	431	-	48	-	-	-	-	-	-	-	4,167
1a.1.17.3	NSSS Decontamination Flush	-	-	-	-	-	-	50	8	58	58	-	-	-	-	-	-	-	-	-	500
1a.1.17.4	Reactor internals	-	-	-	-	-	-	710	107	817	817	-	-	-	-	-	-	-	-	-	7,100
1a.1.17.5	Reactor vessel	-	-	-	-	-	-	650	98	748	748	-	-	-	-	-	-	-	-	-	6,500
1a.1.17.6	Sacrificial shield	-	-	-	-	-	-	50	8	58	58	-	-	-	-	-	-	-	-	-	500
1a.1.17.7	Moisture separators/reheaters	-	-	-	-	-	-	100	15	115	115	-	-	-	-	-	-	-	-	-	1,000
1a.1.17.8	Reinforced concrete	-	-	-	-	-	-	160	24	184	92	-	92	-	-	-	-	-	-	-	1,600
1a.1.17.9	Main Turbine	-	-	-	-	-	-	209	31	240	240	-	-	-	-	-	-	-	-	-	2,088
1a.1.17.10	Main Condensers	-	-	-	-	-	-	209	31	240	240	-	-	-	-	-	-	-	-	-	2,088
1a.1.17.11	Pressure suppression structure	-	-	-	-	-	-	200	30	230	230	-	-	-	-	-	-	-	-	-	2,000
1a.1.17.12	Drywell	-	-	-	-	-	-	160	24	184	184	-	-	-	-	-	-	-	-	-	1,600
1a.1.17.13	Plant structures & buildings	-	-	-	-	-	-	312	47	359	179	-	179	-	-	-	-	-	-	-	3,120
1a.1.17.14	Waste management	-	-	-	-	-	-	460	69	529	529	-	-	-	-	-	-	-	-	-	4,600
1a.1.17.15	Facility & site closeout	-	-	-	-	-	-	90	14	104	52	-	52	-	-	-	-	-	-	-	900
1a.1.17	Total	-	-	-	-	-	-	4,268	640	4,909	4,481	-	428	-	-	-	-	-	-	-	42,683
Planning & Site Preparations																					
1a.1.18	Prepare dismantling sequence	-	-	-	-	-	-	240	36	276	276	-	-	-	-	-	-	-	-	-	2,400
1a.1.19	Plant prep. & temp. svces	-	-	-	-	-	-	2,700	405	3,105	3,105	-	-	-	-	-	-	-	-	-	-
1a.1.20	Design water clean-up system	-	-	-	-	-	-	140	21	161	161	-	-	-	-	-	-	-	-	-	1,400
1a.1.21	Rigging/Cont. Cntrl Envlps/tooling/etc.	-	-	-	-	-	-	2,100	315	2,415	2,415	-	-	-	-	-	-	-	-	-	-
1a.1.22	Procure casks/liners & containers	-	-	-	-	-	-	123	18	141	141	-	-	-	-	-	-	-	-	-	1,230
1a.1	Subtotal Period 1a Activity Costs	-	-	-	-	-	-	12,661	1,899	14,560	14,132	-	428	-	-	-	-	-	-	-	78,609
Period 1a Collateral Costs																					
1a.3.1	Spent Fuel Capital and Transfer	-	-	-	-	-	-	10,335	1,550	11,886	-	11,886	-	-	-	-	-	-	-	-	-
1a.3.2	Corporate Overheads	-	-	-	-	-	-	3,105	466	3,570	3,570	-	-	-	-	-	-	-	-	-	-
1a.3	Subtotal Period 1a Collateral Costs	-	-	-	-	-	-	13,440	2,016	15,456	3,570	11,886	-	-	-	-	-	-	-	-	-
Period 1a Period-Dependent Costs																					
1a.4.1	Insurance	-	-	-	-	-	-	1,600	160	1,760	1,760	-	-	-	-	-	-	-	-	-	-
1a.4.2	Property taxes	-	-	-	-	-	-	4	0	4	4	-	-	-	-	-	-	-	-	-	-
1a.4.3	Health physics supplies	-	370	-	-	-	-	-	93	463	463	-	-	-	-	-	-	-	-	-	-
1a.4.4	Heavy equipment rental	-	368	-	-	-	-	-	55	423	423	-	-	-	-	-	-	-	-	-	-

Table C-1
Cooper Nuclear Station
2014 DECON Decommissioning Cost Estimate
(thousands of 2008 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
Period 1a Period-Dependent Costs (continued)																					
1a.4.5	Disposal of DAW generated	-	-	5	3	-	73	-	19	100	100	-	-	-	1,575	-	-	-	14,445	5	-
1a.4.6	Plant energy budget	-	-	-	-	-	-	927	139	1,066	1,066	-	-	-	-	-	-	-	-	-	-
1a.4.7	NRC Fees	-	-	-	-	-	-	706	71	776	776	-	-	-	-	-	-	-	-	-	-
1a.4.8	Emergency Planning Fees	-	-	-	-	-	-	1,185	118	1,303	-	1,303	-	-	-	-	-	-	-	-	-
1a.4.9	Spent Fuel Pool O&M	-	-	-	-	-	-	745	112	857	-	857	-	-	-	-	-	-	-	-	-
1a.4.10	ISFSI Operating Costs	-	-	-	-	-	-	85	13	98	-	98	-	-	-	-	-	-	-	-	-
1a.4.11	Security Staff Cost	-	-	-	-	-	-	5,483	822	6,306	6,306	-	-	-	-	-	-	-	-	-	157,471
1a.4.12	Utility Staff Cost	-	-	-	-	-	-	22,690	3,403	26,093	26,093	-	-	-	-	-	-	-	-	-	423,400
1a.4	Subtotal Period 1a Period-Dependent Costs	-	738	5	3	-	73	33,424	5,006	39,249	36,991	2,258	-	-	1,575	-	-	-	14,445	5	580,871
1a.0	TOTAL PERIOD 1a COST	-	738	5	3	-	73	59,525	8,921	69,265	54,693	14,144	428	-	1,575	-	-	-	14,445	5	659,480
PERIOD 1b - Decommissioning Preparations																					
Period 1b Direct Decommissioning Activities																					
Detailed Work Procedures																					
1b.1.1.1	Plant systems	-	-	-	-	-	-	473	71	544	490	-	54	-	-	-	-	-	-	-	4,733
1b.1.1.2	NSSS Decontamination Flush	-	-	-	-	-	-	100	15	115	115	-	-	-	-	-	-	-	-	-	1,000
1b.1.1.3	Reactor internals	-	-	-	-	-	-	400	60	460	460	-	-	-	-	-	-	-	-	-	4,000
1b.1.1.4	Remaining buildings	-	-	-	-	-	-	135	20	155	39	-	116	-	-	-	-	-	-	-	1,350
1b.1.1.5	CRD housings & NIs	-	-	-	-	-	-	100	15	115	115	-	-	-	-	-	-	-	-	-	1,000
1b.1.1.6	Incore instrumentation	-	-	-	-	-	-	100	15	115	115	-	-	-	-	-	-	-	-	-	1,000
1b.1.1.7	Removal primary containment	-	-	-	-	-	-	200	30	230	230	-	-	-	-	-	-	-	-	-	2,000
1b.1.1.8	Reactor vessel	-	-	-	-	-	-	363	54	417	417	-	-	-	-	-	-	-	-	-	3,630
1b.1.1.9	Facility closeout	-	-	-	-	-	-	120	18	138	69	-	69	-	-	-	-	-	-	-	1,200
1b.1.1.10	Sacrificial shield	-	-	-	-	-	-	120	18	138	138	-	-	-	-	-	-	-	-	-	1,200
1b.1.1.11	Reinforced concrete	-	-	-	-	-	-	100	15	115	58	-	58	-	-	-	-	-	-	-	1,000
1b.1.1.12	Main Turbine	-	-	-	-	-	-	208	31	239	239	-	-	-	-	-	-	-	-	-	2,080
1b.1.1.13	Main Condensers	-	-	-	-	-	-	209	31	240	240	-	-	-	-	-	-	-	-	-	2,088
1b.1.1.14	Moisture separators & reheaters	-	-	-	-	-	-	200	30	230	230	-	-	-	-	-	-	-	-	-	2,000
1b.1.1.15	Radwaste building	-	-	-	-	-	-	273	41	314	283	-	31	-	-	-	-	-	-	-	2,730
1b.1.1.16	Reactor building	-	-	-	-	-	-	273	41	314	283	-	31	-	-	-	-	-	-	-	2,730
1b.1.1	Total	-	-	-	-	-	-	3,374	506	3,880	3,520	-	360	-	-	-	-	-	-	-	33,741
1b.1.2	Decon NSSS	348	-	-	-	-	-	-	174	523	523	-	-	-	-	-	-	-	-	1,067	-
1b.1	Subtotal Period 1b Activity Costs	348	-	-	-	-	-	3,374	680	4,403	4,043	-	360	-	-	-	-	-	-	1,067	33,741
Period 1b Additional Costs																					
1b.2.1	Spent Fuel Pool Isolation	-	-	-	-	-	-	9,407	1,411	10,818	10,818	-	-	-	-	-	-	-	-	-	-
1b.2.2	Site Characterization	-	-	-	-	-	-	5,395	1,619	7,014	7,014	-	-	-	-	-	-	-	-	-	-
1b.2.3	Asbestos Insulation Disposal	-	773	1	65	-	558	-	265	1,662	1,662	-	-	-	10,333	-	-	-	134,329	10,002	-
1b.2	Subtotal Period 1b Additional Costs	-	773	1	65	-	558	14,802	3,295	19,493	19,493	-	-	-	10,333	-	-	-	134,329	10,002	-
Period 1b Collateral Costs																					
1b.3.1	Decon equipment	713	-	-	-	-	-	-	107	820	820	-	-	-	-	-	-	-	-	-	-
1b.3.2	DOC staff relocation expenses	-	-	-	-	-	-	912	137	1,049	1,049	-	-	-	-	-	-	-	-	-	-
1b.3.3	Process liquid waste	64	-	46	249	-	1,808	-	525	2,690	2,690	-	-	-	427	543	-	-	85,905	189	-
1b.3.4	Small tool allowance	-	11	-	-	-	-	-	2	12	12	-	-	-	-	-	-	-	-	-	-
1b.3.5	Pipe cutting equipment	-	1,000	-	-	-	-	-	150	1,150	1,150	-	-	-	-	-	-	-	-	-	-
1b.3.6	Decon rig	1,400	-	-	-	-	-	-	210	1,610	1,610	-	-	-	-	-	-	-	-	-	-
1b.3.7	Spent Fuel Capital and Transfer	-	-	-	-	-	-	3,054	458	3,512	-	3,512	-	-	-	-	-	-	-	-	-
1b.3.8	Corporate Overheads	-	-	-	-	-	-	1,554	233	1,787	1,787	-	-	-	-	-	-	-	-	-	-
1b.3	Subtotal Period 1b Collateral Costs	2,177	1,011	46	249	-	1,808	5,520	1,822	12,631	9,118	3,512	-	-	427	543	-	-	85,905	189	-

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Cooper Nuclear Station
2014 DECON Decommissioning Cost Estimate
(thousands of 2008 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
Period 1b Period-Dependent Costs																					
1b.4.1	Decon supplies	22	-	-	-	-	-	-	5	27	27	-	-	-	-	-	-	-	-	-	-
1b.4.2	Insurance	-	-	-	-	-	-	244	24	269	269	-	-	-	-	-	-	-	-	-	-
1b.4.3	Property taxes	-	-	-	-	-	-	2	0	2	2	-	-	-	-	-	-	-	-	-	-
1b.4.4	Health physics supplies	-	242	-	-	-	-	-	60	302	302	-	-	-	-	-	-	-	-	-	-
1b.4.5	Heavy equipment rental	-	183	-	-	-	-	-	27	211	211	-	-	-	-	-	-	-	-	-	-
1b.4.6	Disposal of DAW generated	-	-	3	2	-	43	-	11	58	58	-	-	-	920	-	-	-	8,439	3	-
1b.4.7	Plant energy budget	-	-	-	-	-	-	924	139	1,063	1,063	-	-	-	-	-	-	-	-	-	-
1b.4.8	NRC Fees	-	-	-	-	-	-	352	35	387	387	-	-	-	-	-	-	-	-	-	-
1b.4.9	Emergency Planning Fees	-	-	-	-	-	-	591	59	650	-	650	-	-	-	-	-	-	-	-	-
1b.4.10	Spent Fuel Pool O&M	-	-	-	-	-	-	372	56	427	-	427	-	-	-	-	-	-	-	-	-
1b.4.11	ISFSI Operating Costs	-	-	-	-	-	-	42	6	49	-	49	-	-	-	-	-	-	-	-	-
1b.4.12	Security Staff Cost	-	-	-	-	-	-	2,734	410	3,144	3,144	-	-	-	-	-	-	-	-	-	78,520
1b.4.13	DOC Staff Cost	-	-	-	-	-	-	4,759	714	5,473	5,473	-	-	-	-	-	-	-	-	-	63,440
1b.4.14	Utility Staff Cost	-	-	-	-	-	-	11,380	1,707	13,086	13,086	-	-	-	-	-	-	-	-	-	212,160
1b.4	Subtotal Period 1b Period-Dependent Costs	22	425	3	2	-	43	21,400	3,255	25,149	24,023	1,126	-	-	920	-	-	-	8,439	3	354,120
1b.0	TOTAL PERIOD 1b COST	2,547	2,209	49	316	-	2,407	45,096	9,052	61,676	56,677	4,638	360	-	11,680	543	-	-	228,674	11,261	387,861
PERIOD 1 TOTALS		2,547	2,947	54	318	-	2,480	104,622	17,973	130,940	111,370	18,782	788	-	13,255	543	-	-	243,119	11,265	1,047,341
PERIOD 2a - Large Component Removal																					
Period 2a Direct Decommissioning Activities																					
Nuclear Steam Supply System Removal																					
2a.1.1.1	Recirculation System Piping & Valves	90	71	14	20	-	303	-	142	639	639	-	-	-	997	-	-	-	120,597	4,031	-
2a.1.1.2	Recirculation Pumps & Motors	33	28	11	29	-	321	-	109	532	532	-	-	-	1,188	-	-	-	132,880	1,683	-
2a.1.1.3	CRDMs & NIs Removal	133	139	377	92	-	317	-	232	1,291	1,291	-	-	-	6,935	-	-	-	126,494	6,209	-
2a.1.1.4	Reactor Vessel Internals	119	2,362	5,343	2,009	-	16,355	218	11,879	38,285	38,285	-	-	-	1,878	1,205	976	-	376,084	28,075	1,255
2a.1.1.5	Reactor Vessel	56	5,457	1,460	762	-	5,358	218	7,388	20,700	20,700	-	-	-	11,211	2,128	-	-	1,440,354	28,075	1,255
2a.1.1	Totals	431	8,058	7,205	2,912	-	22,653	437	19,751	61,447	61,447	-	-	-	22,209	3,334	976	-	2,196,409	68,073	2,510
Removal of Major Equipment																					
2a.1.2	Main Turbine/Generator	-	171	828	379	6,057	389	-	1,188	9,011	9,011	-	-	58,524	1,725	-	-	-	2,788,381	4,555	-
2a.1.3	Main Condensers	-	722	552	273	3,773	812	-	1,045	7,177	7,177	-	-	38,456	3,604	-	-	-	1,983,840	19,966	-
Cascading Costs from Clean Building Demolition																					
2a.1.4.1	Reactor	-	260	-	-	-	-	-	39	299	299	-	-	-	-	-	-	-	-	2,486	-
2a.1.4.2	Augmented Radwaste	-	25	-	-	-	-	-	4	28	28	-	-	-	-	-	-	-	-	235	-
2a.1.4.3	Radwaste	-	43	-	-	-	-	-	7	50	50	-	-	-	-	-	-	-	-	359	-
2a.1.4.4	Turbine	-	285	-	-	-	-	-	43	328	328	-	-	-	-	-	-	-	-	4,419	-
2a.1.4	Totals	-	613	-	-	-	-	-	92	705	705	-	-	-	-	-	-	-	-	7,498	-
Disposal of Plant Systems																					
2a.1.5.1	Augmented Radwaste El 877 Area1A	-	207	28	28	-	432	-	167	862	862	-	-	-	2,055	-	-	-	172,205	5,783	-
2a.1.5.2	Augmented Radwaste El 903 Area1A	-	68	6	7	-	104	-	45	230	230	-	-	-	469	-	-	-	41,606	1,889	-
2a.1.5.3	Augmented Radwaste El 918 Area1A	-	53	10	9	-	139	-	50	261	261	-	-	-	765	-	-	-	55,345	1,451	-
2a.1.5.4	Augmented Radwaste El 929 Area1A	-	21	4	5	-	73	-	25	128	128	-	-	-	324	-	-	-	29,038	591	-
2a.1.5.5	Augmented Radwaste El 929 Area1B	-	3	0	0	3	0	-	1	8	8	-	-	36	1	-	-	-	1,538	77	-
2a.1.5.6	DRYWELL Area1A	-	534	85	84	-	1,289	-	477	2,470	2,470	-	-	-	5,726	-	-	-	513,627	15,069	-
2a.1.5.7	DRYWELL Area1B	-	134	3	5	54	28	-	50	274	274	-	-	577	126	-	-	-	34,718	4,142	-
2a.1.5.8	Multi-Purpose Facility	-	202	6	15	201	47	-	95	566	566	-	-	2,148	214	-	-	-	105,982	5,547	-
2a.1.5.9	Reactor El 903 Area1A	-	404	56	42	-	651	-	276	1,428	1,428	-	-	-	2,892	-	-	-	259,190	10,573	-
2a.1.5.10	Reactor El 903 Area1B	-	462	13	34	443	131	-	221	1,305	1,305	-	-	4,739	583	-	-	-	244,706	12,864	-
2a.1.5.11	Turbine El 932 Area1B	-	332	52	99	882	725	-	416	2,505	2,505	-	-	9,442	3,220	-	-	-	672,225	9,481	-
2a.1.5.12	Turbine El 932 Area2C	-	8	-	-	-	-	-	1	9	-	-	9	-	-	-	-	-	-	237	-

Table C-1
Cooper Nuclear Station
2014 DECON Decommissioning Cost Estimate
(thousands of 2008 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
Disposal of Plant Systems (continued)																					
2a.1.5.13	Turbine El 932 Area3C	-	67	-	-	-	-	-	10	78	-	-	78	-	-	-	-	-	-	2,083	-
2a.1.5.14	Yard Area1B	-	518	110	284	3,535	1,198	-	1,013	6,657	6,657	-	-	37,846	5,399	-	-	-	2,014,081	14,477	-
2a.1.5	Totals	-	3,013	374	612	5,117	4,817	-	2,847	16,780	16,693	-	87	54,788	21,774	-	-	-	4,144,259	84,262	-
2a.1.6	Scaffolding in support of decommissioning	-	2,070	24	11	168	23	-	553	2,848	2,848	-	-	1,621	101	-	-	-	81,992	28,092	-
2a.1	Subtotal Period 2a Activity Costs	431	14,647	8,983	4,186	15,116	28,694	437	25,476	97,968	97,881	-	87	151,388	49,413	3,334	976	-	11,174,880	212,445	2,510
Period 2a Collateral Costs																					
2a.3.1	Process liquid waste	135	-	44	231	-	264	-	173	847	847	-	-	-	921	-	-	-	55,244	180	-
2a.3.2	Small tool allowance	-	124	-	-	-	-	-	19	143	129	-	14	-	-	-	-	-	-	-	-
2a.3.3	Spent Fuel Capital and Transfer	-	-	-	-	-	-	8,576	1,286	9,862	-	9,862	-	-	-	-	-	-	-	-	-
2a.3.4	Corporate Overheads	-	-	-	-	-	-	3,202	480	3,682	3,682	-	-	-	-	-	-	-	-	-	-
2a.3	Subtotal Period 2a Collateral Costs	135	124	44	231	-	264	11,778	1,958	14,534	4,657	9,862	14	-	921	-	-	-	55,244	180	-
Period 2a Period-Dependent Costs																					
2a.4.1	Decon supplies	61	-	-	-	-	-	-	15	76	76	-	-	-	-	-	-	-	-	-	-
2a.4.2	Insurance	-	-	-	-	-	-	688	69	756	756	-	-	-	-	-	-	-	-	-	-
2a.4.3	Property taxes	-	-	-	-	-	-	6	1	6	6	-	1	-	-	-	-	-	-	-	-
2a.4.4	Health physics supplies	-	1,262	-	-	-	-	-	315	1,577	1,577	-	-	-	-	-	-	-	-	-	-
2a.4.5	Heavy equipment rental	-	2,480	-	-	-	-	-	372	2,852	2,852	-	-	-	-	-	-	-	-	-	-
2a.4.6	Disposal of DAW generated	-	-	34	19	-	537	-	140	730	730	-	-	-	11,545	-	-	-	105,898	35	-
2a.4.7	Plant energy budget	-	-	-	-	-	-	1,235	185	1,420	1,420	-	-	-	-	-	-	-	-	-	-
2a.4.8	NRC Fees	-	-	-	-	-	-	923	92	1,016	1,016	-	-	-	-	-	-	-	-	-	-
2a.4.9	Emergency Planning Fees	-	-	-	-	-	-	1,183	118	1,301	-	1,301	-	-	-	-	-	-	-	-	-
2a.4.10	Spent Fuel Pool O&M	-	-	-	-	-	-	1,046	157	1,203	-	1,203	-	-	-	-	-	-	-	-	-
2a.4.11	ISFSI Operating Costs	-	-	-	-	-	-	119	18	137	-	137	-	-	-	-	-	-	-	-	-
2a.4.12	Security Staff Cost	-	-	-	-	-	-	6,631	995	7,626	7,626	-	-	-	-	-	-	-	-	-	185,051
2a.4.13	DOC Staff Cost	-	-	-	-	-	-	16,275	2,441	18,716	18,716	-	-	-	-	-	-	-	-	-	222,354
2a.4.14	Utility Staff Cost	-	-	-	-	-	-	22,962	3,444	26,407	26,407	-	-	-	-	-	-	-	-	-	413,989
2a.4	Subtotal Period 2a Period-Dependent Costs	61	3,741	34	19	-	537	51,067	8,363	63,822	61,182	2,640	1	-	11,545	-	-	-	105,898	35	821,394
2a.0	TOTAL PERIOD 2a COST	627	18,513	9,060	4,437	15,116	29,494	63,282	35,797	176,325	163,720	12,503	102	151,388	61,878	3,334	976	-	11,336,020	212,660	823,904
PERIOD 2b - Site Decontamination																					
Period 2b Direct Decommissioning Activities																					
Disposal of Plant Systems																					
2b.1.1.1	Control El 882 Area1B	-	285	17	42	554	147	-	199	1,243	1,243	-	-	5,929	674	-	-	-	299,222	7,975	-
2b.1.1.2	Control El 903 Area1C	-	170	-	-	-	-	-	25	195	-	-	195	-	-	-	-	-	-	5,155	-
2b.1.1.3	Control El 918 Area1C	-	66	-	-	-	-	-	10	76	-	-	76	-	-	-	-	-	-	2,100	-
2b.1.1.4	Control El 932 Area1C	-	22	-	-	-	-	-	3	26	-	-	26	-	-	-	-	-	-	702	-
2b.1.1.5	Intake	-	101	-	-	-	-	-	15	116	-	-	116	-	-	-	-	-	-	3,136	-
2b.1.1.6	Radwaste El 877 Area1A	-	405	75	62	-	949	-	355	1,845	1,845	-	-	-	5,097	-	-	-	377,917	11,133	-
2b.1.1.7	Radwaste El 877 Area2A	-	44	9	7	-	113	-	41	214	214	-	-	-	613	-	-	-	44,992	1,207	-
2b.1.1.8	Radwaste El 877 Area3A	-	84	16	13	-	201	-	75	388	388	-	-	-	1,156	-	-	-	79,963	2,349	-
2b.1.1.9	Radwaste El 903 Area1A	-	113	9	10	-	153	-	69	355	355	-	-	-	684	-	-	-	61,153	3,102	-
2b.1.1.10	Radwaste El 903 Area2A	-	192	36	29	-	439	-	166	861	861	-	-	-	1,955	-	-	-	175,093	5,412	-
2b.1.1.11	Radwaste El 903 Area3A	-	37	6	7	-	104	-	37	191	191	-	-	-	463	-	-	-	41,366	1,047	-
2b.1.1.12	Radwaste El 918 Area1A	-	21	2	2	-	30	-	13	68	68	-	-	-	135	-	-	-	12,033	572	-
2b.1.1.13	Radwaste El 918 Area2A	-	17	3	3	-	39	-	15	76	76	-	-	-	201	-	-	-	15,667	455	-
2b.1.1.14	Radwaste El 918 Area3A	-	189	23	22	-	338	-	137	710	710	-	-	-	1,690	-	-	-	134,827	5,152	-
2b.1.1.15	Radwaste El 934 Area1A	-	26	3	4	-	60	-	22	115	115	-	-	-	266	-	-	-	23,735	692	-
2b.1.1.16	Radwaste El 934 Area2A	-	100	11	12	-	177	-	72	372	372	-	-	-	808	-	-	-	70,665	2,706	-
2b.1.1.17	Radwaste El 949 Area1A	-	12	1	2	-	24	-	9	47	47	-	-	-	105	-	-	-	9,381	310	-

Table C-1
Cooper Nuclear Station
2014 DECON Decommissioning Cost Estimate
(thousands of 2008 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
Disposal of Plant Systems (continued)																					
2b.1.1.18	Reactor El 859 Area1A	-	72	15	16	-	246	-	83	432	432	-	-	-	1,091	-	-	-	97,874	2,068	-
2b.1.1.19	Reactor El 859 Area1B	-	449	28	64	712	344	-	317	1,914	1,914	-	-	7,624	1,526	-	-	-	446,483	12,746	-
2b.1.1.20	Reactor El 859 Area2A	-	73	25	26	-	401	-	125	650	650	-	-	-	1,780	-	-	-	159,714	2,137	-
2b.1.1.21	Reactor El 859 Area2B	-	70	3	6	99	40	-	44	264	264	-	-	1,055	177	-	-	-	58,760	2,009	-
2b.1.1.22	Reactor El 859 Area3A	-	48	9	9	-	137	-	49	252	252	-	-	-	608	-	-	-	54,543	1,356	-
2b.1.1.23	Reactor El 859 Area3B	-	34	2	3	23	23	-	18	103	103	-	-	249	103	-	-	-	19,362	975	-
2b.1.1.24	Reactor El 859 Area4A	-	51	9	8	-	117	-	44	229	229	-	-	-	520	-	-	-	46,666	1,416	-
2b.1.1.25	Reactor El 859 Area4B	-	17	1	2	19	14	-	11	65	65	-	-	208	62	-	-	-	14,010	487	-
2b.1.1.26	Reactor El 859 Area5A	-	64	16	17	-	262	-	86	445	445	-	-	-	1,163	-	-	-	104,381	1,839	-
2b.1.1.27	Reactor El 859 Area5B	-	38	2	3	23	23	-	19	107	107	-	-	242	102	-	-	-	18,927	1,114	-
2b.1.1.28	Reactor El 903 Area2A	-	4	0	0	-	6	-	3	14	14	-	-	-	26	-	-	-	2,372	123	-
2b.1.1.29	Reactor El 903 Area2B	-	71	5	12	149	51	-	55	342	342	-	-	1,594	225	-	-	-	84,943	1,983	-
2b.1.1.30	Reactor El 903 Area3A	-	37	10	11	-	167	-	54	279	279	-	-	-	741	-	-	-	66,516	1,109	-
2b.1.1.31	Reactor El 903 Area3B	-	25	2	3	37	17	-	17	101	101	-	-	401	77	-	-	-	23,200	744	-
2b.1.1.32	Reactor El 903 Area4A	-	31	8	9	-	136	-	44	229	229	-	-	-	606	-	-	-	54,373	928	-
2b.1.1.33	Reactor El 903 Area4B	-	24	1	3	38	17	-	17	101	101	-	-	411	75	-	-	-	23,408	717	-
2b.1.1.34	Reactor El 931 Area1A	-	25	3	3	-	52	-	20	104	104	-	-	-	232	-	-	-	20,858	681	-
2b.1.1.35	Reactor El 931 Area1B	-	307	22	45	483	256	-	222	1,334	1,334	-	-	5,169	1,137	-	-	-	311,878	8,640	-
2b.1.1.36	Reactor El 931 Area2A	-	31	2	2	-	35	-	17	87	87	-	-	-	154	-	-	-	13,824	881	-
2b.1.1.37	Reactor El 931 Area2B	-	3	0	0	1	0	-	1	5	5	-	-	7	1	-	-	-	380	91	-
2b.1.1.38	Reactor El 931 Area3A	-	123	23	22	-	336	-	120	625	625	-	-	-	1,651	-	-	-	134,007	3,509	-
2b.1.1.39	Reactor El 931 Area3B	-	3	0	0	1	0	-	1	4	4	-	-	7	0	-	-	-	345	85	-
2b.1.1.40	Reactor El 931 Area4C	-	24	-	-	-	-	-	4	28	-	-	28	-	-	-	-	-	-	767	-
2b.1.1.41	Reactor El 931 Area5C	-	7	-	-	-	-	-	1	8	-	-	8	-	-	-	-	-	-	213	-
2b.1.1.42	Reactor El 958 Area1A	-	57	9	10	-	149	-	54	279	279	-	-	-	662	-	-	-	59,432	1,492	-
2b.1.1.43	Reactor El 958 Area1B	-	171	8	18	209	88	-	100	594	594	-	-	2,238	392	-	-	-	126,002	4,814	-
2b.1.1.44	Reactor El 958 Area2A	-	49	10	10	-	153	-	53	276	276	-	-	-	681	-	-	-	61,083	1,425	-
2b.1.1.45	Reactor El 958 Area2B	-	15	1	1	6	14	-	8	46	46	-	-	66	63	-	-	-	8,331	430	-
2b.1.1.46	Reactor El 958 Area3A	-	38	4	3	-	48	-	22	116	116	-	-	-	214	-	-	-	19,185	1,070	-
2b.1.1.47	Reactor El 958 Area3B	-	17	1	1	6	12	-	8	45	45	-	-	60	54	-	-	-	7,250	491	-
2b.1.1.48	Turbine El 882 Area1A	-	38	3	3	-	50	-	23	117	117	-	-	-	222	-	-	-	19,878	1,028	-
2b.1.1.49	Turbine El 882 Area1B	-	394	46	95	1,101	476	-	402	2,515	2,515	-	-	11,784	2,117	-	-	-	668,352	11,459	-
2b.1.1.50	Turbine El 882 Area2A	-	22	2	2	-	29	-	13	68	68	-	-	-	129	-	-	-	11,556	597	-
2b.1.1.51	Turbine El 882 Area2B	-	213	10	23	301	89	-	125	762	762	-	-	3,227	405	-	-	-	166,542	5,929	-
2b.1.1.52	Turbine El 882 Area3A	-	17	2	1	-	23	-	10	53	53	-	-	-	101	-	-	-	9,017	461	-
2b.1.1.53	Turbine El 882 Area3B	-	620	62	156	1,960	633	-	637	4,068	4,068	-	-	20,984	2,817	-	-	-	1,104,460	17,788	-
2b.1.1.54	Turbine El 903 Area1A	-	9	1	1	-	15	-	6	33	33	-	-	-	68	-	-	-	6,127	239	-
2b.1.1.55	Turbine El 903 Area1B	-	995	134	271	2,726	1,717	-	1,141	6,983	6,983	-	-	29,180	7,631	-	-	-	1,868,932	28,509	-
2b.1.1.56	Turbine El 903 Area2A	-	5	1	1	-	9	-	4	20	20	-	-	-	42	-	-	-	3,729	145	-
2b.1.1.57	Turbine El 903 Area2B	-	147	3	8	105	30	-	62	355	355	-	-	1,122	133	-	-	-	57,476	4,141	-
2b.1.1.58	Turbine El 903 Area3B	-	3	0	2	33	2	-	7	48	48	-	-	357	9	-	-	-	15,340	97	-
2b.1.1.59	Turbine El 903 Area3C	-	108	-	-	-	-	-	16	124	-	-	124	-	-	-	-	-	-	3,412	-
2b.1.1.60	Turbine El 903 Area4B	-	12	0	2	26	3	-	8	50	50	-	-	276	11	-	-	-	12,251	367	-
2b.1.1.61	Yard Area1C	-	197	-	-	-	-	-	30	227	-	-	227	-	-	-	-	-	-	5,770	-
2b.1.1	Totals	-	6,646	693	1,087	8,611	8,996	-	5,365	31,398	30,598	-	800	92,188	41,662	-	-	-	7,327,776	189,487	-
2b.1.2	Scaffolding in support of decommissioning	-	2,588	30	14	210	28	-	691	3,560	3,560	-	-	2,026	126	-	-	-	102,490	35,115	-
Decontamination of Site Buildings																					
2b.1.3.1	Reactor	2,702	1,457	131	320	4,748	1,116	-	2,767	13,241	13,241	-	-	50,830	16,343	-	-	-	3,680,298	101,984	-
2b.1.3.2	Augmented Radwaste	55	32	7	10	23	119	-	71	316	316	-	-	242	2,189	-	-	-	228,383	2,299	-
2b.1.3.3	Miscellaneous Structures - Contaminated	377	174	15	43	759	74	-	372	1,815	1,815	-	-	8,129	679	-	-	-	395,527	13,327	-
2b.1.3.4	Multi-Purpose Facility	72	73	11	19	115	172	-	118	579	579	-	-	1,234	3,087	-	-	-	356,985	3,680	-
2b.1.3.5	Radwaste	167	88	18	26	38	319	-	196	850	850	-	-	404	5,886	-	-	-	603,975	6,839	-
2b.1.3.6	Turbine	552	267	70	97	64	1,261	-	689	3,001	3,001	-	-	688	23,302	-	-	-	2,357,288	21,920	-
2b.1.3	Totals	3,924	2,088	252	515	5,747	3,061	-	4,214	19,801	19,801	-	-	61,526	51,485	-	-	-	7,622,455	150,050	-

Table C-1
Cooper Nuclear Station
2014 DECON Decommissioning Cost Estimate
(thousands of 2008 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
2b.1	Subtotal Period 2b Activity Costs	3,924	11,322	975	1,616	14,567	12,086	-	10,269	54,759	53,960	-	800	155,741	93,273	-	-	-	15,052,720	374,651	-
Period 2b Collateral Costs																					
2b.3.1	Process liquid waste	164	-	54	283	-	323	-	211	1,035	1,035	-	-	-	1,126	-	-	-	67,588	220	-
2b.3.2	Small tool allowance	-	195	-	-	-	-	-	29	225	225	-	-	-	-	-	-	-	-	-	-
2b.3.3	Spent Fuel Capital and Transfer	-	-	-	-	-	-	17,873	2,681	20,554	-	20,554	-	-	-	-	-	-	-	-	-
2b.3.4	Corporate Overheads	-	-	-	-	-	-	5,754	863	6,618	6,618	-	-	-	-	-	-	-	-	-	-
2b.3	Subtotal Period 2b Collateral Costs	164	195	54	283	-	323	23,627	3,784	28,431	7,877	20,554	-	-	1,126	-	-	-	67,588	220	-
Period 2b Period-Dependent Costs																					
2b.4.1	Decon supplies	1,318	-	-	-	-	-	-	330	1,648	1,648	-	-	-	-	-	-	-	-	-	-
2b.4.2	Insurance	-	-	-	-	-	-	1,273	127	1,400	1,400	-	-	-	-	-	-	-	-	-	-
2b.4.3	Property taxes	-	-	-	-	-	-	10	1	11	11	-	-	-	-	-	-	-	-	-	-
2b.4.4	Health physics supplies	-	2,257	-	-	-	-	-	564	2,822	2,822	-	-	-	-	-	-	-	-	-	-
2b.4.5	Heavy equipment rental	-	4,559	-	-	-	-	-	684	5,243	5,243	-	-	-	-	-	-	-	-	-	-
2b.4.6	Disposal of DAW generated	-	-	53	29	-	835	-	218	1,135	1,135	-	-	-	17,954	-	-	-	164,691	55	-
2b.4.7	Plant energy budget	-	-	-	-	-	-	1,805	271	2,076	2,076	-	-	-	-	-	-	-	-	-	-
2b.4.8	NRC Fees	-	-	-	-	-	-	1,709	171	1,880	1,880	-	-	-	-	-	-	-	-	-	-
2b.4.9	Emergency Planning Fees	-	-	-	-	-	-	2,190	219	2,409	-	2,409	-	-	-	-	-	-	-	-	-
2b.4.10	Spent Fuel Pool O&M	-	-	-	-	-	-	1,936	290	2,227	-	2,227	-	-	-	-	-	-	-	-	-
2b.4.11	Liquid Radwaste Processing Equipment/Services	-	-	-	-	-	-	487	73	560	560	-	-	-	-	-	-	-	-	-	-
2b.4.12	ISFSI Operating Costs	-	-	-	-	-	-	220	33	254	-	254	-	-	-	-	-	-	-	-	-
2b.4.13	Security Staff Cost	-	-	-	-	-	-	12,279	1,842	14,120	14,120	-	-	-	-	-	-	-	-	-	342,634
2b.4.14	DOC Staff Cost	-	-	-	-	-	-	29,008	4,351	33,359	33,359	-	-	-	-	-	-	-	-	-	395,451
2b.4.15	Utility Staff Cost	-	-	-	-	-	-	40,864	6,130	46,993	46,993	-	-	-	-	-	-	-	-	-	734,023
2b.4	Subtotal Period 2b Period-Dependent Costs	1,318	6,816	53	29	-	835	91,781	15,304	116,137	111,248	4,889	-	-	17,954	-	-	-	164,691	55	1,472,109
2b.0	TOTAL PERIOD 2b COST	5,407	18,334	1,081	1,928	14,567	13,243	115,409	29,358	199,327	173,085	25,442	800	155,741	112,354	-	-	-	15,285,000	374,926	1,472,109
PERIOD 2c - Decontamination Following Wet Fuel Storage																					
Period 2c Direct Decommissioning Activities																					
2c.1.1	Remove spent fuel racks	267	33	79	88	-	1,348	-	500	2,316	2,316	-	-	-	5,986	-	-	-	537,141	1,004	-
Disposal of Plant Systems																					
2c.1.2.1	Reactor El 1001 Area1A	-	50	7	8	-	121	-	45	231	231	-	-	-	537	-	-	-	48,175	1,273	-
2c.1.2.2	Reactor El 1001 Area1B	-	64	1	4	54	13	-	28	164	164	-	-	576	57	-	-	-	28,513	1,737	-
2c.1.2.3	Reactor El 976 Area1A	-	11	1	1	-	16	-	7	36	36	-	-	-	72	-	-	-	6,482	304	-
2c.1.2.4	Reactor El 976 Area1B	-	150	11	27	328	115	-	121	752	752	-	-	3,516	511	-	-	-	188,501	4,017	-
2c.1.2.5	Reactor El 976 Area2A	-	7	1	1	-	13	-	5	26	26	-	-	-	57	-	-	-	5,136	174	-
2c.1.2.6	Reactor El 976 Area2B	-	38	1	3	42	16	-	20	121	121	-	-	449	72	-	-	-	24,474	1,056	-
2c.1.2	Totals	-	321	23	44	424	293	-	226	1,331	1,331	-	-	4,543	1,305	-	-	-	301,281	8,561	-
Decontamination of Site Buildings																					
2c.1.3.1	Reactor (post fuel)	257	510	97	138	163	1,742	-	747	3,656	3,656	-	-	1,749	32,119	-	-	-	3,281,659	18,302	-
2c.1.3	Totals	257	510	97	138	163	1,742	-	747	3,656	3,656	-	-	1,749	32,119	-	-	-	3,281,659	18,302	-
2c.1.4	Scaffolding in support of decommissioning	-	518	8	3	42	8	-	138	712	712	-	-	405	25	-	-	-	20,498	7,023	-
2c.1	Subtotal Period 2c Activity Costs	525	1,382	205	273	630	3,389	-	1,811	8,014	8,014	-	-	6,697	39,437	-	-	-	4,140,579	34,890	-
Period 2c Additional Costs																					
2c.2.1	Final Site Survey	-	-	-	-	-	-	1,205	362	1,567	1,567	-	-	-	-	-	-	-	-	-	12,480
2c.2	Subtotal Period 2c Additional Costs	-	-	-	-	-	-	1,205	362	1,567	1,567	-	-	-	-	-	-	-	-	-	12,480

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Cooper Nuclear 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 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
Period 2c Collateral Costs																					
2c.3.1	Process liquid waste	101	-	33	175	-	200	-	130	639	639	-	-	-	696	-	-	-	41,756	136	-
2c.3.2	Small tool allowance	-	22	-	-	-	-	-	3	25	25	-	-	-	-	-	-	-	-	-	-
2c.3.3	Decommissioning Equipment Disposition	-	-	88	50	621	84	-	130	973	973	-	-	6,000	373	-	-	-	303,507	88	-
2c.3.4	Spent Fuel Capital and Transfer	-	-	-	-	-	-	1,595	239	1,834	-	1,834	-	-	-	-	-	-	-	-	-
2c.3	Subtotal Period 2c Collateral Costs	101	22	121	225	621	284	1,595	503	3,471	1,637	1,834	-	6,000	1,069	-	-	-	345,263	224	-
Period 2c Period-Dependent Costs																					
2c.4.1	Decon supplies	90	-	-	-	-	-	-	23	113	113	-	-	-	-	-	-	-	-	-	-
2c.4.2	Insurance	-	-	-	-	-	-	197	20	217	217	-	-	-	-	-	-	-	-	-	-
2c.4.3	Property taxes	-	-	-	-	-	-	2	0	2	2	-	-	-	-	-	-	-	-	-	-
2c.4.4	Health physics supplies	-	256	-	-	-	-	-	64	320	320	-	-	-	-	-	-	-	-	-	-
2c.4.5	Heavy equipment rental	-	707	-	-	-	-	-	106	813	813	-	-	-	-	-	-	-	-	-	-
2c.4.6	Disposal of DAW generated	-	-	12	6	-	184	-	48	250	250	-	-	-	3,949	-	-	-	36,227	12	-
2c.4.7	Plant energy budget	-	-	-	-	-	-	149	22	172	172	-	-	-	-	-	-	-	-	-	-
2c.4.8	NRC Fees	-	-	-	-	-	-	265	27	292	292	-	-	-	-	-	-	-	-	-	-
2c.4.9	Emergency Planning Fees	-	-	-	-	-	-	340	34	373	-	373	-	-	-	-	-	-	-	-	-
2c.4.10	Liquid Radwaste Processing Equipment/Services	-	-	-	-	-	-	151	23	174	174	-	-	-	-	-	-	-	-	-	-
2c.4.11	ISFSI Operating Costs	-	-	-	-	-	-	34	5	39	-	39	-	-	-	-	-	-	-	-	-
2c.4.12	Security Staff Cost	-	-	-	-	-	-	1,159	174	1,333	1,333	-	-	-	-	-	-	-	-	-	27,930
2c.4.13	DOC Staff Cost	-	-	-	-	-	-	3,126	469	3,595	3,595	-	-	-	-	-	-	-	-	-	42,000
2c.4.14	Utility Staff Cost	-	-	-	-	-	-	4,699	705	5,404	5,404	-	-	-	-	-	-	-	-	-	80,220
2c.4	Subtotal Period 2c Period-Dependent Costs	90	963	12	6	-	184	10,123	1,719	13,096	12,684	413	-	-	3,949	-	-	-	36,227	12	150,150
2c.0	TOTAL PERIOD 2c COST	716	2,367	337	504	1,251	3,856	12,922	4,194	26,148	23,902	2,247	-	12,697	44,455	-	-	-	4,522,069	35,126	162,630
PERIOD 2e - License Termination																					
Period 2e Direct Decommissioning Activities																					
2e.1.1	ORISE confirmatory survey	-	-	-	-	-	-	147	44	191	191	-	-	-	-	-	-	-	-	-	-
2e.1.2	Terminate license									a											
2e.1	Subtotal Period 2e Activity Costs	-	-	-	-	-	-	147	44	191	191	-	-	-	-	-	-	-	-	-	-
Period 2e Additional Costs																					
2e.2.1	Final Site Survey	-	-	-	-	-	-	5,998	1,799	7,797	7,797	-	-	-	-	-	-	-	-	148,435	6,240
2e.2	Subtotal Period 2e Additional Costs	-	-	-	-	-	-	5,998	1,799	7,797	7,797	-	-	-	-	-	-	-	-	148,435	6,240
Period 2e Collateral Costs																					
2e.3.1	DOC staff relocation expenses	-	-	-	-	-	-	912	137	1,049	1,049	-	-	-	-	-	-	-	-	-	-
2e.3.2	Spent Fuel Capital and Transfer	-	-	-	-	-	-	217	33	250	-	250	-	-	-	-	-	-	-	-	-
2e.3	Subtotal Period 2e Collateral Costs	-	-	-	-	-	-	1,129	169	1,299	1,049	250	-	-	-	-	-	-	-	-	-
Period 2e Period-Dependent Costs																					
2e.4.1	Insurance	-	-	-	-	-	-	327	33	360	360	-	-	-	-	-	-	-	-	-	-
2e.4.2	Property taxes	-	-	-	-	-	-	3	0	3	3	-	-	-	-	-	-	-	-	-	-
2e.4.3	Health physics supplies	-	737	-	-	-	-	-	184	921	921	-	-	-	-	-	-	-	-	-	-
2e.4.4	Disposal of DAW generated	-	-	3	1	-	42	-	11	58	58	-	-	-	914	-	-	-	8,380	3	-
2e.4.5	Plant energy budget	-	-	-	-	-	-	139	21	160	160	-	-	-	-	-	-	-	-	-	-
2e.4.6	NRC Fees	-	-	-	-	-	-	530	53	583	583	-	-	-	-	-	-	-	-	-	-
2e.4.7	Emergency Planning Fees	-	-	-	-	-	-	633	63	696	-	696	-	-	-	-	-	-	-	-	-
2e.4.8	ISFSI Operating Costs	-	-	-	-	-	-	64	10	73	-	73	-	-	-	-	-	-	-	-	-
2e.4.9	Security Staff Cost	-	-	-	-	-	-	2,125	319	2,444	2,444	-	-	-	-	-	-	-	-	-	50,886
2e.4.10	DOC Staff Cost	-	-	-	-	-	-	4,442	666	5,108	5,108	-	-	-	-	-	-	-	-	-	57,149
2e.4.11	Utility Staff Cost	-	-	-	-	-	-	5,071	761	5,832	5,832	-	-	-	-	-	-	-	-	-	80,634
2e.4	Subtotal Period 2e Period-Dependent Costs	-	737	3	1	-	42	13,334	2,121	16,238	15,468	769	-	-	914	-	-	-	8,380	3	188,669
2e.0	TOTAL PERIOD 2e COST	-	737	3	1	-	42	20,608	4,134	25,525	24,506	1,019	-	-	914	-	-	-	8,380	148,438	194,909

Table C-1
Cooper Nuclear Station
2014 DECON Decommissioning Cost Estimate
(thousands of 2008 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
PERIOD 2 TOTALS		6,750	39,950	10,481	6,870	30,933	46,637	212,221	73,483	427,325	385,213	41,211	901	319,826	219,601	3,334	976	-	31,151,470	771,150	2,653,551
PERIOD 3b - Site Restoration																					
Period 3b Direct Decommissioning Activities																					
Demolition of Remaining Site Buildings																					
3b.1.1.1	Reactor	-	1,473	-	-	-	-	-	221	1,694	-	-	1,694	-	-	-	-	-	-	14,089	-
3b.1.1.2	Augmented Radwaste	-	222	-	-	-	-	-	33	255	-	-	255	-	-	-	-	-	-	2,119	-
3b.1.1.3	Control	-	214	-	-	-	-	-	32	246	-	-	246	-	-	-	-	-	-	1,655	-
3b.1.1.4	Intake Structure	-	523	-	-	-	-	-	78	602	-	-	602	-	-	-	-	-	-	5,621	-
3b.1.1.5	LLRW Storage Pad	-	145	-	-	-	-	-	22	167	-	-	167	-	-	-	-	-	-	1,227	-
3b.1.1.6	Miscellaneous Structures - Clean	-	1,196	-	-	-	-	-	179	1,375	-	-	1,375	-	-	-	-	-	-	11,837	-
3b.1.1.7	Miscellaneous Structures - Contaminated	-	27	-	-	-	-	-	4	30	-	-	30	-	-	-	-	-	-	572	-
3b.1.1.8	Multi-Purpose Facility	-	123	-	-	-	-	-	18	141	-	-	141	-	-	-	-	-	-	1,982	-
3b.1.1.9	OWC Gas Generator	-	18	-	-	-	-	-	3	20	-	-	20	-	-	-	-	-	-	283	-
3b.1.1.10	Office	-	156	-	-	-	-	-	23	179	-	-	179	-	-	-	-	-	-	1,920	-
3b.1.1.11	Radwaste	-	391	-	-	-	-	-	59	449	-	-	449	-	-	-	-	-	-	3,229	-
3b.1.1.12	Seal Well	-	17	-	-	-	-	-	3	20	-	-	20	-	-	-	-	-	-	166	-
3b.1.1.13	Sewage Treatment Area	-	4	-	-	-	-	-	1	5	-	-	5	-	-	-	-	-	-	53	-
3b.1.1.14	Transformer Yard	-	20	-	-	-	-	-	3	24	-	-	24	-	-	-	-	-	-	172	-
3b.1.1.15	Turbine	-	2,596	-	-	-	-	-	389	2,985	-	-	2,985	-	-	-	-	-	-	40,503	-
3b.1.1.16	Turbine Pedestal	-	277	-	-	-	-	-	42	318	-	-	318	-	-	-	-	-	-	2,100	-
3b.1.1.17	Reactor (post fuel)	-	18	-	-	-	-	-	3	21	-	-	21	-	-	-	-	-	-	512	-
3b.1.1	Totals	-	7,418	-	-	-	-	-	1,113	8,531	-	-	8,531	-	-	-	-	-	-	88,040	-
Site Closeout Activities																					
3b.1.2	Remove Rubble	-	424	-	-	-	-	-	64	488	-	-	488	-	-	-	-	-	-	3,286	-
3b.1.3	Grade & landscape site	-	578	-	-	-	-	-	87	665	-	-	665	-	-	-	-	-	-	1,578	-
3b.1.4	Final report to NRC	-	-	-	-	-	-	156	23	179	179	-	-	-	-	-	-	-	-	-	1,560
3b.1	Subtotal Period 3b Activity Costs	-	8,421	-	-	-	-	156	1,286	9,863	179	-	9,684	-	-	-	-	-	-	92,904	1,560
Period 3b Additional Costs																					
3b.2.1	Concrete Crushing	-	499	-	-	-	-	8	76	582	-	-	582	-	-	-	-	-	-	3,045	-
3b.2.2	Cofferdam	-	458	-	-	-	-	-	69	527	-	-	527	-	-	-	-	-	-	5,130	-
3b.2	Subtotal Period 3b Additional Costs	-	957	-	-	-	-	8	145	1,109	-	-	1,109	-	-	-	-	-	-	8,175	-
Period 3b Collateral Costs																					
3b.3.1	Small tool allowance	-	53	-	-	-	-	-	8	61	-	-	61	-	-	-	-	-	-	-	-
3b.3.2	Spent Fuel Capital and Transfer	-	-	-	-	-	-	183	27	211	-	211	-	-	-	-	-	-	-	-	-
3b.3	Subtotal Period 3b Collateral Costs	-	53	-	-	-	-	183	35	271	-	211	61	-	-	-	-	-	-	-	-
Period 3b Period-Dependent Costs																					
3b.4.1	Insurance	-	-	-	-	-	-	751	75	826	-	826	-	-	-	-	-	-	-	-	-
3b.4.2	Property taxes	-	-	-	-	-	-	7	1	8	-	8	-	-	-	-	-	-	-	-	-
3b.4.3	Heavy equipment rental	-	4,053	-	-	-	-	-	608	4,661	-	-	4,661	-	-	-	-	-	-	-	-
3b.4.4	Plant energy budget	-	-	-	-	-	-	160	24	184	-	-	184	-	-	-	-	-	-	-	-
3b.4.5	NRC ISFSI Fees	-	-	-	-	-	-	339	34	373	-	373	-	-	-	-	-	-	-	-	-
3b.4.6	Emergency Planning Fees	-	-	-	-	-	-	1,453	145	1,598	-	1,598	-	-	-	-	-	-	-	-	-
3b.4.7	ISFSI Operating Costs	-	-	-	-	-	-	146	22	168	-	168	-	-	-	-	-	-	-	-	-
3b.4.8	Security Staff Cost	-	-	-	-	-	-	4,878	732	5,610	-	4,937	673	-	-	-	-	-	-	-	116,814
3b.4.9	DOC Staff Cost	-	-	-	-	-	-	9,777	1,467	11,244	-	-	11,244	-	-	-	-	-	-	-	122,206
3b.4.10	Utility Staff Cost	-	-	-	-	-	-	5,903	885	6,789	0	1,697	5,091	-	-	-	-	-	-	-	97,944
3b.4	Subtotal Period 3b Period-Dependent Costs	-	4,053	-	-	-	-	23,415	3,993	31,460	0	9,607	21,853	-	-	-	-	-	-	-	336,964
3b.0	TOTAL PERIOD 3b COST	-	13,483	-	-	-	-	23,762	5,459	42,704	179	9,818	32,707	-	-	-	-	-	-	101,079	338,524

Table C-1
Cooper Nuclear Station
2014 DECON Decommissioning Cost Estimate
(thousands of 2008 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
PERIOD 3c - Fuel Storage Operations/Shipping																					
Period 3c Collateral Costs																					
3c.3.1	Spent Fuel Capital and Transfer	-	-	-	-	-	-	16,015	2,402	18,418	-	18,418	-	-	-	-	-	-	-	-	-
3c.3	Subtotal Period 3c Collateral Costs	-	-	-	-	-	-	16,015	2,402	18,418	-	18,418	-	-	-	-	-	-	-	-	-
Period 3c Period-Dependent Costs																					
3c.4.1	Insurance	-	-	-	-	-	-	10,706	1,071	11,776	-	11,776	-	-	-	-	-	-	-	-	-
3c.4.2	Property taxes	-	-	-	-	-	-	98	10	108	-	108	-	-	-	-	-	-	-	-	-
3c.4.3	Plant energy budget	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3c.4.4	NRC ISFSI Fees	-	-	-	-	-	-	6,234	623	6,857	-	6,857	-	-	-	-	-	-	-	-	-
3c.4.5	Emergency Planning Fees	-	-	-	-	-	-	20,704	2,070	22,774	-	22,774	-	-	-	-	-	-	-	-	-
3c.4.6	ISFSI Operating Costs	-	-	-	-	-	-	2,085	313	2,398	-	2,398	-	-	-	-	-	-	-	-	-
3c.4.7	Security Staff Cost	-	-	-	-	-	-	61,192	9,179	70,371	-	70,371	-	-	-	-	-	-	-	-	1,383,017
3c.4.8	Utility Staff Cost	-	-	-	-	-	-	21,209	3,181	24,390	-	24,390	-	-	-	-	-	-	-	-	345,754
3c.4	Subtotal Period 3c Period-Dependent Costs	-	-	-	-	-	-	122,227	16,447	138,674	-	138,674	-	-	-	-	-	-	-	-	1,728,771
3c.0	TOTAL PERIOD 3c COST	-	-	-	-	-	-	138,242	18,849	157,092	-	157,092	-	-	-	-	-	-	-	-	1,728,771
PERIOD 3d - GTCC shipping																					
Period 3d Direct Decommissioning Activities																					
Nuclear Steam Supply System Removal																					
3d.1.1.1	Vessel & Internals GTCC Disposal	-	-	660	-	-	7,470	-	1,186	9,316	9,316	-	-	-	-	-	-	508	89,497	-	-
3d.1.1	Totals	-	-	660	-	-	7,470	-	1,186	9,316	9,316	-	-	-	-	-	-	508	89,497	-	-
3d.1	Subtotal Period 3d Activity Costs	-	-	660	-	-	7,470	-	1,186	9,316	9,316	-	-	-	-	-	-	508	89,497	-	-
Period 3d Collateral Costs																					
3d.3.1	Spent Fuel Capital and Transfer	-	-	-	-	-	-	76	11	87	-	87	-	-	-	-	-	-	-	-	-
3d.3	Subtotal Period 3d Collateral Costs	-	-	-	-	-	-	76	11	87	-	87	-	-	-	-	-	-	-	-	-
Period 3d Period-Dependent Costs																					
3d.4.1	Insurance	-	-	-	-	-	-	17	2	18	-	18	-	-	-	-	-	-	-	-	-
3d.4.2	Property taxes	-	-	-	-	-	-	0	0	0	-	0	-	-	-	-	-	-	-	-	-
3d.4.3	Plant energy budget	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3d.4.4	NRC ISFSI Fees	-	-	-	-	-	-	8	1	8	-	8	-	-	-	-	-	-	-	-	-
3d.4.5	Emergency Planning Fees	-	-	-	-	-	-	32	3	36	-	36	-	-	-	-	-	-	-	-	-
3d.4.6	ISFSI Operating Costs	-	-	-	-	-	-	3	0	4	-	4	-	-	-	-	-	-	-	-	-
3d.4.7	Security Staff Cost	-	-	-	-	-	-	96	14	110	-	110	-	-	-	-	-	-	-	-	2,160
3d.4.8	Utility Staff Cost	-	-	-	-	-	-	33	5	38	-	38	-	-	-	-	-	-	-	-	540
3d.4	Subtotal Period 3d Period-Dependent Costs	-	-	-	-	-	-	189	25	214	-	214	-	-	-	-	-	-	-	-	2,700
3d.0	TOTAL PERIOD 3d COST	-	-	660	-	-	7,470	265	1,223	9,618	9,316	302	-	-	-	-	-	508	89,497	-	2,700
PERIOD 3e - ISFSI Decontamination																					
Period 3e Direct Decommissioning Activities																					
Period 3e Additional Costs																					
3e.2.1	ISFSI Decontamination	-	656	4	24	-	55	1,192	360	2,290	-	2,290	-	-	1,050	-	-	-	162,629	17,515	2,560
3e.2	Subtotal Period 3e Additional Costs	-	656	4	24	-	55	1,192	360	2,290	-	2,290	-	-	1,050	-	-	-	162,629	17,515	2,560
Period 3e Collateral Costs																					
3e.3.1	Small tool allowance	-	9	-	-	-	-	-	1	10	-	10	-	-	-	-	-	-	-	-	-
3e.3.2	Spent Fuel Capital and Transfer	-	-	-	-	-	-	5	1	6	-	6	-	-	-	-	-	-	-	-	-
3e.3	Subtotal Period 3e Collateral Costs	-	9	-	-	-	-	5	2	16	-	16	-	-	-	-	-	-	-	-	-

Table C-1
Cooper Nuclear Station
2014 DECON Decommissioning Cost Estimate
(thousands of 2008 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 3e Period-Dependent Costs																					
3e.4.1	Insurance	-	-	-	-	-	-	145	14	159	-	159	-	-	-	-	-	-	-	-	-
3e.4.2	Property taxes	-	-	-	-	-	-	1	0	1	-	1	-	-	-	-	-	-	-	-	-
3e.4.3	Heavy equipment rental	-	232	-	-	-	-	-	35	267	-	267	-	-	-	-	-	-	-	-	-
3e.4.4	Plant energy budget	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3e.4.5	Security Staff Cost	-	-	-	-	-	-	303	46	349	-	349	-	-	-	-	-	-	-	-	5,013
3e.4.6	Utility Staff Cost	-	-	-	-	-	-	249	37	287	-	287	-	-	-	-	-	-	-	-	3,803
3e.4	Subtotal Period 3e Period-Dependent Costs	-	232	-	-	-	-	699	132	1,063	-	1,063	-	-	-	-	-	-	-	-	8,816
3e.0	TOTAL PERIOD 3e COST	-	897	4	24	-	55	1,896	495	3,370	-	3,370	-	-	1,050	-	-	-	162,629	17,515	11,376
PERIOD 3f - ISFSI Site Restoration																					
Period 3f Direct Decommissioning Activities																					
Period 3f Additional Costs																					
3f.2.1	ISFSI Demolition	-	487	-	-	-	-	44	80	611	-	611	-	-	-	-	-	-	-	4,336	160
3f.2	Subtotal Period 3f Additional Costs	-	487	-	-	-	-	44	80	611	-	611	-	-	-	-	-	-	-	4,336	160
Period 3f Collateral Costs																					
3f.3.1	Small tool allowance	-	2	-	-	-	-	-	0	3	-	3	-	-	-	-	-	-	-	-	-
3f.3	Subtotal Period 3f Collateral Costs	-	2	-	-	-	-	-	0	3	-	3	-	-	-	-	-	-	-	-	-
Period 3f Period-Dependent Costs																					
3f.4.1	Insurance	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3f.4.2	Property taxes	-	-	-	-	-	-	1	0	1	-	1	-	-	-	-	-	-	-	-	-
3f.4.3	Heavy equipment rental	-	79	-	-	-	-	-	12	91	-	91	-	-	-	-	-	-	-	-	-
3f.4.4	Plant energy budget	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3f.4.5	Security Staff Cost	-	-	-	-	-	-	155	23	179	-	179	-	-	-	-	-	-	-	-	2,569
3f.4.6	Utility Staff Cost	-	-	-	-	-	-	110	16	126	-	126	-	-	-	-	-	-	-	-	1,594
3f.4	Subtotal Period 3f Period-Dependent Costs	-	79	-	-	-	-	266	52	396	-	396	-	-	-	-	-	-	-	-	4,163
3f.0	TOTAL PERIOD 3f COST	-	568	-	-	-	-	310	132	1,010	-	1,010	-	-	-	-	-	-	-	4,336	4,323
PERIOD 3 TOTALS		-	14,948	664	24	-	7,524	164,475	26,158	213,793	9,495	171,591	32,707	-	1,050	-	-	508	252,126	122,930	2,085,694
TOTAL COST TO DECOMMISSION		9,298	57,845	11,199	7,212	30,933	56,640	481,317	117,614	772,058	506,078	231,584	34,396	319,826	233,906	3,877	976	508	31,646,710	905,345	5,786,586

Table C-1
Cooper Nuclear Station
2014 DECON Decommissioning Cost Estimate
(thousands of 2008 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 17.97% CONTINGENCY:	$772,058	thousands of 2008 dollars
TOTAL NRC LICENSE TERMINATION COST IS 65.55% OR:	$506,078	thousands of 2008 dollars
SPENT FUEL MANAGEMENT COST IS 30% OR:	$231,584	thousands of 2008 dollars
NON-NUCLEAR DEMOLITION COST IS 4.46% OR:	$34,396	thousands of 2008 dollars
TOTAL LOW-LEVE RADIOACTIVE WASTE VOLUME BURIED (EXCLUDING GTCC):	238,758	cubic feet
TOTAL GREATER THAN CLASS C RADWASTE VOLUME GENERATED:	508	cubic feet
TOTAL SCRAP METAL REMOVED:	30,345	tons
TOTAL CRAFT LABOR REQUIREMENTS:	905,345	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

Table C-2
Cooper Nuclear Station
2014 Delayed DECON Decommissioning Cost Estimate
(thousands of 2008 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
PERIOD 1a - Shutdown through Transition																					
Period 1a Direct Decommissioning Activities																					
1a.1.1	SAFSTOR site characterization survey	-	-	-	-	-	-	346	104	450	450	-	-	-	-	-	-	-	-	-	-
1a.1.2	Prepare preliminary decommissioning cost	-	-	-	-	-	-	130	20	150	150	-	-	-	-	-	-	-	-	-	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	-	-	-	-	-	-	200	30	230	230	-	-	-	-	-	-	-	-	-	2,000
1a.1.8	Review plant dwgs & specs.	-	-	-	-	-	-	130	20	150	150	-	-	-	-	-	-	-	-	-	1,300
1a.1.9	Perform detailed rad survey									a											
1a.1.10	Estimate by-product inventory	-	-	-	-	-	-	100	15	115	115	-	-	-	-	-	-	-	-	-	1,000
1a.1.11	End product description	-	-	-	-	-	-	100	15	115	115	-	-	-	-	-	-	-	-	-	1,000
1a.1.12	Detailed by-product inventory	-	-	-	-	-	-	150	23	173	173	-	-	-	-	-	-	-	-	-	1,500
1a.1.13	Define major work sequence	-	-	-	-	-	-	100	15	115	115	-	-	-	-	-	-	-	-	-	1,000
1a.1.14	Perform SER and EA	-	-	-	-	-	-	310	47	357	357	-	-	-	-	-	-	-	-	-	3,100
1a.1.15	Perform Site-Specific Cost Study	-	-	-	-	-	-	500	75	575	575	-	-	-	-	-	-	-	-	-	5,000
Activity Specifications																					
1a.1.16.1	Prepare plant and facilities for SAFSTOR	-	-	-	-	-	-	492	74	566	566	-	-	-	-	-	-	-	-	-	4,920
1a.1.16.2	Plant systems	-	-	-	-	-	-	417	63	479	479	-	-	-	-	-	-	-	-	-	4,167
1a.1.16.3	Plant structures and buildings	-	-	-	-	-	-	312	47	359	359	-	-	-	-	-	-	-	-	-	3,120
1a.1.16.4	Waste management	-	-	-	-	-	-	200	30	230	230	-	-	-	-	-	-	-	-	-	2,000
1a.1.16.5	Facility and site dormancy	-	-	-	-	-	-	200	30	230	230	-	-	-	-	-	-	-	-	-	2,000
1a.1.16	Total	-	-	-	-	-	-	1,621	243	1,864	1,864	-	-	-	-	-	-	-	-	-	16,207
Detailed Work Procedures																					
1a.1.17.1	Plant systems	-	-	-	-	-	-	118	18	136	136	-	-	-	-	-	-	-	-	-	1,183
1a.1.17.2	Facility closeout & dormancy	-	-	-	-	-	-	120	18	138	138	-	-	-	-	-	-	-	-	-	1,200
1a.1.17	Total	-	-	-	-	-	-	238	36	274	274	-	-	-	-	-	-	-	-	-	2,383
1a.1.18	Procure vacuum drying system	-	-	-	-	-	-	10	2	12	12	-	-	-	-	-	-	-	-	-	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	-	-	-	-	-	-	3,935	642	4,577	4,577	-	-	-	-	-	-	-	-	-	35,890
Period 1a Collateral Costs																					
1a.3.1	Spent Fuel Capital and Transfer	-	-	-	-	-	-	10,335	1,550	11,886	-	11,886	-	-	-	-	-	-	-	-	-
1a.3.2	Corporate Overheads	-	-	-	-	-	-	3,105	466	3,570	3,570	-	-	-	-	-	-	-	-	-	-
1a.3	Subtotal Period 1a Collateral Costs	-	-	-	-	-	-	13,440	2,016	15,456	3,570	11,886	-	-	-	-	-	-	-	-	-
Period 1a Period-Dependent Costs																					
1a.4.1	Insurance	-	-	-	-	-	-	1,600	160	1,760	1,760	-	-	-	-	-	-	-	-	-	-
1a.4.2	Property taxes	-	-	-	-	-	-	4	0	4	4	-	-	-	-	-	-	-	-	-	-
1a.4.3	Health physics supplies	-	370	-	-	-	-	-	93	463	463	-	-	-	-	-	-	-	-	-	-
1a.4.4	Heavy equipment rental	-	368	-	-	-	-	-	55	423	423	-	-	-	-	-	-	-	-	-	-
1a.4.5	Disposal of DAW generated	-	-	5	3	-	73	-	19	100	100	-	-	-	1,575	-	-	-	14,445	5	-
1a.4.6	Plant energy budget	-	-	-	-	-	-	927	139	1,066	1,066	-	-	-	-	-	-	-	-	-	-
1a.4.7	NRC Fees	-	-	-	-	-	-	706	71	776	776	-	-	-	-	-	-	-	-	-	-
1a.4.8	Emergency Planning Fees	-	-	-	-	-	-	1,185	118	1,303	-	1,303	-	-	-	-	-	-	-	-	-
1a.4.9	Spent Fuel Pool O&M	-	-	-	-	-	-	745	112	857	-	857	-	-	-	-	-	-	-	-	-
1a.4.10	ISFSI Operating Costs	-	-	-	-	-	-	85	13	98	-	98	-	-	-	-	-	-	-	-	-
1a.4.11	Security Staff Cost	-	-	-	-	-	-	6,021	903	6,924	6,924	-	-	-	-	-	-	-	-	-	157,471

Table C-2
Cooper Nuclear Station
2014 Delayed DECON Decommissioning Cost Estimate
(thousands of 2008 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.4.12	Utility Staff Cost	-	-	-	-	-	-	22,690	3,403	26,093	26,093	-	-	-	-	-	-	-	-	-	423,400
1a.4	Subtotal Period 1a Period-Dependent Costs	-	738	5	3	-	73	33,962	5,087	39,867	37,609	2,258	-	-	1,575	-	-	-	14,445	5	580,871
1a.0	TOTAL PERIOD 1a COST	-	738	5	3	-	73	51,338	7,745	59,901	45,757	14,144	-	-	1,575	-	-	-	14,445	5	616,761
PERIOD 1b - SAFSTOR Limited DECON Activities																					
Period 1b Direct Decommissioning Activities																					
Decontamination of Site Buildings																					
1b.1.1.1	Reactor	2,929	-	-	-	-	-	-	1,465	4,394	4,394	-	-	-	-	-	-	-	-	68,438	-
1b.1.1.2	Augmented Radwaste	52	-	-	-	-	-	-	26	78	78	-	-	-	-	-	-	-	-	1,562	-
1b.1.1.3	Miscellaneous Structures - Contaminated	376	-	-	-	-	-	-	188	565	565	-	-	-	-	-	-	-	-	8,542	-
1b.1.1.4	Multi-Purpose Facility	68	-	-	-	-	-	-	34	101	101	-	-	-	-	-	-	-	-	2,036	-
1b.1.1.5	Radwaste	158	-	-	-	-	-	-	79	237	237	-	-	-	-	-	-	-	-	4,761	-
1b.1.1.6	Turbine	520	-	-	-	-	-	-	260	780	780	-	-	-	-	-	-	-	-	15,667	-
1b.1.1	Totals	4,103	-	-	-	-	-	-	2,052	6,155	6,155	-	-	-	-	-	-	-	-	101,006	-
1b.1	Subtotal Period 1b Activity Costs	4,103	-	-	-	-	-	-	2,052	6,155	6,155	-	-	-	-	-	-	-	-	101,006	-
Period 1b Additional Costs																					
1b.2.1	Spent Fuel Pool Isolation	-	-	-	-	-	-	9,407	1,411	10,818	10,818	-	-	-	-	-	-	-	-	-	-
1b.2.2	Asbestos Insulation Disposal	-	773	1	65	-	558	-	265	1,662	1,662	-	-	-	10,333	-	-	-	134,329	10,002	-
1b.2	Subtotal Period 1b Additional Costs	-	773	1	65	-	558	9,407	1,676	12,480	12,480	-	-	-	10,333	-	-	-	134,329	10,002	-
Period 1b Collateral Costs																					
1b.3.1	Decon equipment	713	-	-	-	-	-	-	107	820	820	-	-	-	-	-	-	-	-	-	-
1b.3.2	Process liquid waste	229	-	74	392	-	448	-	293	1,436	1,436	-	-	-	1,561	-	-	-	93,644	304	-
1b.3.3	Small tool allowance	-	70	-	-	-	-	-	11	81	81	-	-	-	-	-	-	-	-	-	-
1b.3.4	Spent Fuel Capital and Transfer	-	-	-	-	-	-	1,510	227	1,737	-	1,737	-	-	-	-	-	-	-	-	-
1b.3.5	Corporate Overheads	-	-	-	-	-	-	766	115	880	880	-	-	-	-	-	-	-	-	-	-
1b.3	Subtotal Period 1b Collateral Costs	942	70	74	392	-	448	2,276	752	4,954	3,217	1,737	-	-	1,561	-	-	-	93,644	304	-
Period 1b Period-Dependent Costs																					
1b.4.1	Decon supplies	1,156	-	-	-	-	-	-	289	1,445	1,445	-	-	-	-	-	-	-	-	-	-
1b.4.2	Insurance	-	-	-	-	-	-	121	12	133	133	-	-	-	-	-	-	-	-	-	-
1b.4.3	Property taxes	-	-	-	-	-	-	1	0	1	1	-	-	-	-	-	-	-	-	-	-
1b.4.4	Health physics supplies	-	473	-	-	-	-	-	118	592	592	-	-	-	-	-	-	-	-	-	-
1b.4.5	Heavy equipment rental	-	91	-	-	-	-	-	14	104	104	-	-	-	-	-	-	-	-	-	-
1b.4.6	Disposal of DAW generated	-	-	5	3	-	81	-	21	110	110	-	-	-	1,741	-	-	-	15,968	5	-
1b.4.7	Plant energy budget	-	-	-	-	-	-	229	34	263	263	-	-	-	-	-	-	-	-	-	-
1b.4.8	NRC Fees	-	-	-	-	-	-	174	17	191	191	-	-	-	-	-	-	-	-	-	-
1b.4.9	Emergency Planning Fees	-	-	-	-	-	-	292	29	321	-	321	-	-	-	-	-	-	-	-	-
1b.4.10	Spent Fuel Pool O&M	-	-	-	-	-	-	184	28	211	-	211	-	-	-	-	-	-	-	-	-
1b.4.11	ISFSI Operating Costs	-	-	-	-	-	-	21	3	24	-	24	-	-	-	-	-	-	-	-	-
1b.4.12	Security Staff Cost	-	-	-	-	-	-	1,485	223	1,707	1,707	-	-	-	-	-	-	-	-	-	38,829
1b.4.13	Utility Staff Cost	-	-	-	-	-	-	5,595	839	6,434	6,434	-	-	-	-	-	-	-	-	-	104,400
1b.4	Subtotal Period 1b Period-Dependent Costs	1,156	564	5	3	-	81	8,101	1,628	11,538	10,981	557	-	-	1,741	-	-	-	15,968	5	143,229
1b.0	TOTAL PERIOD 1b COST	6,201	1,407	80	460	-	1,087	19,783	6,107	35,126	32,833	2,294	-	-	13,635	-	-	-	243,942	111,318	143,229

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Cooper Nuclear 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 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
PERIOD 1c - Preparations for SAFSTOR Dormancy																					
Period 1c Direct Decommissioning Activities																					
1c.1.1	Prepare support equipment for storage	-	387	-	-	-	-	-	58	445	445	-	-	-	-	-	-	-	-	3,000	-
1c.1.2	Install containment pressure equal. lines	-	31	-	-	-	-	-	5	36	36	-	-	-	-	-	-	-	-	700	-
1c.1.3	Interim survey prior to dormancy	-	-	-	-	-	-	733	220	953	953	-	-	-	-	-	-	-	-	15,696	-
1c.1.4	Secure building accesses									a											
1c.1.5	Prepare & submit interim report	-	-	-	-	-	-	58	9	67	67	-	-	-	-	-	-	-	-	-	583
1c.1	Subtotal Period 1c Activity Costs	-	419	-	-	-	-	791	291	1,501	1,501	-	-	-	-	-	-	-	-	19,396	583
Period 1c Collateral Costs																					
1c.3.1	Process liquid waste	235	-	76	403	-	460	-	301	1,475	1,475	-	-	-	1,603	-	-	-	96,195	313	-
1c.3.2	Small tool allowance	-	3	-	-	-	-	-	0	3	3	-	-	-	-	-	-	-	-	-	-
1c.3.3	Spent Fuel Capital and Transfer	-	-	-	-	-	-	1,527	229	1,756	-	1,756	-	-	-	-	-	-	-	-	-
1c.3.4	Corporate Overheads	-	-	-	-	-	-	774	116	890	890	-	-	-	-	-	-	-	-	-	-
1c.3	Subtotal Period 1c Collateral Costs	235	3	76	403	-	460	2,301	646	4,124	2,368	1,756	-	-	1,603	-	-	-	96,195	313	-
Period 1c Period-Dependent Costs																					
1c.4.1	Insurance	-	-	-	-	-	-	122	12	134	134	-	-	-	-	-	-	-	-	-	-
1c.4.2	Property taxes	-	-	-	-	-	-	1	0	1	1	-	-	-	-	-	-	-	-	-	-
1c.4.3	Health physics supplies	-	160	-	-	-	-	-	40	200	200	-	-	-	-	-	-	-	-	-	-
1c.4.4	Heavy equipment rental	-	92	-	-	-	-	-	14	105	105	-	-	-	-	-	-	-	-	-	-
1c.4.5	Disposal of DAW generated	-	-	1	1	-	18	-	5	25	25	-	-	-	393	-	-	-	3,601	1	-
1c.4.6	Plant energy budget	-	-	-	-	-	-	231	35	266	266	-	-	-	-	-	-	-	-	-	-
1c.4.7	NRC Fees	-	-	-	-	-	-	176	18	194	194	-	-	-	-	-	-	-	-	-	-
1c.4.8	Emergency Planning Fees	-	-	-	-	-	-	295	30	325	-	325	-	-	-	-	-	-	-	-	-
1c.4.9	Spent Fuel Pool O&M	-	-	-	-	-	-	186	28	214	-	214	-	-	-	-	-	-	-	-	-
1c.4.10	ISFSI Operating Costs	-	-	-	-	-	-	21	3	24	-	24	-	-	-	-	-	-	-	-	-
1c.4.11	Security Staff Cost	-	-	-	-	-	-	1,501	225	1,726	1,726	-	-	-	-	-	-	-	-	-	39,260
1c.4.12	Utility Staff Cost	-	-	-	-	-	-	5,657	849	6,505	6,505	-	-	-	-	-	-	-	-	-	105,560
1c.4	Subtotal Period 1c Period-Dependent Costs	-	252	1	1	-	18	8,191	1,257	9,720	9,157	563	-	-	393	-	-	-	3,601	1	144,820
1c.0	TOTAL PERIOD 1c COST	235	673	77	404	-	478	11,283	2,195	15,345	13,026	2,319	-	-	1,996	-	-	-	99,796	19,710	145,403
PERIOD 1 TOTALS		6,437	2,818	162	866	-	1,638	82,404	16,047	110,372	91,616	18,757	-	-	17,205	-	-	-	358,183	131,033	905,393
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	-	-	-	-	-	-	63	9	72	72	-	-	-	-	-	-	-	-	-	-
2a.1.5	Maintenance supplies	-	-	-	-	-	-	503	126	629	629	-	-	-	-	-	-	-	-	-	-
2a.1	Subtotal Period 2a Activity Costs	-	-	-	-	-	-	566	135	701	701	-	-	-	-	-	-	-	-	-	-
Period 2a Collateral Costs																					
2a.3.1	Spent Fuel Capital and Transfer	-	-	-	-	-	-	26,466	3,970	30,435	-	30,435	-	-	-	-	-	-	-	-	-
2a.3.2	Corporate Overheads	-	-	-	-	-	-	4,139	621	4,759	4,759	-	-	-	-	-	-	-	-	-	-
2a.3	Subtotal Period 2a Collateral Costs	-	-	-	-	-	-	30,604	4,591	35,195	4,759	30,435	-	-	-	-	-	-	-	-	-
Period 2a Period-Dependent Costs																					
2a.4.1	Insurance	-	-	-	-	-	-	1,962	196	2,158	-	2,158	-	-	-	-	-	-	-	-	-
2a.4.2	Property taxes	-	-	-	-	-	-	16	2	18	-	18	-	-	-	-	-	-	-	-	-
2a.4.3	Health physics supplies	-	344	-	-	-	-	-	86	430	430	-	-	-	-	-	-	-	-	-	-

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Cooper Nuclear 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 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
Period 2a Period-Dependent Costs (continued)																					
2a.4.4	Disposal of DAW generated	-	-	13	7	-	198	-	52	270	270	-	-	-	4,267	-	-	-	39,139	13	-
2a.4.5	Plant energy budget	-	-	-	-	-	-	742	111	853	-	853	-	-	-	-	-	-	-	-	-
2a.4.6	NRC Fees	-	-	-	-	-	-	807	81	887	887	-	-	-	-	-	-	-	-	-	-
2a.4.7	Emergency Planning Fees	-	-	-	-	-	-	3,374	337	3,712	-	3,712	-	-	-	-	-	-	-	-	-
2a.4.8	Spent Fuel Pool O&M	-	-	-	-	-	-	2,984	448	3,431	-	3,431	-	-	-	-	-	-	-	-	-
2a.4.9	ISFSI Operating Costs	-	-	-	-	-	-	340	51	391	-	391	-	-	-	-	-	-	-	-	-
2a.4.10	Security Staff Cost	-	-	-	-	-	-	17,728	2,659	20,387	-	20,387	-	-	-	-	-	-	-	-	444,561
2a.4.11	Utility Staff Cost	-	-	-	-	-	-	18,816	2,822	21,639	-	21,639	-	-	-	-	-	-	-	-	329,769
2a.4	Subtotal Period 2a Period-Dependent Costs	-	344	13	7	-	198	46,768	6,845	54,176	1,587	52,588	-	-	4,267	-	-	-	39,139	13	774,330
2a.0	TOTAL PERIOD 2a COST	-	344	13	7	-	198	77,939	11,571	90,072	7,048	83,024	-	-	4,267	-	-	-	39,139	13	774,330
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	-	-	-	-	-	-	432	65	497	497	-	-	-	-	-	-	-	-	-	-
2b.1.5	Maintenance supplies	-	-	-	-	-	-	3,453	863	4,317	4,317	-	-	-	-	-	-	-	-	-	-
2b.1	Subtotal Period 2b Activity Costs	-	-	-	-	-	-	3,886	928	4,814	4,814	-	-	-	-	-	-	-	-	-	-
Period 2b Collateral Costs																					
2b.3.1	Spent Fuel Capital and Transfer	-	-	-	-	-	-	18,092	2,714	20,806	-	20,806	-	-	-	-	-	-	-	-	-
2b.3	Subtotal Period 2b Collateral Costs	-	-	-	-	-	-	18,092	2,714	20,806	-	20,806	-	-	-	-	-	-	-	-	-
Period 2b Period-Dependent Costs																					
2b.4.1	Insurance	-	-	-	-	-	-	11,977	1,198	13,174	-	13,174	-	-	-	-	-	-	-	-	-
2b.4.2	Property taxes	-	-	-	-	-	-	110	11	121	-	121	-	-	-	-	-	-	-	-	-
2b.4.3	Health physics supplies	-	1,981	-	-	-	-	-	495	2,476	2,476	-	-	-	-	-	-	-	-	-	-
2b.4.4	Disposal of DAW generated	-	-	80	44	-	1,268	-	332	1,725	1,725	-	-	-	27,278	-	-	-	250,212	84	-
2b.4.5	Plant energy budget	-	-	-	-	-	-	2,546	382	2,928	-	2,928	-	-	-	-	-	-	-	-	-
2b.4.6	NRC Fees	-	-	-	-	-	-	5,536	554	6,090	6,090	-	-	-	-	-	-	-	-	-	-
2b.4.7	Emergency Planning Fees	-	-	-	-	-	-	23,161	2,316	25,477	-	25,477	-	-	-	-	-	-	-	-	-
2b.4.8	ISFSI Operating Costs	-	-	-	-	-	-	2,332	350	2,682	-	2,682	-	-	-	-	-	-	-	-	-
2b.4.9	Security Staff Cost	-	-	-	-	-	-	70,072	10,511	80,583	-	80,583	-	-	-	-	-	-	-	-	1,547,177
2b.4.10	Utility Staff Cost	-	-	-	-	-	-	51,313	7,697	59,010	-	59,010	-	-	-	-	-	-	-	-	916,846
2b.4	Subtotal Period 2b Period-Dependent Costs	-	1,981	80	44	-	1,268	167,047	23,845	194,266	10,290	183,976	-	-	27,278	-	-	-	250,212	84	2,464,023
2b.0	TOTAL PERIOD 2b COST	-	1,981	80	44	-	1,268	189,025	27,487	219,886	15,104	204,781	-	-	27,278	-	-	-	250,212	84	2,464,023
PERIOD 2 TOTALS		-	2,325	93	51	-	1,467	266,964	39,058	309,957	22,152	287,805	-	-	31,545	-	-	-	289,351	97	3,238,353
PERIOD 3a - Reactivate Site Following SAFSTOR Dormancy																					
Period 3a Direct Decommissioning Activities																					
3a.1.1	Prepare preliminary decommissioning cost	-	-	-	-	-	-	130	20	150	150	-	-	-	-	-	-	-	-	-	1,300
3a.1.2	Review plant dwgs & specs.	-	-	-	-	-	-	460	69	529	529	-	-	-	-	-	-	-	-	-	4,600
3a.1.3	Perform detailed rad survey									a											
3a.1.4	End product description	-	-	-	-	-	-	100	15	115	115	-	-	-	-	-	-	-	-	-	1,000
3a.1.5	Detailed by-product inventory	-	-	-	-	-	-	130	20	150	150	-	-	-	-	-	-	-	-	-	1,300
3a.1.6	Define major work sequence	-	-	-	-	-	-	750	113	863	863	-	-	-	-	-	-	-	-	-	7,500
3a.1.7	Perform SER and EA	-	-	-	-	-	-	310	47	357	357	-	-	-	-	-	-	-	-	-	3,100
3a.1.8	Perform Site-Specific Cost Study	-	-	-	-	-	-	500	75	575	575	-	-	-	-	-	-	-	-	-	5,000
3a.1.9	Prepare/submit License Termination Plan	-	-	-	-	-	-	410	61	471	471	-	-	-	-	-	-	-	-	-	4,096
3a.1.10	Receive NRC approval of termination plan									a											

Table C-2
Cooper Nuclear Station
2014 Delayed DECON Decommissioning Cost Estimate
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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: 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																					
3a.1.11.1	Re-activate plant & temporary facilities	-	-	-	-	-	-	737	111	848	763	-	85	-	-	-	-	-	-	-	7,370
3a.1.11.2	Plant systems	-	-	-	-	-	-	417	63	479	431	-	48	-	-	-	-	-	-	-	4,167
3a.1.11.3	Reactor internals	-	-	-	-	-	-	710	107	817	817	-	-	-	-	-	-	-	-	-	7,100
3a.1.11.4	Reactor vessel	-	-	-	-	-	-	650	98	748	748	-	-	-	-	-	-	-	-	-	6,500
3a.1.11.5	Sacrificial shield	-	-	-	-	-	-	50	8	58	58	-	-	-	-	-	-	-	-	-	500
3a.1.11.6	Moisture separators/reheaters	-	-	-	-	-	-	100	15	115	115	-	-	-	-	-	-	-	-	-	1,000
3a.1.11.7	Reinforced concrete	-	-	-	-	-	-	160	24	184	92	-	92	-	-	-	-	-	-	-	1,600
3a.1.11.8	Main Turbine	-	-	-	-	-	-	209	31	240	240	-	-	-	-	-	-	-	-	-	2,088
3a.1.11.9	Main Condensers	-	-	-	-	-	-	209	31	240	240	-	-	-	-	-	-	-	-	-	2,088
3a.1.11.10	Pressure suppression structure	-	-	-	-	-	-	200	30	230	230	-	-	-	-	-	-	-	-	-	2,000
3a.1.11.11	Drywell	-	-	-	-	-	-	160	24	184	184	-	-	-	-	-	-	-	-	-	1,600
3a.1.11.12	Plant structures & buildings	-	-	-	-	-	-	312	47	359	179	-	179	-	-	-	-	-	-	-	3,120
3a.1.11.13	Waste management	-	-	-	-	-	-	460	69	529	529	-	-	-	-	-	-	-	-	-	4,600
3a.1.11.14	Facility & site closeout	-	-	-	-	-	-	90	14	104	52	-	52	-	-	-	-	-	-	-	900
3a.1.11	Total	-	-	-	-	-	-	4,463	669	5,133	4,677	-	456	-	-	-	-	-	-	-	44,633
Planning & Site Preparations																					
3a.1.12	Prepare dismantling sequence	-	-	-	-	-	-	240	36	276	276	-	-	-	-	-	-	-	-	-	2,400
3a.1.13	Plant prep. & temp. svces	-	-	-	-	-	-	2,700	405	3,105	3,105	-	-	-	-	-	-	-	-	-	-
3a.1.14	Design water clean-up system	-	-	-	-	-	-	140	21	161	161	-	-	-	-	-	-	-	-	-	1,400
3a.1.15	Rigging/Cont. Cntrl Envlps/tooling/etc.	-	-	-	-	-	-	2,100	315	2,415	2,415	-	-	-	-	-	-	-	-	-	-
3a.1.16	Procure casks/liners & containers	-	-	-	-	-	-	123	18	141	141	-	-	-	-	-	-	-	-	-	1,230
3a.1	Subtotal Period 3a Activity Costs	-	-	-	-	-	-	12,556	1,883	14,439	13,983	-	456	-	-	-	-	-	-	-	77,559
Period 3a Period-Dependent Costs																					
3a.4.1	Insurance	-	-	-	-	-	-	420	42	462	462	-	-	-	-	-	-	-	-	-	-
3a.4.2	Property taxes	-	-	-	-	-	-	4	0	4	4	-	-	-	-	-	-	-	-	-	-
3a.4.3	Health physics supplies	-	324	-	-	-	-	-	81	405	405	-	-	-	-	-	-	-	-	-	-
3a.4.4	Heavy equipment rental	-	368	-	-	-	-	-	55	423	423	-	-	-	-	-	-	-	-	-	-
3a.4.5	Disposal of DAW generated	-	-	4	2	-	62	-	16	84	84	-	-	-	1,329	-	-	-	12,190	4	-
3a.4.6	Plant energy budget	-	-	-	-	-	-	927	139	1,066	1,066	-	-	-	-	-	-	-	-	-	-
3a.4.7	NRC Fees	-	-	-	-	-	-	249	25	274	274	-	-	-	-	-	-	-	-	-	-
3a.4.8	Security Staff Cost	-	-	-	-	-	-	2,855	428	3,283	3,283	-	-	-	-	-	-	-	-	-	65,179
3a.4.9	Utility Staff Cost	-	-	-	-	-	-	14,190	2,128	16,318	16,318	-	-	-	-	-	-	-	-	-	258,629
3a.4	Subtotal Period 3a Period-Dependent Costs	-	691	4	2	-	62	18,644	2,915	22,318	22,318	-	-	-	1,329	-	-	-	12,190	4	323,807
3a.0	TOTAL PERIOD 3a COST	-	691	4	2	-	62	31,200	4,799	36,758	36,302	-	456	-	1,329	-	-	-	12,190	4	401,366
PERIOD 3b - Decommissioning Preparations																					
Period 3b Direct Decommissioning Activities																					
Detailed Work Procedures																					
3b.1.1.1	Plant systems	-	-	-	-	-	-	473	71	544	490	-	54	-	-	-	-	-	-	-	4,733
3b.1.1.2	Reactor internals	-	-	-	-	-	-	400	60	460	460	-	-	-	-	-	-	-	-	-	4,000
3b.1.1.3	Remaining buildings	-	-	-	-	-	-	135	20	155	39	-	116	-	-	-	-	-	-	-	1,350
3b.1.1.4	CRD housings & Nls	-	-	-	-	-	-	100	15	115	115	-	-	-	-	-	-	-	-	-	1,000
3b.1.1.5	Incore instrumentation	-	-	-	-	-	-	100	15	115	115	-	-	-	-	-	-	-	-	-	1,000
3b.1.1.6	Removal primary containment	-	-	-	-	-	-	200	30	230	230	-	-	-	-	-	-	-	-	-	2,000
3b.1.1.7	Reactor vessel	-	-	-	-	-	-	363	54	417	417	-	-	-	-	-	-	-	-	-	3,630
3b.1.1.8	Facility closeout	-	-	-	-	-	-	120	18	138	69	-	69	-	-	-	-	-	-	-	1,200
3b.1.1.9	Sacrificial shield	-	-	-	-	-	-	120	18	138	138	-	-	-	-	-	-	-	-	-	1,200
3b.1.1.10	Reinforced concrete	-	-	-	-	-	-	100	15	115	58	-	58	-	-	-	-	-	-	-	1,000
3b.1.1.11	Main Turbine	-	-	-	-	-	-	208	31	239	239	-	-	-	-	-	-	-	-	-	2,080
3b.1.1.12	Main Condensers	-	-	-	-	-	-	209	31	240	240	-	-	-	-	-	-	-	-	-	2,088

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Cooper Nuclear 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 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
Detailed Work Procedures (continued)																					
3b.1.1.13	Moisture separators & reheaters	-	-	-	-	-	-	200	30	230	230	-	-	-	-	-	-	-	-	-	2,000
3b.1.1.14	Radwaste building	-	-	-	-	-	-	273	41	314	283	-	31	-	-	-	-	-	-	-	2,730
3b.1.1.15	Reactor building	-	-	-	-	-	-	273	41	314	283	-	31	-	-	-	-	-	-	-	2,730
3b.1.1	Total	-	-	-	-	-	-	3,274	491	3,765	3,405	-	360	-	-	-	-	-	-	-	32,741
3b.1	Subtotal Period 3b Activity Costs	-	-	-	-	-	-	3,274	491	3,765	3,405	-	360	-	-	-	-	-	-	-	32,741
Period 3b Additional Costs																					
3b.2.1	Site Characterization	-	-	-	-	-	-	5,395	1,619	7,014	7,014	-	-	-	-	-	-	-	-	-	-
3b.2	Subtotal Period 3b Additional Costs	-	-	-	-	-	-	5,395	1,619	7,014	7,014	-	-	-	-	-	-	-	-	-	-
Period 3b Collateral Costs																					
3b.3.1	Decon equipment	713	-	-	-	-	-	-	107	820	820	-	-	-	-	-	-	-	-	-	-
3b.3.2	DOC staff relocation expenses	-	-	-	-	-	-	912	137	1,049	1,049	-	-	-	-	-	-	-	-	-	-
3b.3.3	Pipe cutting equipment	-	1,000	-	-	-	-	-	150	1,150	1,150	-	-	-	-	-	-	-	-	-	-
3b.3	Subtotal Period 3b Collateral Costs	713	1,000	-	-	-	-	912	394	3,019	3,019	-	-	-	-	-	-	-	-	-	-
Period 3b Period-Dependent Costs																					
3b.4.1	Decon supplies	22	-	-	-	-	-	-	5	27	27	-	-	-	-	-	-	-	-	-	-
3b.4.2	Insurance	-	-	-	-	-	-	246	25	270	270	-	-	-	-	-	-	-	-	-	-
3b.4.3	Property taxes	-	-	-	-	-	-	2	0	2	2	-	-	-	-	-	-	-	-	-	-
3b.4.4	Health physics supplies	-	179	-	-	-	-	-	45	224	224	-	-	-	-	-	-	-	-	-	-
3b.4.5	Heavy equipment rental	-	184	-	-	-	-	-	28	212	212	-	-	-	-	-	-	-	-	-	-
3b.4.6	Disposal of DAW generated	-	-	2	1	-	35	-	9	48	48	-	-	-	754	-	-	-	6,913	2	-
3b.4.7	Plant energy budget	-	-	-	-	-	-	465	70	534	534	-	-	-	-	-	-	-	-	-	-
3b.4.8	NRC Fees	-	-	-	-	-	-	125	12	137	137	-	-	-	-	-	-	-	-	-	-
3b.4.9	Security Staff Cost	-	-	-	-	-	-	1,431	215	1,646	1,646	-	-	-	-	-	-	-	-	-	32,679
3b.4.10	DOC Staff Cost	-	-	-	-	-	-	4,378	657	5,035	5,035	-	-	-	-	-	-	-	-	-	58,560
3b.4.11	Utility Staff Cost	-	-	-	-	-	-	7,114	1,067	8,181	8,181	-	-	-	-	-	-	-	-	-	129,669
3b.4	Subtotal Period 3b Period-Dependent Costs	22	363	2	1	-	35	13,761	2,133	16,317	16,317	-	-	-	754	-	-	-	6,913	2	220,907
3b.0	TOTAL PERIOD 3b COST	735	1,363	2	1	-	35	23,342	4,636	30,115	29,755	-	360	-	754	-	-	-	6,913	2	253,648
PERIOD 3 TOTALS		735	2,055	6	3	-	97	54,542	9,435	66,872	66,056	-	816	-	2,083	-	-	-	19,104	6	655,014
PERIOD 4a - Large Component Removal																					
Period 4a Direct Decommissioning Activities																					
Nuclear Steam Supply System Removal																					
4a.1.1.1	Recirculation System Piping & Valves	16	70	14	14	25	272	-	101	512	512	-	-	100	897	-	-	-	119,606	2,487	-
4a.1.1.2	Recirculation Pumps & Motors	6	28	11	26	-	321	-	95	488	488	-	-	-	1,188	-	-	-	132,880	1,125	-
4a.1.1.3	CRDMs & NIs Removal	24	139	377	68	-	317	-	174	1,099	1,099	-	-	-	6,935	-	-	-	126,494	3,972	-
4a.1.1.4	Reactor Vessel Internals	86	1,959	3,871	912	-	4,981	155	5,222	17,185	17,185	-	-	-	1,878	1,377	344	-	359,044	18,900	888
4a.1.1.5	Vessel & Internals GTCC Disposal	-	-	-	-	-	7,470	-	1,120	8,590	8,590	-	-	-	-	-	-	508	89,497	-	-
4a.1.1.6	Reactor Vessel	-	5,054	906	351	-	3,006	155	5,631	15,103	15,103	-	-	-	14,106	-	-	-	1,447,089	18,900	888
4a.1.1	Totals	132	7,250	5,179	1,371	25	16,367	309	12,343	42,977	42,977	-	-	100	25,004	1,377	344	508	2,274,810	45,384	1,776
Removal of Major Equipment																					
4a.1.2	Main Turbine/Generator	-	167	845	372	6,376	-	-	1,138	8,898	8,898	-	-	61,604	-	-	-	-	2,772,179	4,438	-
4a.1.3	Main Condensers	-	706	588	259	4,439	-	-	940	6,932	6,932	-	-	42,889	-	-	-	-	1,930,000	19,519	-
Cascading Costs from Clean Building Demolition																					
4a.1.4.1	Reactor	-	260	-	-	-	-	-	39	299	299	-	-	-	-	-	-	-	-	2,488	-
4a.1.4.2	Augmented Radwaste	-	25	-	-	-	-	-	4	28	28	-	-	-	-	-	-	-	-	235	-
4a.1.4.3	Radwaste	-	43	-	-	-	-	-	7	50	50	-	-	-	-	-	-	-	-	359	-

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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 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
Cascading Costs from Clean Building Demolition (continued)																					
4a.1.4.4	Turbine	-	285	-	-	-	-	-	43	328	328	-	-	-	-	-	-	-	-	4,419	-
4a.1.4	Totals	-	613	-	-	-	-	-	92	705	705	-	-	-	-	-	-	-	-	7,498	-
Disposal of Plant Systems																					
4a.1.5.1	Augmented Radwaste El 877 Area1A	-	203	28	28	-	432	-	166	857	857	-	-	-	2,055	-	-	-	172,205	5,668	-
4a.1.5.2	Augmented Radwaste El 903 Area1A	-	66	6	7	-	104	-	44	228	228	-	-	-	469	-	-	-	41,606	1,842	-
4a.1.5.3	Augmented Radwaste El 918 Area1A	-	52	10	9	-	139	-	50	260	260	-	-	-	765	-	-	-	55,345	1,432	-
4a.1.5.4	Augmented Radwaste El 929 Area1A	-	21	4	5	-	73	-	25	127	127	-	-	-	324	-	-	-	29,038	579	-
4a.1.5.5	Augmented Radwaste El 929 Area1B	-	3	0	0	4	-	-	1	8	8	-	-	38	-	-	-	-	1,529	75	-
4a.1.5.6	DRYWELL Area1A	-	457	85	84	-	1,289	-	458	2,373	2,373	-	-	-	5,726	-	-	-	513,627	12,634	-
4a.1.5.7	DRYWELL Area1B	-	112	1	5	75	2	-	41	235	235	-	-	806	10	-	-	-	33,576	3,384	-
4a.1.5.8	Turbine El 932 Area1B	-	324	16	86	1,477	-	-	317	2,220	2,220	-	-	15,808	-	-	-	-	641,963	9,170	-
4a.1.5.9	Turbine El 932 Area2C	-	8	-	-	-	-	-	1	9	-	-	9	-	-	-	-	-	-	237	-
4a.1.5.10	Turbine El 932 Area3C	-	67	-	-	-	-	-	10	78	-	-	78	-	-	-	-	-	-	2,083	-
4a.1.5.11	Yard Area1B	-	518	50	264	4,517	-	-	852	6,201	6,201	-	-	48,385	-	-	-	-	1,964,114	14,340	-
4a.1.5	Totals	-	1,831	202	487	6,073	2,040	-	1,964	12,597	12,510	-	87	65,016	9,348	-	-	-	3,453,003	51,444	-
4a.1.6	Scaffolding in support of decommissioning	-	2,049	24	11	168	23	-	547	2,821	2,821	-	-	1,621	101	-	-	-	81,992	27,411	-
4a.1	Subtotal Period 4a Activity Costs	132	12,616	6,838	2,500	17,081	18,430	309	17,025	74,931	74,844	-	87	171,229	34,453	1,377	344	508	10,511,780	155,694	1,776
Period 4a Collateral Costs																					
4a.3.1	Process liquid waste	61	-	21	113	-	129	-	82	408	408	-	-	-	451	-	-	-	27,075	88	-
4a.3.2	Small tool allowance	-	90	-	-	-	-	-	14	104	94	-	10	-	-	-	-	-	-	-	-
4a.3	Subtotal Period 4a Collateral Costs	61	90	21	113	-	129	-	96	512	502	-	10	-	451	-	-	-	27,075	88	-
Period 4a Period-Dependent Costs																					
4a.4.1	Decon supplies	49	-	-	-	-	-	-	12	61	61	-	-	-	-	-	-	-	-	-	-
4a.4.2	Insurance	-	-	-	-	-	-	549	55	604	604	-	-	-	-	-	-	-	-	-	-
4a.4.3	Property taxes	-	-	-	-	-	-	4	0	5	4	-	0	-	-	-	-	-	-	-	-
4a.4.4	Health physics supplies	-	944	-	-	-	-	-	236	1,180	1,180	-	-	-	-	-	-	-	-	-	-
4a.4.5	Heavy equipment rental	-	1,981	-	-	-	-	-	297	2,278	2,278	-	-	-	-	-	-	-	-	-	-
4a.4.6	Disposal of DAW generated	-	-	26	14	-	405	-	106	551	551	-	-	-	8,708	-	-	-	79,878	27	-
4a.4.7	Plant energy budget	-	-	-	-	-	-	987	148	1,135	1,135	-	-	-	-	-	-	-	-	-	-
4a.4.8	NRC Fees	-	-	-	-	-	-	737	74	811	811	-	-	-	-	-	-	-	-	-	-
4a.4.9	Liquid Radwaste Processing Equipment/Services	-	-	-	-	-	-	420	63	483	483	-	-	-	-	-	-	-	-	-	-
4a.4.10	Security Staff Cost	-	-	-	-	-	-	3,199	480	3,679	3,679	-	-	-	-	-	-	-	-	-	73,036
4a.4.11	DOC Staff Cost	-	-	-	-	-	-	11,638	1,746	13,384	13,384	-	-	-	-	-	-	-	-	-	161,263
4a.4.12	Utility Staff Cost	-	-	-	-	-	-	16,014	2,402	18,416	18,416	-	-	-	-	-	-	-	-	-	292,143
4a.4	Subtotal Period 4a Period-Dependent Costs	49	2,925	26	14	-	405	33,548	5,619	42,586	42,585	-	0	-	8,708	-	-	-	79,878	27	526,441
4a.0	TOTAL PERIOD 4a COST	242	15,631	6,885	2,628	17,081	18,964	33,858	22,740	118,029	117,931	-	98	171,229	43,613	1,377	344	508	10,618,740	155,809	528,217
PERIOD 4b - Site Decontamination																					
Period 4b Direct Decommissioning Activities																					
4b.1.1	Remove spent fuel racks	262	33	79	88	-	1,348	-	498	2,308	2,308	-	-	-	5,986	-	-	-	537,141	1,004	-
Disposal of Plant Systems																					
4b.1.2.1	Control El 882 Area1B	-	280	7	39	674	-	-	178	1,178	1,178	-	-	7,213	-	-	-	-	292,908	7,797	-
4b.1.2.2	Control El 903 Area1C	-	170	-	-	-	-	-	25	195	-	-	195	-	-	-	-	-	-	5,155	-
4b.1.2.3	Control El 918 Area1C	-	66	-	-	-	-	-	10	76	-	-	76	-	-	-	-	-	-	2,100	-
4b.1.2.4	Control El 932 Area1C	-	22	-	-	-	-	-	3	26	-	-	26	-	-	-	-	-	-	702	-
4b.1.2.5	Intake	-	101	-	-	-	-	-	15	116	-	-	116	-	-	-	-	-	-	3,136	-
4b.1.2.6	Multi-Purpose Facility	-	198	3	14	239	-	-	88	541	541	-	-	2,558	-	-	-	-	103,862	5,430	-
4b.1.2.7	Radwaste El 877 Area1A	-	398	75	62	-	949	-	353	1,836	1,836	-	-	-	5,097	-	-	-	377,917	10,930	-

Table C-2
Cooper Nuclear Station
2014 Delayed DECON Decommissioning Cost Estimate
(thousands of 2008 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
Disposal of Plant Systems (continued)																					
4b.1.2.8	Radwaste El 877 Area2A	-	43	9	7	-	113	-	41	213	213	-	-	-	613	-	-	-	44,992	1,189	-
4b.1.2.9	Radwaste El 877 Area3A	-	71	16	13	-	201	-	72	372	372	-	-	-	1,156	-	-	-	79,963	1,969	-
4b.1.2.10	Radwaste El 903 Area1A	-	110	9	10	-	153	-	68	351	351	-	-	-	684	-	-	-	61,153	3,015	-
4b.1.2.11	Radwaste El 903 Area2A	-	188	36	29	-	439	-	165	856	856	-	-	-	1,955	-	-	-	175,093	5,282	-
4b.1.2.12	Radwaste El 903 Area3A	-	37	6	7	-	104	-	37	190	190	-	-	-	463	-	-	-	41,366	1,029	-
4b.1.2.13	Radwaste El 918 Area1A	-	18	2	2	-	30	-	12	64	64	-	-	-	135	-	-	-	12,033	477	-
4b.1.2.14	Radwaste El 918 Area2A	-	16	3	3	-	39	-	15	75	75	-	-	-	201	-	-	-	15,667	448	-
4b.1.2.15	Radwaste El 918 Area3A	-	185	23	22	-	338	-	136	705	705	-	-	-	1,690	-	-	-	134,827	5,045	-
4b.1.2.16	Radwaste El 934 Area1A	-	26	3	4	-	60	-	22	115	115	-	-	-	266	-	-	-	23,735	680	-
4b.1.2.17	Radwaste El 934 Area2A	-	98	11	12	-	177	-	72	370	370	-	-	-	808	-	-	-	70,665	2,663	-
4b.1.2.18	Radwaste El 949 Area1A	-	12	1	2	-	24	-	9	47	47	-	-	-	105	-	-	-	9,381	305	-
4b.1.2.19	Reactor El 1001 Area1A	-	50	7	8	-	121	-	45	230	230	-	-	-	537	-	-	-	48,175	1,261	-
4b.1.2.20	Reactor El 1001 Area1B	-	62	1	4	64	-	-	26	157	157	-	-	689	-	-	-	-	27,979	1,681	-
4b.1.2.21	Reactor El 859 Area1A	-	71	15	16	-	246	-	83	430	430	-	-	-	1,091	-	-	-	97,874	2,024	-
4b.1.2.22	Reactor El 859 Area1B	-	440	11	58	994	-	-	269	1,771	1,771	-	-	10,641	-	-	-	-	432,136	12,411	-
4b.1.2.23	Reactor El 859 Area2A	-	72	25	26	-	401	-	125	648	648	-	-	-	1,780	-	-	-	159,714	2,094	-
4b.1.2.24	Reactor El 859 Area2B	-	69	1	8	131	-	-	38	247	247	-	-	1,406	-	-	-	-	57,093	1,954	-
4b.1.2.25	Reactor El 859 Area3A	-	47	9	9	-	137	-	48	251	251	-	-	-	608	-	-	-	54,543	1,321	-
4b.1.2.26	Reactor El 859 Area3B	-	33	0	2	42	-	-	15	93	93	-	-	453	-	-	-	-	18,381	951	-
4b.1.2.27	Reactor El 859 Area4A	-	50	9	8	-	117	-	44	227	227	-	-	-	520	-	-	-	46,666	1,374	-
4b.1.2.28	Reactor El 859 Area4B	-	17	0	2	31	-	-	9	59	59	-	-	331	-	-	-	-	13,424	476	-
4b.1.2.29	Reactor El 859 Area5A	-	63	16	17	-	262	-	85	443	443	-	-	-	1,163	-	-	-	104,381	1,798	-
4b.1.2.30	Reactor El 859 Area5B	-	37	0	2	41	-	-	16	98	98	-	-	442	-	-	-	-	17,962	1,087	-
4b.1.2.31	Reactor El 903 Area1A	-	401	56	42	-	651	-	275	1,424	1,424	-	-	-	2,892	-	-	-	259,190	10,497	-
4b.1.2.32	Reactor El 903 Area1B	-	451	6	32	550	-	-	201	1,240	1,240	-	-	5,890	-	-	-	-	239,197	12,496	-
4b.1.2.33	Reactor El 903 Area2A	-	4	0	0	-	6	-	3	14	14	-	-	-	26	-	-	-	2,372	120	-
4b.1.2.34	Reactor El 903 Area2B	-	69	2	11	190	-	-	48	320	320	-	-	2,039	-	-	-	-	82,815	1,915	-
4b.1.2.35	Reactor El 903 Area3A	-	32	10	11	-	167	-	52	272	272	-	-	-	741	-	-	-	68,516	929	-
4b.1.2.36	Reactor El 903 Area3B	-	21	1	3	52	-	-	14	90	90	-	-	553	-	-	-	-	22,464	618	-
4b.1.2.37	Reactor El 903 Area4A	-	27	8	9	-	136	-	43	223	223	-	-	-	606	-	-	-	54,373	776	-
4b.1.2.38	Reactor El 903 Area4B	-	21	1	3	52	-	-	14	90	90	-	-	559	-	-	-	-	22,692	597	-
4b.1.2.39	Reactor El 931 Area1A	-	25	3	3	-	52	-	20	104	104	-	-	-	232	-	-	-	20,858	670	-
4b.1.2.40	Reactor El 931 Area1B	-	300	8	40	692	-	-	186	1,227	1,227	-	-	7,412	-	-	-	-	301,017	8,410	-
4b.1.2.41	Reactor El 931 Area2A	-	20	2	2	-	35	-	14	74	74	-	-	-	154	-	-	-	13,824	544	-
4b.1.2.42	Reactor El 931 Area2B	-	2	0	0	1	0	-	1	3	3	-	-	9	0	-	-	-	371	53	-
4b.1.2.43	Reactor El 931 Area3A	-	77	23	22	-	336	-	109	567	567	-	-	-	1,651	-	-	-	134,007	2,165	-
4b.1.2.44	Reactor El 931 Area3B	-	2	0	0	1	-	-	1	3	3	-	-	8	-	-	-	-	340	49	-
4b.1.2.45	Reactor El 931 Area4C	-	24	-	-	-	-	-	4	28	-	-	28	-	-	-	-	-	-	767	-
4b.1.2.46	Reactor El 931 Area5C	-	7	-	-	-	-	-	1	8	-	-	8	-	-	-	-	-	-	213	-
4b.1.2.47	Reactor El 958 Area1A	-	56	9	10	-	149	-	54	278	278	-	-	-	662	-	-	-	59,432	1,472	-
4b.1.2.48	Reactor El 958 Area1B	-	167	3	16	281	-	-	87	554	554	-	-	3,009	-	-	-	-	122,212	4,693	-
4b.1.2.49	Reactor El 958 Area2A	-	31	10	10	-	153	-	49	253	253	-	-	-	681	-	-	-	61,083	880	-
4b.1.2.50	Reactor El 958 Area2B	-	10	1	1	12	7	-	6	37	37	-	-	125	33	-	-	-	8,024	263	-
4b.1.2.51	Reactor El 958 Area3A	-	33	4	3	-	48	-	21	109	109	-	-	-	214	-	-	-	19,185	898	-
4b.1.2.52	Reactor El 958 Area3B	-	14	1	1	10	6	-	7	39	39	-	-	109	29	-	-	-	7,011	410	-
4b.1.2.53	Reactor El 976 Area1A	-	11	1	1	-	16	-	7	36	36	-	-	-	72	-	-	-	6,482	298	-
4b.1.2.54	Reactor El 976 Area1B	-	147	5	25	422	-	-	104	703	703	-	-	4,521	-	-	-	-	183,615	3,931	-
4b.1.2.55	Reactor El 976 Area2A	-	7	1	1	-	13	-	5	26	26	-	-	-	57	-	-	-	5,136	172	-
4b.1.2.56	Reactor El 976 Area2B	-	37	1	3	55	-	-	18	114	114	-	-	588	-	-	-	-	23,813	1,033	-
4b.1.2.57	Turbine El 882 Area1A	-	37	3	3	-	50	-	23	116	116	-	-	-	222	-	-	-	19,878	1,004	-
4b.1.2.58	Turbine El 882 Area1B	-	388	16	87	1,490	-	-	335	2,313	2,313	-	-	15,948	-	-	-	-	647,859	11,113	-
4b.1.2.59	Turbine El 882 Area2A	-	21	2	2	-	29	-	13	67	67	-	-	-	129	-	-	-	11,556	584	-
4b.1.2.60	Turbine El 882 Area2B	-	209	4	22	374	-	-	112	721	721	-	-	4,006	-	-	-	-	162,678	5,781	-
4b.1.2.61	Turbine El 882 Area3A	-	16	2	1	-	23	-	10	52	52	-	-	-	101	-	-	-	9,017	451	-
4b.1.2.62	Turbine El 882 Area3B	-	607	27	145	2,478	-	-	548	3,805	3,805	-	-	26,533	-	-	-	-	1,077,531	17,302	-
4b.1.2.63	Turbine El 903 Area1A	-	9	1	1	-	15	-	6	32	32	-	-	-	68	-	-	-	6,127	232	-

Table C-2
Cooper Nuclear Station
2014 Delayed DECON Decommissioning Cost Estimate
(thousands of 2008 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
Disposal of Plant Systems (continued)																					
4b.1.2.64	Turbine El 903 Area1B	-	974	46	241	4,133	-	-	904	6,299	6,299	-	-	44,251	-	-	-	-	1,797,054	27,674	-
4b.1.2.65	Turbine El 903 Area2A	-	5	1	1	-	9	-	4	20	20	-	-	-	42	-	-	-	3,729	142	-
4b.1.2.66	Turbine El 903 Area2B	-	144	1	7	128	-	-	56	337	337	-	-	1,375	-	-	-	-	55,851	4,040	-
4b.1.2.67	Turbine El 903 Area3B	-	3	0	2	35	-	-	6	47	47	-	-	376	-	-	-	-	15,251	97	-
4b.1.2.68	Turbine El 903 Area3C	-	108	-	-	-	-	-	16	124	-	-	124	-	-	-	-	-	-	3,412	-
4b.1.2.69	Turbine El 903 Area4B	-	12	0	2	28	-	-	7	49	49	-	-	299	-	-	-	-	12,139	367	-
4b.1.2.70	Yard Area1C	-	197	-	-	-	-	-	30	227	-	-	227	-	-	-	-	-	-	5,770	-
4b.1.2	Totals	-	7,771	556	1,148	13,202	5,814	-	5,535	34,027	33,227	-	800	141,342	27,486	-	-	-	8,056,388	218,627	-
4b.1.3	Scaffolding in support of decommissioning	-	3,073	36	17	252	34	-	821	4,232	4,232	-	-	2,431	151	-	-	-	122,988	41,117	-
Decontamination of Site Buildings																					
4b.1.4.1	Reactor	2,880	1,820	202	422	4,911	2,376	-	3,310	15,922	15,922	-	-	52,579	39,536	-	-	-	6,069,283	115,053	-
4b.1.4.2	Augmented Radwaste	52	19	4	6	23	60	-	51	215	215	-	-	242	1,099	-	-	-	119,386	1,978	-
4b.1.4.3	Miscellaneous Structures - Contaminated	368	167	15	42	759	62	-	363	1,777	1,777	-	-	8,129	452	-	-	-	372,774	12,956	-
4b.1.4.4	Multi-Purpose Facility	68	55	6	12	115	89	-	90	437	437	-	-	1,234	1,567	-	-	-	205,066	3,237	-
4b.1.4.5	Radwaste	159	50	9	14	38	161	-	141	572	572	-	-	404	2,953	-	-	-	310,769	5,863	-
4b.1.4.6	Turbine	526	142	35	51	64	633	-	477	1,928	1,928	-	-	688	11,664	-	-	-	1,193,496	18,679	-
4b.1.4	Totals	4,055	2,253	271	547	5,910	3,382	-	4,432	20,850	20,850	-	-	63,275	57,271	-	-	-	8,270,774	157,766	-
4b.1	Subtotal Period 4b Activity Costs	4,318	13,131	942	1,800	19,364	10,578	-	11,285	61,417	60,618	-	800	207,048	90,895	-	-	-	16,987,290	418,513	-
Period 4b Additional Costs																					
4b.2.1	ISFSI Decontamination	-	656	4	24	-	55	1,192	360	2,290	-	2,290	-	-	1,050	-	-	-	162,629	17,515	2,560
4b.2.2	Final Site Survey	-	-	-	-	-	-	1,205	362	1,567	1,567	-	-	-	-	-	-	-	-	-	12,480
4b.2	Subtotal Period 4b Additional Costs	-	656	4	24	-	55	2,397	722	3,857	1,567	2,290	-	-	1,050	-	-	-	162,629	17,515	15,040
Period 4b Collateral Costs																					
4b.3.1	Process liquid waste	128	-	45	238	-	271	-	172	853	853	-	-	-	945	-	-	-	56,726	184	-
4b.3.2	Small tool allowance	-	230	-	-	-	-	-	35	265	265	-	-	-	-	-	-	-	-	-	-
4b.3.3	Decommissioning Equipment Disposition	-	-	88	50	621	84	-	130	973	973	-	-	6,000	373	-	-	-	303,507	88	-
4b.3	Subtotal Period 4b Collateral Costs	128	230	133	287	621	355	-	337	2,091	2,091	-	-	6,000	1,319	-	-	-	360,233	272	-
Period 4b Period-Dependent Costs																					
4b.4.1	Decon supplies	1,252	-	-	-	-	-	-	313	1,564	1,564	-	-	-	-	-	-	-	-	-	-
4b.4.2	Insurance	-	-	-	-	-	-	1,192	119	1,312	1,312	-	-	-	-	-	-	-	-	-	-
4b.4.3	Property taxes	-	-	-	-	-	-	10	1	11	11	-	-	-	-	-	-	-	-	-	-
4b.4.4	Health physics supplies	-	2,373	-	-	-	-	-	593	2,966	2,966	-	-	-	-	-	-	-	-	-	-
4b.4.5	Heavy equipment rental	-	4,270	-	-	-	-	-	641	4,911	4,911	-	-	-	-	-	-	-	-	-	-
4b.4.6	Disposal of DAW generated	-	-	55	31	-	876	-	229	1,191	1,191	-	-	-	18,832	-	-	-	172,741	58	-
4b.4.7	Plant energy budget	-	-	-	-	-	-	1,691	254	1,945	1,945	-	-	-	-	-	-	-	-	-	-
4b.4.8	NRC Fees	-	-	-	-	-	-	1,601	160	1,761	1,761	-	-	-	-	-	-	-	-	-	-
4b.4.9	Liquid Radwaste Processing Equipment/Services	-	-	-	-	-	-	913	137	1,049	1,049	-	-	-	-	-	-	-	-	-	-
4b.4.10	Security Staff Cost	-	-	-	-	-	-	6,945	1,042	7,987	7,987	-	-	-	-	-	-	-	-	-	158,571
4b.4.11	DOC Staff Cost	-	-	-	-	-	-	24,622	3,693	28,315	28,315	-	-	-	-	-	-	-	-	-	339,977
4b.4.12	Utility Staff Cost	-	-	-	-	-	-	33,080	4,962	38,042	38,042	-	-	-	-	-	-	-	-	-	598,766
4b.4	Subtotal Period 4b Period-Dependent Costs	1,252	6,643	55	31	-	876	70,053	12,144	91,053	91,053	-	-	-	18,832	-	-	-	172,741	58	1,097,314
4b.0	TOTAL PERIOD 4b COST	5,697	20,661	1,134	2,141	19,985	11,863	72,450	24,487	158,419	155,329	2,290	800	213,048	112,096	-	-	-	17,682,890	436,358	1,112,354
PERIOD 4e - License Termination																					
Period 4e Direct Decommissioning Activities																					
4e.1.1	ORISE confirmatory survey	-	-	-	-	-	-	147	44	191	191	-	-	-	-	-	-	-	-	-	-
4e.1.2	Terminate license									a											
4e.1	Subtotal Period 4e Activity Costs	-	-	-	-	-	-	147	44	191	191	-	-	-	-	-	-	-	-	-	-

Table C-2
Cooper Nuclear Station
2014 Delayed DECON Decommissioning Cost Estimate
(thousands of 2008 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
Period 4e Additional Costs																					
4e.2.1	Final Site Survey	-	-	-	-	-	-	5,998	1,799	7,797	7,797	-	-	-	-	-	-	-	-	165,605	6,240
4e.2	Subtotal Period 4e Additional Costs	-	-	-	-	-	-	5,998	1,799	7,797	7,797	-	-	-	-	-	-	-	-	165,605	6,240
Period 4e Collateral Costs																					
4e.3.1	DOC staff relocation expenses	-	-	-	-	-	-	912	137	1,049	1,049	-	-	-	-	-	-	-	-	-	-
4e.3	Subtotal Period 4e Collateral Costs	-	-	-	-	-	-	912	137	1,049	1,049	-	-	-	-	-	-	-	-	-	-
Period 4e Period-Dependent Costs																					
4e.4.1	Insurance	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4e.4.2	Property taxes	-	-	-	-	-	-	3	0	3	3	-	-	-	-	-	-	-	-	-	-
4e.4.3	Health physics supplies	-	795	-	-	-	-	-	199	993	993	-	-	-	-	-	-	-	-	-	-
4e.4.4	Disposal of DAW generated	-	-	3	1	-	42	-	11	57	57	-	-	-	907	-	-	-	8,324	3	-
4e.4.5	Plant energy budget	-	-	-	-	-	-	140	21	161	161	-	-	-	-	-	-	-	-	-	-
4e.4.6	NRC Fees	-	-	-	-	-	-	532	53	585	585	-	-	-	-	-	-	-	-	-	-
4e.4.7	Security Staff Cost	-	-	-	-	-	-	1,012	152	1,164	1,164	-	-	-	-	-	-	-	-	-	18,857
4e.4.8	DOC Staff Cost	-	-	-	-	-	-	4,458	669	5,126	5,126	-	-	-	-	-	-	-	-	-	57,357
4e.4.9	Utility Staff Cost	-	-	-	-	-	-	4,895	704	5,399	5,399	-	-	-	-	-	-	-	-	-	74,643
4e.4	Subtotal Period 4e Period-Dependent Costs	-	795	3	1	-	42	10,839	1,809	13,489	13,489	-	-	-	907	-	-	-	8,324	3	150,857
4e.0	TOTAL PERIOD 4e COST	-	795	3	1	-	42	17,897	3,789	22,527	22,527	-	-	-	907	-	-	-	8,324	165,608	157,097
PERIOD 4 TOTALS		5,939	37,086	8,022	4,771	37,066	30,870	124,205	51,016	298,974	295,786	2,290	897	384,277	156,617	1,377	344	508	28,309,950	757,775	1,797,669
PERIOD 5b - Site Restoration																					
Period 5b Direct Decommissioning Activities																					
Demolition of Remaining Site Buildings																					
5b.1.1.1	Reactor	-	1,491	-	-	-	-	-	224	1,715	-	-	1,715	-	-	-	-	-	-	14,601	-
5b.1.1.2	Augmented Radwaste	-	222	-	-	-	-	-	33	255	-	-	255	-	-	-	-	-	-	2,119	-
5b.1.1.3	Control	-	214	-	-	-	-	-	32	246	-	-	246	-	-	-	-	-	-	1,655	-
5b.1.1.4	Intake Structure	-	523	-	-	-	-	-	78	602	-	-	602	-	-	-	-	-	-	5,621	-
5b.1.1.5	LLRW Storage Pad	-	145	-	-	-	-	-	22	167	-	-	167	-	-	-	-	-	-	1,227	-
5b.1.1.6	Miscellaneous Structures - Clean	-	1,196	-	-	-	-	-	179	1,375	-	-	1,375	-	-	-	-	-	-	11,837	-
5b.1.1.7	Miscellaneous Structures - Contaminated	-	27	-	-	-	-	-	4	30	-	-	30	-	-	-	-	-	-	572	-
5b.1.1.8	Multi-Purpose Facility	-	123	-	-	-	-	-	18	141	-	-	141	-	-	-	-	-	-	1,982	-
5b.1.1.9	OWC Gas Generator	-	18	-	-	-	-	-	3	20	-	-	20	-	-	-	-	-	-	283	-
5b.1.1.10	Office	-	156	-	-	-	-	-	23	179	-	-	179	-	-	-	-	-	-	1,920	-
5b.1.1.11	Radwaste	-	391	-	-	-	-	-	59	449	-	-	449	-	-	-	-	-	-	3,229	-
5b.1.1.12	Seal Well	-	17	-	-	-	-	-	3	20	-	-	20	-	-	-	-	-	-	166	-
5b.1.1.13	Sewage Treatment Area	-	4	-	-	-	-	-	1	5	-	-	5	-	-	-	-	-	-	53	-
5b.1.1.14	Transformer Yard	-	20	-	-	-	-	-	3	24	-	-	24	-	-	-	-	-	-	172	-
5b.1.1.15	Turbine	-	2,596	-	-	-	-	-	389	2,985	-	-	2,985	-	-	-	-	-	-	40,503	-
5b.1.1.16	Turbine Pedestal	-	277	-	-	-	-	-	42	318	-	-	318	-	-	-	-	-	-	2,100	-
5b.1.1	Totals	-	7,418	-	-	-	-	-	1,113	8,531	-	-	8,531	-	-	-	-	-	-	88,040	-
Site Closeout Activities																					
5b.1.2	Remove Rubble	-	424	-	-	-	-	-	64	488	-	-	488	-	-	-	-	-	-	3,286	-
5b.1.3	Grade & landscape site	-	578	-	-	-	-	-	87	665	-	-	665	-	-	-	-	-	-	1,578	-
5b.1.4	Final report to NRC	-	-	-	-	-	-	156	23	179	179	-	-	-	-	-	-	-	-	-	1,560
5b.1	Subtotal Period 5b Activity Costs	-	8,421	-	-	-	-	156	1,286	9,863	179	-	9,684	-	-	-	-	-	-	92,904	1,560
Period 5b Additional Costs																					
5b.2.1	ISFSI Demolition	-	487	-	-	-	-	44	80	611	-	611	-	-	-	-	-	-	-	4,336	160
5b.2.2	Concrete Crushing	-	499	-	-	-	-	8	76	582	-	-	582	-	-	-	-	-	-	3,045	-
5b.2.3	Cofferdam	-	458	-	-	-	-	-	69	527	-	-	527	-	-	-	-	-	-	5,130	-

Table C-2
Cooper Nuclear Station
2014 Delayed DECON Decommissioning Cost Estimate
(thousands of 2008 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
5b.2	Subtotal Period 5b Additional Costs	-	1,444	-	-	-	-	52	224	1,720	-	611	1,109	-	-	-	-	-	-	12,511	160
Period 5b Collateral Costs																					
5b.3.1	Small tool allowance	-	55	-	-	-	-	-	8	63	-	-	63	-	-	-	-	-	-	-	-
5b.3	Subtotal Period 5b Collateral Costs	-	55	-	-	-	-	-	8	63	-	-	63	-	-	-	-	-	-	-	-
Period 5b Period-Dependent Costs																					
5b.4.1	Insurance	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5b.4.2	Property taxes	-	-	-	-	-	-	7	1	8	-	-	8	-	-	-	-	-	-	-	-
5b.4.3	Heavy equipment rental	-	4,233	-	-	-	-	-	635	4,869	-	-	4,869	-	-	-	-	-	-	-	-
5b.4.4	Plant energy budget	-	-	-	-	-	-	167	25	192	-	-	192	-	-	-	-	-	-	-	-
5b.4.5	Security Staff Cost	-	-	-	-	-	-	2,419	363	2,782	-	-	2,782	-	-	-	-	-	-	-	45,051
5b.4.6	DOC Staff Cost	-	-	-	-	-	-	10,212	1,532	11,744	-	-	11,744	-	-	-	-	-	-	-	127,646
5b.4.7	Utility Staff Cost	-	-	-	-	-	-	4,507	676	5,183	-	-	5,183	-	-	-	-	-	-	-	73,209
5b.4	Subtotal Period 5b Period-Dependent Costs	-	4,233	-	-	-	-	17,312	3,232	24,777	-	-	24,777	-	-	-	-	-	-	-	245,906
5b.0	TOTAL PERIOD 5b COST	-	14,153	-	-	-	-	17,520	4,751	36,424	179	611	35,634	-	-	-	-	-	-	105,415	247,626
PERIOD 5 TOTALS		-	14,153	-	-	-	-	17,520	4,751	36,424	179	611	35,634	-	-	-	-	-	-	105,415	247,626
TOTAL COST TO DECOMMISSION		13,111	58,437	8,282	5,692	37,066	34,071	545,635	120,307	822,600	475,790	309,463	37,347	384,277	207,449	1,377	344	508	28,976,590	994,325	6,844,054

TOTAL COST TO DECOMMISSION WITH 17.13% CONTINGENCY:	**$822,600**	**thousands of 2008 dollars**
TOTAL NRC LICENSE TERMINATION COST IS 57.84% OR:	**$475,790**	**thousands of 2008 dollars**
SPENT FUEL MANAGEMENT COST IS 37.62% OR:	**$309,463**	**thousands of 2008 dollars**
NON-NUCLEAR DEMOLITION COST IS 4.54% OR:	**$37,347**	**thousands of 2008 dollars**
TOTAL LOW-LEVEL RADIOACTIVE WASTE VOLUME BURIED (EXCLUDING GTCC):	**209,171**	**cubic feet**
TOTAL GREATER THAN CLASS C RADWASTE VOLUME GENERATED:	**508**	**cubic feet**
TOTAL SCRAP METAL REMOVED:	**30,276**	**tons**
TOTAL CRAFT LABOR REQUIREMENTS:	**994,325**	**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

Table C-3
Cooper Nuclear Station
2014 SAFSTOR Decommissioning Cost Estimate
(thousands of 2008 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
PERIOD 1a - Shutdown through Transition																					
Period 1a Direct Decommissioning Activities																					
1a.1.1	SAFSTOR site characterization survey	-	-	-	-	-	-	346	104	450	450	-	-	-	-	-	-	-	-	-	-
1a.1.2	Prepare preliminary decommissioning cost	-	-	-	-	-	-	130	20	150	150	-	-	-	-	-	-	-	-	-	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	-	-	-	-	-	-	200	30	230	230	-	-	-	-	-	-	-	-	-	2,000
1a.1.8	Review plant dwgs & specs.	-	-	-	-	-	-	130	20	150	150	-	-	-	-	-	-	-	-	-	1,300
1a.1.9	Perform detailed rad survey									a											
1a.1.10	Estimate by-product inventory	-	-	-	-	-	-	100	15	115	115	-	-	-	-	-	-	-	-	-	1,000
1a.1.11	End product description	-	-	-	-	-	-	100	15	115	115	-	-	-	-	-	-	-	-	-	1,000
1a.1.12	Detailed by-product inventory	-	-	-	-	-	-	150	23	173	173	-	-	-	-	-	-	-	-	-	1,500
1a.1.13	Define major work sequence	-	-	-	-	-	-	100	15	115	115	-	-	-	-	-	-	-	-	-	1,000
1a.1.14	Perform SER and EA	-	-	-	-	-	-	310	47	357	357	-	-	-	-	-	-	-	-	-	3,100
1a.1.15	Perform Site-Specific Cost Study	-	-	-	-	-	-	500	75	575	575	-	-	-	-	-	-	-	-	-	5,000
Activity Specifications																					
1a.1.16.1	Prepare plant and facilities for SAFSTOR	-	-	-	-	-	-	492	74	566	566	-	-	-	-	-	-	-	-	-	4,920
1a.1.16.2	Plant systems	-	-	-	-	-	-	417	63	479	479	-	-	-	-	-	-	-	-	-	4,167
1a.1.16.3	Plant structures and buildings	-	-	-	-	-	-	312	47	359	359	-	-	-	-	-	-	-	-	-	3,120
1a.1.16.4	Waste management	-	-	-	-	-	-	200	30	230	230	-	-	-	-	-	-	-	-	-	2,000
1a.1.16.5	Facility and site dormancy	-	-	-	-	-	-	200	30	230	230	-	-	-	-	-	-	-	-	-	2,000
1a.1.16	Total	-	-	-	-	-	-	1,621	243	1,864	1,864	-	-	-	-	-	-	-	-	-	16,207
Detailed Work Procedures																					
1a.1.17.1	Plant systems	-	-	-	-	-	-	118	18	136	136	-	-	-	-	-	-	-	-	-	1,183
1a.1.17.2	Facility closeout & dormancy	-	-	-	-	-	-	120	18	138	138	-	-	-	-	-	-	-	-	-	1,200
1a.1.17	Total	-	-	-	-	-	-	238	36	274	274	-	-	-	-	-	-	-	-	-	2,383
1a.1.18	Procure vacuum drying system	-	-	-	-	-	-	10	2	12	12	-	-	-	-	-	-	-	-	-	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	-	-	-	-	-	-	3,935	642	4,577	4,577	-	-	-	-	-	-	-	-	-	35,890
Period 1a Collateral Costs																					
1a.3.1	Spent Fuel Capital and Transfer	-	-	-	-	-	-	10,335	1,550	11,886	-	11,886	-	-	-	-	-	-	-	-	-
1a.3.2	Corporate Overheads	-	-	-	-	-	-	3,105	466	3,570	3,570	-	-	-	-	-	-	-	-	-	-
1a.3	Subtotal Period 1a Collateral Costs	-	-	-	-	-	-	13,440	2,016	15,456	3,570	11,886	-	-	-	-	-	-	-	-	-
Period 1a Period-Dependent Costs																					
1a.4.1	Insurance	-	-	-	-	-	-	1,600	160	1,760	1,760	-	-	-	-	-	-	-	-	-	-
1a.4.2	Property taxes	-	-	-	-	-	-	4	0	4	4	-	-	-	-	-	-	-	-	-	-
1a.4.3	Health physics supplies	-	370	-	-	-	-	-	93	463	463	-	-	-	-	-	-	-	-	-	-
1a.4.4	Heavy equipment rental	-	368	-	-	-	-	-	55	423	423	-	-	-	-	-	-	-	-	-	-
1a.4.5	Disposal of DAW generated	-	-	5	3	-	73	-	19	100	100	-	-	-	1,575	-	-	-	14,445	5	-
1a.4.6	Plant energy budget	-	-	-	-	-	-	927	139	1,066	1,066	-	-	-	-	-	-	-	-	-	-
1a.4.7	NRC Fees	-	-	-	-	-	-	706	71	776	776	-	-	-	-	-	-	-	-	-	-
1a.4.8	Emergency Planning Fees	-	-	-	-	-	-	1,185	118	1,303	-	1,303	-	-	-	-	-	-	-	-	-
1a.4.9	Spent Fuel Pool O&M	-	-	-	-	-	-	745	112	857	-	857	-	-	-	-	-	-	-	-	-
1a.4.10	ISFSI Operating Costs	-	-	-	-	-	-	85	13	98	-	98	-	-	-	-	-	-	-	-	-
1a.4.11	Security Staff Cost	-	-	-	-	-	-	6,021	903	6,924	6,924	-	-	-	-	-	-	-	-	-	157,471

Table C-3
Cooper Nuclear Station
2014 SAFSTOR Decommissioning Cost Estimate
(thousands of 2008 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.4.12	Utility Staff Cost	-	-	-	-	-	-	22,690	3,403	26,093	26,093	-	-	-	-	-	-	-	-	-	423,400
1a.4	Subtotal Period 1a Period-Dependent Costs	-	738	5	3	-	73	33,962	5,087	39,867	37,609	2,258	-	-	1,575	-	-	-	14,445	5	580,871
1a.0	TOTAL PERIOD 1a COST	-	738	5	3	-	73	51,338	7,745	59,901	45,757	14,144	-	-	1,575	-	-	-	14,445	5	616,761
PERIOD 1b - SAFSTOR Limited DECON Activities																					
Period 1b Direct Decommissioning Activities																					
Decontamination of Site Buildings																					
1b.1.1.1	Reactor	2,929	-	-	-	-	-	-	1,465	4,394	4,394	-	-	-	-	-	-	-	-	68,438	-
1b.1.1.2	Augmented Radwaste	52	-	-	-	-	-	-	26	78	78	-	-	-	-	-	-	-	-	1,562	-
1b.1.1.3	Miscellaneous Structures - Contaminated	376	-	-	-	-	-	-	188	565	565	-	-	-	-	-	-	-	-	8,542	-
1b.1.1.4	Multi-Purpose Facility	68	-	-	-	-	-	-	34	101	101	-	-	-	-	-	-	-	-	2,036	-
1b.1.1.5	Radwaste	158	-	-	-	-	-	-	79	237	237	-	-	-	-	-	-	-	-	4,761	-
1b.1.1.6	Turbine	520	-	-	-	-	-	-	260	780	780	-	-	-	-	-	-	-	-	15,667	-
1b.1.1	Totals	4,103	-	-	-	-	-	-	2,052	6,155	6,155	-	-	-	-	-	-	-	-	101,006	-
1b.1	Subtotal Period 1b Activity Costs	4,103	-	-	-	-	-	-	2,052	6,155	6,155	-	-	-	-	-	-	-	-	101,006	-
Period 1b Additional Costs																					
1b.2.1	Spent Fuel Pool Isolation	-	-	-	-	-	-	9,407	1,411	10,818	10,818	-	-	-	-	-	-	-	-	-	-
1b.2.2	Asbestos Insulation Disposal	-	773	1	65	-	558	-	265	1,662	1,662	-	-	-	10,333	-	-	-	134,329	10,002	-
1b.2	Subtotal Period 1b Additional Costs	-	773	1	65	-	558	9,407	1,676	12,480	12,480	-	-	-	10,333	-	-	-	134,329	10,002	-
Period 1b Collateral Costs																					
1b.3.1	Decon equipment	713	-	-	-	-	-	-	107	820	820	-	-	-	-	-	-	-	-	-	-
1b.3.2	Process liquid waste	229	-	74	392	-	448	-	293	1,436	1,436	-	-	-	1,561	-	-	-	93,644	304	-
1b.3.3	Small tool allowance	-	70	-	-	-	-	-	11	81	81	-	-	-	-	-	-	-	-	-	-
1b.3.4	Spent Fuel Capital and Transfer	-	-	-	-	-	-	1,510	227	1,737	-	1,737	-	-	-	-	-	-	-	-	-
1b.3.5	Corporate Overheads	-	-	-	-	-	-	766	115	880	880	-	-	-	-	-	-	-	-	-	-
1b.3	Subtotal Period 1b Collateral Costs	942	70	74	392	-	448	2,276	752	4,954	3,217	1,737	-	-	1,561	-	-	-	93,644	304	-
Period 1b Period-Dependent Costs																					
1b.4.1	Decon supplies	1,156	-	-	-	-	-	-	289	1,445	1,445	-	-	-	-	-	-	-	-	-	-
1b.4.2	Insurance	-	-	-	-	-	-	121	12	133	133	-	-	-	-	-	-	-	-	-	-
1b.4.3	Property taxes	-	-	-	-	-	-	1	0	1	1	-	-	-	-	-	-	-	-	-	-
1b.4.4	Health physics supplies	-	473	-	-	-	-	-	118	592	592	-	-	-	-	-	-	-	-	-	-
1b.4.5	Heavy equipment rental	-	91	-	-	-	-	-	14	104	104	-	-	-	-	-	-	-	-	-	-
1b.4.6	Disposal of DAW generated	-	-	5	3	-	81	-	21	110	110	-	-	-	1,741	-	-	-	15,968	5	-
1b.4.7	Plant energy budget	-	-	-	-	-	-	229	34	263	263	-	-	-	-	-	-	-	-	-	-
1b.4.8	NRC Fees	-	-	-	-	-	-	174	17	191	191	-	-	-	-	-	-	-	-	-	-
1b.4.9	Emergency Planning Fees	-	-	-	-	-	-	292	29	321	-	321	-	-	-	-	-	-	-	-	-
1b.4.10	Spent Fuel Pool O&M	-	-	-	-	-	-	184	28	211	-	211	-	-	-	-	-	-	-	-	-
1b.4.11	ISFSI Operating Costs	-	-	-	-	-	-	21	3	24	-	24	-	-	-	-	-	-	-	-	-
1b.4.12	Security Staff Cost	-	-	-	-	-	-	1,485	223	1,707	1,707	-	-	-	-	-	-	-	-	-	38,829
1b.4.13	Utility Staff Cost	-	-	-	-	-	-	5,595	839	6,434	6,434	-	-	-	-	-	-	-	-	-	104,400
1b.4	Subtotal Period 1b Period-Dependent Costs	1,156	564	5	3	-	81	8,101	1,628	11,538	10,981	557	-	-	1,741	-	-	-	15,968	5	143,229
1b.0	TOTAL PERIOD 1b COST	6,201	1,407	80	460	-	1,087	19,783	6,107	35,126	32,833	2,294	-	-	13,635	-	-	-	243,942	111,318	143,229

Table C-3
Cooper Nuclear Station
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(thousands of 2008 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
PERIOD 1c - Preparations for SAFSTOR Dormancy																					
Period 1c Direct Decommissioning Activities																					
1c.1.1	Prepare support equipment for storage	-	387	-	-	-	-	-	58	445	445	-	-	-	-	-	-	-	-	3,000	-
1c.1.2	Install containment pressure equal. lines	-	31	-	-	-	-	-	5	36	36	-	-	-	-	-	-	-	-	700	-
1c.1.3	Interim survey prior to dormancy	-	-	-	-	-	-	733	220	953	953	-	-	-	-	-	-	-	-	15,696	-
1c.1.4	Secure building accesses									a											
1c.1.5	Prepare & submit interim report	-	-	-	-	-	-	58	9	67	67	-	-	-	-	-	-	-	-	-	583
1c.1	Subtotal Period 1c Activity Costs	-	419	-	-	-	-	791	291	1,501	1,501	-	-	-	-	-	-	-	-	19,396	583
Period 1c Collateral Costs																					
1c.3.1	Process liquid waste	235	-	76	403	-	460	-	301	1,475	1,475	-	-	-	1,603	-	-	-	96,195	313	-
1c.3.2	Small tool allowance	-	3	-	-	-	-	-	0	3	3	-	-	-	-	-	-	-	-	-	-
1c.3.3	Spent Fuel Capital and Transfer	-	-	-	-	-	-	1,527	229	1,756	-	1,756	-	-	-	-	-	-	-	-	-
1c.3.4	Corporate Overheads	-	-	-	-	-	-	774	116	890	890	-	-	-	-	-	-	-	-	-	-
1c.3	Subtotal Period 1c Collateral Costs	235	3	76	403	-	460	2,301	646	4,124	2,368	1,756	-	-	1,603	-	-	-	96,195	313	-
Period 1c Period-Dependent Costs																					
1c.4.1	Insurance	-	-	-	-	-	-	122	12	134	134	-	-	-	-	-	-	-	-	-	-
1c.4.2	Property taxes	-	-	-	-	-	-	1	0	1	1	-	-	-	-	-	-	-	-	-	-
1c.4.3	Health physics supplies	-	160	-	-	-	-	-	40	200	200	-	-	-	-	-	-	-	-	-	-
1c.4.4	Heavy equipment rental	-	92	-	-	-	-	-	14	105	105	-	-	-	-	-	-	-	-	-	-
1c.4.5	Disposal of DAW generated	-	-	1	1	-	18	-	5	25	25	-	-	-	393	-	-	-	3,801	1	-
1c.4.6	Plant energy budget	-	-	-	-	-	-	231	35	266	266	-	-	-	-	-	-	-	-	-	-
1c.4.7	NRC Fees	-	-	-	-	-	-	176	18	194	194	-	-	-	-	-	-	-	-	-	-
1c.4.8	Emergency Planning Fees	-	-	-	-	-	-	295	30	325	-	325	-	-	-	-	-	-	-	-	-
1c.4.9	Spent Fuel Pool O&M	-	-	-	-	-	-	186	28	214	-	214	-	-	-	-	-	-	-	-	-
1c.4.10	ISFSI Operating Costs	-	-	-	-	-	-	21	3	24	-	24	-	-	-	-	-	-	-	-	-
1c.4.11	Security Staff Cost	-	-	-	-	-	-	1,501	225	1,726	1,726	-	-	-	-	-	-	-	-	-	39,260
1c.4.12	Utility Staff Cost	-	-	-	-	-	-	5,657	849	6,505	6,505	-	-	-	-	-	-	-	-	-	105,560
1c.4	Subtotal Period 1c Period-Dependent Costs	-	252	1	1	-	18	8,191	1,257	9,720	9,157	563	-	-	393	-	-	-	3,801	1	144,820
1c.0	TOTAL PERIOD 1c COST	235	673	77	404	-	478	11,283	2,195	15,345	13,026	2,319	-	-	1,996	-	-	-	99,796	19,710	145,403
PERIOD 1 TOTALS		6,437	2,818	162	868	-	1,638	82,404	16,047	110,372	91,616	18,757	-	-	17,205	-	-	-	358,183	131,033	905,393
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	-	-	-	-	-	-	63	9	72	72	-	-	-	-	-	-	-	-	-	-
2a.1.5	Maintenance supplies	-	-	-	-	-	-	503	126	629	629	-	-	-	-	-	-	-	-	-	-
2a.1	Subtotal Period 2a Activity Costs	-	-	-	-	-	-	566	135	701	701	-	-	-	-	-	-	-	-	-	-
Period 2a Collateral Costs																					
2a.3.1	Spent Fuel Capital and Transfer	-	-	-	-	-	-	26,466	3,970	30,435	-	30,435	-	-	-	-	-	-	-	-	-
2a.3.2	Corporate Overheads	-	-	-	-	-	-	4,139	621	4,759	4,759	-	-	-	-	-	-	-	-	-	-
2a.3	Subtotal Period 2a Collateral Costs	-	-	-	-	-	-	30,604	4,591	35,195	4,759	30,435	-	-	-	-	-	-	-	-	-
Period 2a Period-Dependent Costs																					
2a.4.1	Insurance	-	-	-	-	-	-	1,962	196	2,158	1,848	310	-	-	-	-	-	-	-	-	-
2a.4.2	Property taxes	-	-	-	-	-	-	16	2	18	18	-	-	-	-	-	-	-	-	-	-
2a.4.3	Health physics supplies	-	344	-	-	-	-	-	86	430	430	-	-	-	-	-	-	-	-	-	-

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Cooper Nuclear 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 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
Period 2a Period-Dependent Costs (continued)																					
2a.4.4	Disposal of DAW generated	-	-	13	7	-	198	-	52	270	270	-	-	-	4,267	-	-	-	39,139	13	-
2a.4.5	Plant energy budget	-	-	-	-	-	-	742	111	853	427	427	-	-	-	-	-	-	-	-	-
2a.4.6	NRC Fees	-	-	-	-	-	-	807	81	887	887	-	-	-	-	-	-	-	-	-	-
2a.4.7	Emergency Planning Fees	-	-	-	-	-	-	3,374	337	3,712	-	3,712	-	-	-	-	-	-	-	-	-
2a.4.8	Spent Fuel Pool O&M	-	-	-	-	-	-	2,984	448	3,431	-	3,431	-	-	-	-	-	-	-	-	-
2a.4.9	ISFSI Operating Costs	-	-	-	-	-	-	340	51	391	-	391	-	-	-	-	-	-	-	-	-
2a.4.10	Security Staff Cost	-	-	-	-	-	-	17,728	2,659	20,387	7,788	12,599	-	-	-	-	-	-	-	-	444,561
2a.4.11	Utility Staff Cost	-	-	-	-	-	-	18,816	2,822	21,639	4,426	17,213	-	-	-	-	-	-	-	-	329,769
2a.4	Subtotal Period 2a Period-Dependent Costs	-	344	13	7	-	198	46,768	6,845	54,176	16,092	38,083	-	-	4,267	-	-	-	39,139	13	774,330
2a.0	TOTAL PERIOD 2a COST	-	344	13	7	-	198	77,939	11,571	90,072	21,553	68,519	-	-	4,267	-	-	-	39,139	13	774,330
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	-	-	-	-	-	-	432	65	497	497	-	-	-	-	-	-	-	-	-	-
2b.1.5	Maintenance supplies	-	-	-	-	-	-	3,453	863	4,317	4,317	-	-	-	-	-	-	-	-	-	-
2b.1	Subtotal Period 2b Activity Costs	-	-	-	-	-	-	3,886	928	4,814	4,814	-	-	-	-	-	-	-	-	-	-
Period 2b Collateral Costs																					
2b.3.1	Spent Fuel Capital and Transfer	-	-	-	-	-	-	18,092	2,714	20,806	-	20,806	-	-	-	-	-	-	-	-	-
2b.3	Subtotal Period 2b Collateral Costs	-	-	-	-	-	-	18,092	2,714	20,806	-	20,806	-	-	-	-	-	-	-	-	-
Period 2b Period-Dependent Costs																					
2b.4.1	Insurance	-	-	-	-	-	-	11,977	1,198	13,174	12,683	491	-	-	-	-	-	-	-	-	-
2b.4.2	Property taxes	-	-	-	-	-	-	110	11	121	121	-	-	-	-	-	-	-	-	-	-
2b.4.3	Health physics supplies	-	1,981	-	-	-	-	-	495	2,476	2,476	-	-	-	-	-	-	-	-	-	-
2b.4.4	Disposal of DAW generated	-	-	80	44	-	1,268	-	332	1,725	1,725	-	-	-	27,278	-	-	-	250,212	84	-
2b.4.5	Plant energy budget	-	-	-	-	-	-	2,546	382	2,928	2,928	-	-	-	-	-	-	-	-	-	-
2b.4.6	NRC Fees	-	-	-	-	-	-	5,536	554	6,090	6,090	-	-	-	-	-	-	-	-	-	-
2b.4.7	Emergency Planning Fees	-	-	-	-	-	-	23,161	2,316	25,477	-	25,477	-	-	-	-	-	-	-	-	-
2b.4.8	ISFSI Operating Costs	-	-	-	-	-	-	2,332	350	2,682	-	2,682	-	-	-	-	-	-	-	-	-
2b.4.9	Security Staff Cost	-	-	-	-	-	-	70,072	10,511	80,583	53,452	27,131	-	-	-	-	-	-	-	-	1,547,177
2b.4.10	Utility Staff Cost	-	-	-	-	-	-	51,313	7,697	59,010	30,376	28,634	-	-	-	-	-	-	-	-	916,846
2b.4	Subtotal Period 2b Period-Dependent Costs	-	1,981	80	44	-	1,268	167,047	23,845	194,266	109,850	84,416	-	-	27,278	-	-	-	250,212	84	2,464,023
2b.0	TOTAL PERIOD 2b COST	-	1,981	80	44	-	1,268	189,025	27,487	219,886	114,664	105,222	-	-	27,278	-	-	-	250,212	84	2,464,023
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	-	-	-	-	-	-	335	50	385	385	-	-	-	-	-	-	-	-	-	-
2c.1.5	Maintenance supplies	-	-	-	-	-	-	2,677	669	3,346	3,346	-	-	-	-	-	-	-	-	-	-
2c.1	Subtotal Period 2c Activity Costs	-	-	-	-	-	-	3,012	719	3,732	3,732	-	-	-	-	-	-	-	-	-	-
Period 2c Period-Dependent Costs																					
2c.4.1	Insurance	-	-	-	-	-	-	8,937	894	9,831	9,831	-	-	-	-	-	-	-	-	-	-
2c.4.2	Property taxes	-	-	-	-	-	-	85	9	94	94	-	-	-	-	-	-	-	-	-	-
2c.4.3	Health physics supplies	-	1,444	-	-	-	-	-	361	1,805	1,805	-	-	-	-	-	-	-	-	-	-
2c.4.4	Disposal of DAW generated	-	-	61	34	-	961	-	251	1,306	1,306	-	-	-	20,663	-	-	-	189,540	63	-

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Cooper Nuclear 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 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
Period 2c Period-Dependent Costs (continued)																					
2c.4.5	Plant energy budget	-	-	-	-	-	-	1,974	296	2,270	2,270	-	-	-	-	-	-	-	-	-	-
2c.4.6	NRC Fees	-	-	-	-	-	-	3,886	389	4,275	4,275	-	-	-	-	-	-	-	-	-	-
2c.4.7	Security Staff Cost	-	-	-	-	-	-	36,028	5,404	41,432	41,432	-	-	-	-	-	-	-	-	-	668,257
2c.4.8	Utility Staff Cost	-	-	-	-	-	-	20,474	3,071	23,545	23,545	-	-	-	-	-	-	-	-	-	386,650
2c.4	Subtotal Period 2c Period-Dependent Costs	-	1,444	61	34	-	961	71,384	10,675	84,558	84,558	-	-	-	20,663	-	-	-	189,540	63	1,054,907
2c.0	TOTAL PERIOD 2c COST	-	1,444	61	34	-	961	74,396	11,394	88,289	88,289	-	-	-	20,663	-	-	-	189,540	63	1,054,907
PERIOD 2 TOTALS		-	3,769	154	85	-	2,427	341,360	50,452	398,247	224,506	173,740	-	-	52,208	-	-	-	478,891	160	4,293,260
PERIOD 3a - Reactivate Site Following SAFSTOR Dormancy																					
Period 3a Direct Decommissioning Activities																					
3a.1.1	Prepare preliminary decommissioning cost	-	-	-	-	-	-	130	20	150	150	-	-	-	-	-	-	-	-	-	1,300
3a.1.2	Review plant dwgs & specs.	-	-	-	-	-	-	460	69	529	529	-	-	-	-	-	-	-	-	-	4,600
3a.1.3	Perform detailed rad survey									a											
3a.1.4	End product description	-	-	-	-	-	-	100	15	115	115	-	-	-	-	-	-	-	-	-	1,000
3a.1.5	Detailed by-product inventory	-	-	-	-	-	-	130	20	150	150	-	-	-	-	-	-	-	-	-	1,300
3a.1.6	Define major work sequence	-	-	-	-	-	-	750	113	863	863	-	-	-	-	-	-	-	-	-	7,500
3a.1.7	Perform SER and EA	-	-	-	-	-	-	310	47	357	357	-	-	-	-	-	-	-	-	-	3,100
3a.1.8	Perform Site-Specific Cost Study	-	-	-	-	-	-	500	75	575	575	-	-	-	-	-	-	-	-	-	5,000
3a.1.9	Prepare/submit License Termination Plan	-	-	-	-	-	-	410	61	471	471	-	-	-	-	-	-	-	-	-	4,098
3a.1.10	Receive NRC approval of termination plan									a											
Activity Specifications																					
3a.1.11.1	Re-activate plant & temporary facilities	-	-	-	-	-	-	737	111	848	763	-	85	-	-	-	-	-	-	-	7,370
3a.1.11.2	Plant systems	-	-	-	-	-	-	417	63	479	431	-	48	-	-	-	-	-	-	-	4,167
3a.1.11.3	Reactor internals	-	-	-	-	-	-	710	107	817	817	-	-	-	-	-	-	-	-	-	7,100
3a.1.11.4	Reactor vessel	-	-	-	-	-	-	650	98	748	748	-	-	-	-	-	-	-	-	-	6,500
3a.1.11.5	Sacrificial shield	-	-	-	-	-	-	50	8	58	58	-	-	-	-	-	-	-	-	-	500
3a.1.11.6	Moisture separators/reheaters	-	-	-	-	-	-	100	15	115	115	-	-	-	-	-	-	-	-	-	1,000
3a.1.11.7	Reinforced concrete	-	-	-	-	-	-	160	24	184	92	-	92	-	-	-	-	-	-	-	1,600
3a.1.11.8	Main Turbine	-	-	-	-	-	-	209	31	240	240	-	-	-	-	-	-	-	-	-	2,088
3a.1.11.9	Main Condensers	-	-	-	-	-	-	209	31	240	240	-	-	-	-	-	-	-	-	-	2,088
3a.1.11.10	Pressure suppression structure	-	-	-	-	-	-	200	30	230	230	-	-	-	-	-	-	-	-	-	2,000
3a.1.11.11	Drywell	-	-	-	-	-	-	160	24	184	184	-	-	-	-	-	-	-	-	-	1,600
3a.1.11.12	Plant structures & buildings	-	-	-	-	-	-	312	47	359	179	-	179	-	-	-	-	-	-	-	3,120
3a.1.11.13	Waste management	-	-	-	-	-	-	460	69	529	529	-	-	-	-	-	-	-	-	-	4,600
3a.1.11.14	Facility & site closeout	-	-	-	-	-	-	90	14	104	52	-	52	-	-	-	-	-	-	-	900
3a.1.11	Total	-	-	-	-	-	-	4,463	669	5,133	4,677	-	456	-	-	-	-	-	-	-	44,833
Planning & Site Preparations																					
3a.1.12	Prepare dismantling sequence	-	-	-	-	-	-	240	36	276	276	-	-	-	-	-	-	-	-	-	2,400
3a.1.13	Plant prep. & temp. svces	-	-	-	-	-	-	2,700	405	3,105	3,105	-	-	-	-	-	-	-	-	-	-
3a.1.14	Design water clean-up system	-	-	-	-	-	-	140	21	161	161	-	-	-	-	-	-	-	-	-	1,400
3a.1.15	Rigging/Cont. Cntrl Envlps/tooling/etc.	-	-	-	-	-	-	2,100	315	2,415	2,415	-	-	-	-	-	-	-	-	-	-
3a.1.16	Procure casks/liners & containers	-	-	-	-	-	-	123	18	141	141	-	-	-	-	-	-	-	-	-	1,230
3a.1	Subtotal Period 3a Activity Costs	-	-	-	-	-	-	12,556	1,883	14,439	13,983	-	456	-	-	-	-	-	-	-	77,559
Period 3a Period-Dependent Costs																					
3a.4.1	Insurance	-	-	-	-	-	-	420	42	462	462	-	-	-	-	-	-	-	-	-	-
3a.4.2	Property taxes	-	-	-	-	-	-	4	0	4	4	-	-	-	-	-	-	-	-	-	-
3a.4.3	Health physics supplies	-	324	-	-	-	-	-	81	405	405	-	-	-	-	-	-	-	-	-	-
3a.4.4	Heavy equipment rental	-	368	-	-	-	-	-	55	423	423	-	-	-	-	-	-	-	-	-	-
3a.4.5	Disposal of DAW generated	-	-	4	2	-	62	-	16	84	84	-	-	-	1,329	-	-	-	12,190	4	-

Table C-3
Cooper Nuclear Station
2014 SAFSTOR Decommissioning Cost Estimate
(thousands of 2008 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
Period 3a Period-Dependent Costs (continued)																					
3a.4.6	Plant energy budget	-	-	-	-	-	-	927	139	1,066	1,066	-	-	-	-	-	-	-	-	-	-
3a.4.7	NRC Fees	-	-	-	-	-	-	249	25	274	274	-	-	-	-	-	-	-	-	-	-
3a.4.8	Security Staff Cost	-	-	-	-	-	-	2,855	428	3,283	3,283	-	-	-	-	-	-	-	-	-	65,179
3a.4.9	Utility Staff Cost	-	-	-	-	-	-	14,190	2,128	16,318	16,318	-	-	-	-	-	-	-	-	-	258,629
3a.4	Subtotal Period 3a Period-Dependent Costs	-	691	4	2	-	62	18,644	2,915	22,318	22,318	-	-	-	1,329	-	-	-	12,190	4	323,807
3a.0	TOTAL PERIOD 3a COST	-	691	4	2	-	62	31,200	4,799	36,758	36,302	-	456	-	1,329	-	-	-	12,190	4	401,366
PERIOD 3b - Decommissioning Preparations																					
Period 3b Direct Decommissioning Activities																					
Detailed Work Procedures																					
3b.1.1.1	Plant systems	-	-	-	-	-	-	473	71	544	490	-	54	-	-	-	-	-	-	-	4,733
3b.1.1.2	Reactor internals	-	-	-	-	-	-	400	60	460	460	-	-	-	-	-	-	-	-	-	4,000
3b.1.1.3	Remaining buildings	-	-	-	-	-	-	135	20	155	39	-	116	-	-	-	-	-	-	-	1,350
3b.1.1.4	CRD housings & NIs	-	-	-	-	-	-	100	15	115	115	-	-	-	-	-	-	-	-	-	1,000
3b.1.1.5	Incore instrumentation	-	-	-	-	-	-	100	15	115	115	-	-	-	-	-	-	-	-	-	1,000
3b.1.1.6	Removal primary containment	-	-	-	-	-	-	200	30	230	230	-	-	-	-	-	-	-	-	-	2,000
3b.1.1.7	Reactor vessel	-	-	-	-	-	-	363	54	417	417	-	-	-	-	-	-	-	-	-	3,630
3b.1.1.8	Facility closeout	-	-	-	-	-	-	120	18	138	69	-	69	-	-	-	-	-	-	-	1,200
3b.1.1.9	Sacrificial shield	-	-	-	-	-	-	120	18	138	138	-	-	-	-	-	-	-	-	-	1,200
3b.1.1.10	Reinforced concrete	-	-	-	-	-	-	100	15	115	58	-	58	-	-	-	-	-	-	-	1,000
3b.1.1.11	Main Turbine	-	-	-	-	-	-	208	31	239	239	-	-	-	-	-	-	-	-	-	2,080
3b.1.1.12	Main Condensers	-	-	-	-	-	-	209	31	240	240	-	-	-	-	-	-	-	-	-	2,088
3b.1.1.13	Moisture separators & reheaters	-	-	-	-	-	-	200	30	230	230	-	-	-	-	-	-	-	-	-	2,000
3b.1.1.14	Radwaste building	-	-	-	-	-	-	273	41	314	283	-	31	-	-	-	-	-	-	-	2,730
3b.1.1.15	Reactor building	-	-	-	-	-	-	273	41	314	283	-	31	-	-	-	-	-	-	-	2,730
3b.1.1	Total	-	-	-	-	-	-	3,274	491	3,765	3,405	-	360	-	-	-	-	-	-	-	32,741
3b.1	Subtotal Period 3b Activity Costs	-	-	-	-	-	-	3,274	491	3,765	3,405	-	360	-	-	-	-	-	-	-	32,741
Period 3b Additional Costs																					
3b.2.1	Site Characterization	-	-	-	-	-	-	5,395	1,619	7,014	7,014	-	-	-	-	-	-	-	-	-	-
3b.2	Subtotal Period 3b Additional Costs	-	-	-	-	-	-	5,395	1,619	7,014	7,014	-	-	-	-	-	-	-	-	-	-
Period 3b Collateral Costs																					
3b.3.1	Decon equipment	713	-	-	-	-	-	-	107	820	820	-	-	-	-	-	-	-	-	-	-
3b.3.2	DOC staff relocation expenses	-	-	-	-	-	-	912	137	1,049	1,049	-	-	-	-	-	-	-	-	-	-
3b.3.3	Pipe cutting equipment	-	1,000	-	-	-	-	-	150	1,150	1,150	-	-	-	-	-	-	-	-	-	-
3b.3	Subtotal Period 3b Collateral Costs	713	1,000	-	-	-	-	912	394	3,019	3,019	-	-	-	-	-	-	-	-	-	-
Period 3b Period-Dependent Costs																					
3b.4.1	Decon supplies	22	-	-	-	-	-	-	5	27	27	-	-	-	-	-	-	-	-	-	-
3b.4.2	Insurance	-	-	-	-	-	-	246	25	270	270	-	-	-	-	-	-	-	-	-	-
3b.4.3	Property taxes	-	-	-	-	-	-	2	0	2	2	-	-	-	-	-	-	-	-	-	-
3b.4.4	Health physics supplies	-	179	-	-	-	-	-	45	224	224	-	-	-	-	-	-	-	-	-	-
3b.4.5	Heavy equipment rental	-	184	-	-	-	-	-	28	212	212	-	-	-	-	-	-	-	-	-	-
3b.4.6	Disposal of DAW generated	-	-	2	1	-	35	-	9	48	48	-	-	-	754	-	-	-	6,913	2	-
3b.4.7	Plant energy budget	-	-	-	-	-	-	465	70	534	534	-	-	-	-	-	-	-	-	-	-
3b.4.8	NRC Fees	-	-	-	-	-	-	125	12	137	137	-	-	-	-	-	-	-	-	-	-
3b.4.9	Security Staff Cost	-	-	-	-	-	-	1,431	215	1,646	1,646	-	-	-	-	-	-	-	-	-	32,679
3b.4.10	DOC Staff Cost	-	-	-	-	-	-	4,378	657	5,035	5,035	-	-	-	-	-	-	-	-	-	58,560
3b.4.11	Utility Staff Cost	-	-	-	-	-	-	7,114	1,067	8,181	8,181	-	-	-	-	-	-	-	-	-	129,669
3b.4	Subtotal Period 3b Period-Dependent Costs	22	363	2	1	-	35	13,761	2,133	16,317	16,317	-	-	-	754	-	-	-	6,913	2	220,907

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3b.0	TOTAL PERIOD 3b COST	735	1,363	2	1	-	35	23,342	4,636	30,115	29,755	-	360	-	754	-	-	-	6,913	2	253,648
PERIOD 3 TOTALS		735	2,055	6	3	-	97	54,542	9,435	66,872	66,056	-	816	-	2,083	-	-	-	19,104	6	655,014
PERIOD 4a - Large Component Removal																					
Period 4a Direct Decommissioning Activities																					
Nuclear Steam Supply System Removal																					
4a.1.1.1	Recirculation System Piping & Valves	16	70	14	13	127	151	-	86	477	477	-	-	499	499	-	-	-	115,643	2,487	-
4a.1.1.2	Recirculation Pumps & Motors	6	28	11	26	-	321	-	95	488	488	-	-	-	1,188	-	-	-	132,880	1,125	-
4a.1.1.3	CRDMs & NIs Removal	24	139	377	68	-	317	-	174	1,099	1,099	-	-	-	6,935	-	-	-	126,494	3,972	-
4a.1.1.4	Reactor Vessel Internals	60	1,876	3,729	727	-	4,679	142	4,912	16,126	16,126	-	-	-	2,181	1,377	344	-	361,669	17,025	813
4a.1.1.5	Vessel & Internals GTCC Disposal	-	-	-	-	-	7,470	-	1,120	8,590	8,590	-	-	-	-	-	-	508	89,497	-	-
4a.1.1.6	Reactor Vessel	-	4,972	813	351	-	3,006	142	5,544	14,828	14,828	-	-	-	14,106	-	-	-	1,447,089	17,025	813
4a.1.1	Totals	106	7,085	4,945	1,185	127	15,944	283	11,932	41,608	41,608	-	-	499	24,908	1,377	344	508	2,273,272	41,634	1,626
Removal of Major Equipment																					
4a.1.2	Main Turbine/Generator	-	187	845	372	6,376	-	-	1,138	8,898	8,898	-	-	61,604	-	-	-	-	2,772,179	4,438	-
4a.1.3	Main Condensers	-	708	588	259	4,439	-	-	940	6,932	6,932	-	-	42,889	-	-	-	-	1,930,000	19,519	-
Cascading Costs from Clean Building Demolition																					
4a.1.4.1	Reactor	-	260	-	-	-	-	-	39	299	299	-	-	-	-	-	-	-	-	2,486	-
4a.1.4.2	Augmented Radwaste	-	25	-	-	-	-	-	4	28	28	-	-	-	-	-	-	-	-	235	-
4a.1.4.3	Radwaste	-	43	-	-	-	-	-	7	50	50	-	-	-	-	-	-	-	-	359	-
4a.1.4.4	Turbine	-	285	-	-	-	-	-	43	328	328	-	-	-	-	-	-	-	-	4,419	-
4a.1.4	Totals	-	613	-	-	-	-	-	92	705	705	-	-	-	-	-	-	-	-	7,498	-
Disposal of Plant Systems																					
4a.1.5.1	Augmented Radwaste El 877 Area1A	-	203	28	28	-	432	-	166	857	857	-	-	-	2,055	-	-	-	172,205	5,668	-
4a.1.5.2	Augmented Radwaste El 903 Area1A	-	66	6	7	-	104	-	44	228	228	-	-	-	469	-	-	-	41,606	1,842	-
4a.1.5.3	Augmented Radwaste El 918 Area1A	-	52	10	9	-	139	-	50	260	260	-	-	-	765	-	-	-	55,345	1,432	-
4a.1.5.4	Augmented Radwaste El 929 Area1A	-	21	4	5	-	73	-	25	127	127	-	-	-	324	-	-	-	29,038	579	-
4a.1.5.5	Augmented Radwaste El 929 Area1B	-	3	0	0	4	-	-	1	8	8	-	-	38	-	-	-	-	1,529	75	-
4a.1.5.6	DRYWELL Area1A	-	457	85	84	-	1,289	-	458	2,373	2,373	-	-	-	5,726	-	-	-	513,627	12,634	-
4a.1.5.7	DRYWELL Area1B	-	112	1	5	75	2	-	41	235	235	-	-	806	10	-	-	-	33,578	3,384	-
4a.1.5.8	Turbine El 932 Area1B	-	324	16	86	1,477	-	-	317	2,220	2,220	-	-	15,808	-	-	-	-	641,963	9,170	-
4a.1.5.9	Turbine El 932 Area2C	-	8	-	-	-	-	-	1	9	-	-	9	-	-	-	-	-	-	237	-
4a.1.5.10	Turbine El 932 Area3C	-	67	-	-	-	-	-	10	78	-	-	78	-	-	-	-	-	-	2,083	-
4a.1.5.11	Yard Area1B	-	518	50	264	4,517	-	-	852	6,201	6,201	-	-	48,365	-	-	-	-	1,964,114	14,340	-
4a.1.5	Totals	-	1,831	202	487	6,073	2,040	-	1,964	12,597	12,510	-	87	65,016	9,348	-	-	-	3,453,003	51,444	-
4a.1.6	Scaffolding in support of decommissioning	-	2,049	24	11	168	23	-	547	2,821	2,821	-	-	1,821	101	-	-	-	81,992	27,411	-
4a.1	Subtotal Period 4a Activity Costs	106	12,451	6,604	2,314	17,183	18,007	283	16,614	73,561	73,474	-	87	171,628	34,358	1,377	344	508	10,510,450	151,944	1,626
Period 4a Collateral Costs																					
4a.3.1	Process liquid waste	38	-	14	76	-	86	-	53	268	268	-	-	-	301	-	-	-	18,076	59	-
4a.3.2	Small tool allowance	-	87	-	-	-	-	-	13	101	91	-	10	-	-	-	-	-	-	-	-
4a.3	Subtotal Period 4a Collateral Costs	38	87	14	76	-	86	-	66	368	358	-	10	-	301	-	-	-	18,076	59	-
Period 4a Period-Dependent Costs																					
4a.4.1	Decon supplies	47	-	-	-	-	-	-	12	59	59	-	-	-	-	-	-	-	-	-	-
4a.4.2	Insurance	-	-	-	-	-	-	526	53	579	579	-	-	-	-	-	-	-	-	-	-
4a.4.3	Property taxes	-	-	-	-	-	-	4	0	5	4	-	0	-	-	-	-	-	-	-	-
4a.4.4	Health physics supplies	-	914	-	-	-	-	-	228	1,142	1,142	-	-	-	-	-	-	-	-	-	-
4a.4.5	Heavy equipment rental	-	1,899	-	-	-	-	-	285	2,183	2,183	-	-	-	-	-	-	-	-	-	-

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Period 4a Period-Dependent Costs (continued)																					
4a.4.6	Disposal of DAW generated	-	-	25	14	-	395	-	103	537	537	-	-	-	8,501	-	-	-	77,973	26	-
4a.4.7	Plant energy budget	-	-	-	-	-	-	946	142	1,087	1,087	-	-	-	-	-	-	-	-	-	-
4a.4.8	NRC Fees	-	-	-	-	-	-	707	71	778	778	-	-	-	-	-	-	-	-	-	-
4a.4.9	Liquid Radwaste Processing Equipment/Services	-	-	-	-	-	-	403	60	463	463	-	-	-	-	-	-	-	-	-	-
4a.4.10	Security Staff Cost	-	-	-	-	-	-	3,066	460	3,526	3,526	-	-	-	-	-	-	-	-	-	70,000
4a.4.11	DOC Staff Cost	-	-	-	-	-	-	11,154	1,673	12,828	12,828	-	-	-	-	-	-	-	-	-	154,560
4a.4.12	Utility Staff Cost	-	-	-	-	-	-	15,348	2,302	17,650	17,650	-	-	-	-	-	-	-	-	-	280,000
4a.4	Subtotal Period 4a Period-Dependent Costs	47	2,812	25	14	-	395	32,154	5,390	40,837	40,837	-	0	-	8,501	-	-	-	77,973	26	504,560
4a.0	TOTAL PERIOD 4a COST	191	15,351	6,643	2,404	17,183	18,488	32,437	22,070	114,767	114,669	-	97	171,628	43,159	1,377	344	508	10,606,500	152,029	506,186
PERIOD 4b - Site Decontamination																					
Period 4b Direct Decommissioning Activities																					
4b.1.1	Remove spent fuel racks	262	33	79	88	-	1,348	-	498	2,308	2,308	-	-	-	5,986	-	-	-	537,141	1,004	-
Disposal of Plant Systems																					
4b.1.2.1	Control El 882 Area1B	-	280	7	39	674	-	-	178	1,178	1,178	-	-	7,213	-	-	-	-	292,908	7,797	-
4b.1.2.2	Control El 903 Area1C	-	170	-	-	-	-	-	25	195	-	-	195	-	-	-	-	-	-	5,155	-
4b.1.2.3	Control El 918 Area1C	-	66	-	-	-	-	-	10	76	-	-	76	-	-	-	-	-	-	2,100	-
4b.1.2.4	Control El 932 Area1C	-	22	-	-	-	-	-	3	26	-	-	26	-	-	-	-	-	-	702	-
4b.1.2.5	Intake	-	101	-	-	-	-	-	15	116	-	-	116	-	-	-	-	-	-	3,136	-
4b.1.2.6	Multi-Purpose Facility	-	198	3	14	239	-	-	88	541	541	-	-	2,558	-	-	-	-	103,862	5,430	-
4b.1.2.7	Radwaste El 877 Area1A	-	398	75	62	-	949	-	353	1,836	1,836	-	-	-	5,097	-	-	-	377,917	10,930	-
4b.1.2.8	Radwaste El 877 Area2A	-	43	9	7	-	113	-	41	213	213	-	-	-	613	-	-	-	44,992	1,189	-
4b.1.2.9	Radwaste El 877 Area3A	-	71	16	13	-	201	-	72	372	372	-	-	-	1,156	-	-	-	79,983	1,969	-
4b.1.2.10	Radwaste El 903 Area1A	-	110	9	10	-	153	-	68	351	351	-	-	-	684	-	-	-	61,153	3,015	-
4b.1.2.11	Radwaste El 903 Area2A	-	188	36	29	-	439	-	165	856	856	-	-	-	1,955	-	-	-	175,093	5,282	-
4b.1.2.12	Radwaste El 903 Area3A	-	37	6	7	-	104	-	37	190	190	-	-	-	463	-	-	-	41,366	1,029	-
4b.1.2.13	Radwaste El 918 Area1A	-	18	2	2	-	30	-	12	64	64	-	-	-	135	-	-	-	12,033	477	-
4b.1.2.14	Radwaste El 918 Area2A	-	16	3	3	-	39	-	15	75	75	-	-	-	201	-	-	-	15,667	448	-
4b.1.2.15	Radwaste El 918 Area3A	-	185	23	22	-	338	-	136	705	705	-	-	-	1,690	-	-	-	134,827	5,045	-
4b.1.2.16	Radwaste El 934 Area1A	-	26	3	4	-	60	-	22	115	115	-	-	-	266	-	-	-	23,735	680	-
4b.1.2.17	Radwaste El 934 Area2A	-	98	11	12	-	177	-	72	370	370	-	-	-	808	-	-	-	70,665	2,663	-
4b.1.2.18	Radwaste El 949 Area1A	-	12	1	2	-	24	-	9	47	47	-	-	-	105	-	-	-	9,381	305	-
4b.1.2.19	Reactor El 1001 Area1A	-	50	7	8	-	121	-	45	230	230	-	-	-	537	-	-	-	48,175	1,261	-
4b.1.2.20	Reactor El 1001 Area1B	-	62	1	4	64	-	-	26	157	157	-	-	689	-	-	-	-	27,979	1,681	-
4b.1.2.21	Reactor El 859 Area1A	-	71	15	16	-	246	-	83	430	430	-	-	-	1,091	-	-	-	97,874	2,024	-
4b.1.2.22	Reactor El 859 Area1B	-	440	11	58	994	-	-	269	1,771	1,771	-	-	10,641	-	-	-	-	432,136	12,411	-
4b.1.2.23	Reactor El 859 Area2A	-	72	25	26	-	401	-	125	648	648	-	-	-	1,780	-	-	-	159,714	2,094	-
4b.1.2.24	Reactor El 859 Area2B	-	69	1	8	131	-	-	38	247	247	-	-	1,406	-	-	-	-	57,093	1,954	-
4b.1.2.25	Reactor El 859 Area3A	-	47	9	9	-	137	-	48	251	251	-	-	-	608	-	-	-	54,543	1,321	-
4b.1.2.26	Reactor El 859 Area3B	-	33	0	2	42	-	-	15	93	93	-	-	453	-	-	-	-	18,381	951	-
4b.1.2.27	Reactor El 859 Area4A	-	50	9	8	-	117	-	44	227	227	-	-	-	520	-	-	-	46,666	1,374	-
4b.1.2.28	Reactor El 859 Area4B	-	17	0	2	31	-	-	9	59	59	-	-	331	-	-	-	-	13,424	476	-
4b.1.2.29	Reactor El 859 Area5A	-	63	16	17	-	262	-	85	443	443	-	-	-	1,163	-	-	-	104,381	1,798	-
4b.1.2.30	Reactor El 859 Area5B	-	37	0	2	41	-	-	16	98	98	-	-	442	-	-	-	-	17,962	1,087	-
4b.1.2.31	Reactor El 903 Area1A	-	401	56	42	-	651	-	275	1,424	1,424	-	-	-	2,892	-	-	-	259,190	10,497	-
4b.1.2.32	Reactor El 903 Area1B	-	451	6	32	550	-	-	201	1,240	1,240	-	-	5,890	-	-	-	-	239,197	12,496	-
4b.1.2.33	Reactor El 903 Area2A	-	4	0	0	-	6	-	3	14	14	-	-	-	26	-	-	-	2,372	120	-
4b.1.2.34	Reactor El 903 Area2B	-	69	2	11	190	-	-	48	320	320	-	-	2,039	-	-	-	-	82,815	1,915	-
4b.1.2.35	Reactor El 903 Area3A	-	32	10	11	-	167	-	52	272	272	-	-	-	741	-	-	-	66,518	929	-
4b.1.2.36	Reactor El 903 Area3B	-	21	1	3	52	-	-	14	90	90	-	-	553	-	-	-	-	22,464	618	-
4b.1.2.37	Reactor El 903 Area4A	-	27	8	9	-	136	-	43	223	223	-	-	-	606	-	-	-	54,373	776	-
4b.1.2.38	Reactor El 903 Area4B	-	21	1	3	52	-	-	14	90	90	-	-	559	-	-	-	-	22,692	597	-
4b.1.2.39	Reactor El 931 Area1A	-	25	3	3	-	52	-	20	104	104	-	-	-	232	-	-	-	20,858	670	-

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Cooper Nuclear 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 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
Disposal of Plant Systems (continued)																					
4b.1.2.40	Reactor El 931 Area1B	-	300	8	40	692	-	-	186	1,227	1,227	-	-	7,412	-	-	-	-	301,017	8,410	-
4b.1.2.41	Reactor El 931 Area2A	-	20	2	2	-	35	-	14	74	74	-	-	-	154	-	-	-	13,824	544	-
4b.1.2.42	Reactor El 931 Area2B	-	2	0	0	1	0	-	1	3	3	-	-	9	0	-	-	-	371	53	-
4b.1.2.43	Reactor El 931 Area3A	-	77	23	22	-	336	-	109	567	567	-	-	-	1,651	-	-	-	134,007	2,165	-
4b.1.2.44	Reactor El 931 Area3B	-	2	0	0	1	-	-	1	3	3	-	-	8	-	-	-	-	340	49	-
4b.1.2.45	Reactor El 931 Area4C	-	24	-	-	-	-	-	4	28	-	-	28	-	-	-	-	-	-	767	-
4b.1.2.46	Reactor El 931 Area5C	-	7	-	-	-	-	-	1	8	-	-	8	-	-	-	-	-	-	213	-
4b.1.2.47	Reactor El 958 Area1A	-	56	9	10	-	149	-	54	278	278	-	-	-	662	-	-	-	59,432	1,472	-
4b.1.2.48	Reactor El 958 Area1B	-	167	3	16	281	-	-	87	554	554	-	-	3,009	-	-	-	-	122,212	4,693	-
4b.1.2.49	Reactor El 958 Area2A	-	31	10	10	-	153	-	49	253	253	-	-	-	681	-	-	-	61,083	880	-
4b.1.2.50	Reactor El 958 Area2B	-	10	1	1	12	7	-	6	37	37	-	-	125	33	-	-	-	8,024	263	-
4b.1.2.51	Reactor El 958 Area3A	-	33	4	3	-	48	-	21	109	109	-	-	-	214	-	-	-	19,185	898	-
4b.1.2.52	Reactor El 958 Area3B	-	14	1	1	10	6	-	7	39	39	-	-	109	29	-	-	-	7,011	410	-
4b.1.2.53	Reactor El 976 Area1A	-	11	1	1	-	16	-	7	36	36	-	-	-	72	-	-	-	6,482	298	-
4b.1.2.54	Reactor El 976 Area1B	-	147	5	25	422	-	-	104	703	703	-	-	4,521	-	-	-	-	183,615	3,931	-
4b.1.2.55	Reactor El 976 Area2A	-	7	1	1	-	13	-	5	26	26	-	-	-	57	-	-	-	5,136	172	-
4b.1.2.56	Reactor El 976 Area2B	-	37	1	3	55	-	-	18	114	114	-	-	586	-	-	-	-	23,813	1,033	-
4b.1.2.57	Turbine El 882 Area1A	-	37	3	3	-	50	-	23	116	116	-	-	-	222	-	-	-	19,878	1,004	-
4b.1.2.58	Turbine El 882 Area1B	-	386	16	87	1,490	-	-	335	2,313	2,313	-	-	15,948	-	-	-	-	647,659	11,113	-
4b.1.2.59	Turbine El 882 Area2A	-	21	2	2	-	29	-	13	67	67	-	-	-	129	-	-	-	11,556	584	-
4b.1.2.60	Turbine El 882 Area2B	-	209	4	22	374	-	-	112	721	721	-	-	4,006	-	-	-	-	162,678	5,781	-
4b.1.2.61	Turbine El 882 Area3A	-	16	2	1	-	23	-	10	52	52	-	-	-	101	-	-	-	9,017	451	-
4b.1.2.62	Turbine El 882 Area3B	-	607	27	145	2,478	-	-	548	3,805	3,805	-	-	26,533	-	-	-	-	1,077,531	17,302	-
4b.1.2.63	Turbine El 903 Area1A	-	9	1	1	-	15	-	6	32	32	-	-	-	68	-	-	-	6,127	232	-
4b.1.2.64	Turbine El 903 Area1B	-	974	46	241	4,133	-	-	904	6,299	6,299	-	-	44,251	-	-	-	-	1,797,054	27,674	-
4b.1.2.65	Turbine El 903 Area2A	-	5	1	1	-	9	-	4	20	20	-	-	-	42	-	-	-	3,729	142	-
4b.1.2.66	Turbine El 903 Area2B	-	144	1	7	128	-	-	56	337	337	-	-	1,375	-	-	-	-	55,851	4,040	-
4b.1.2.67	Turbine El 903 Area3B	-	3	0	2	35	-	-	8	47	47	-	-	376	-	-	-	-	15,251	97	-
4b.1.2.68	Turbine El 903 Area3C	-	108	-	-	-	-	-	16	124	-	-	124	-	-	-	-	-	-	3,412	-
4b.1.2.69	Turbine El 903 Area4B	-	12	0	2	28	-	-	7	49	49	-	-	299	-	-	-	-	12,139	367	-
4b.1.2.70	Yard Area1C	-	197	-	-	-	-	-	30	227	-	-	227	-	-	-	-	-	-	5,770	-
4b.1.2	Totals	-	7,771	556	1,148	13,202	5,814	-	5,535	34,027	33,227	-	800	141,342	27,486	-	-	-	8,056,388	218,627	-
4b.1.3	Scaffolding in support of decommissioning	-	3,073	36	17	252	34	-	821	4,232	4,232	-	-	2,431	151	-	-	-	122,988	41,117	-
Decontamination of Site Buildings																					
4b.1.4.1	Reactor	2,880	1,820	202	422	4,911	2,376	-	3,310	15,922	15,922	-	-	52,579	39,536	-	-	-	6,069,283	115,053	-
4b.1.4.2	Augmented Radwaste	52	19	4	6	23	60	-	51	215	215	-	-	242	1,099	-	-	-	119,386	1,978	-
4b.1.4.3	Miscellaneous Structures - Contaminated	368	167	15	42	759	62	-	363	1,777	1,777	-	-	8,129	452	-	-	-	372,774	12,956	-
4b.1.4.4	Multi-Purpose Facility	68	55	8	12	115	89	-	90	437	437	-	-	1,234	1,567	-	-	-	205,066	3,237	-
4b.1.4.5	Radwaste	159	50	9	14	38	161	-	141	572	572	-	-	404	2,953	-	-	-	310,769	5,863	-
4b.1.4.6	Turbine	526	142	35	51	64	633	-	477	1,928	1,928	-	-	688	11,664	-	-	-	1,193,496	18,679	-
4b.1.4	Totals	4,055	2,253	271	547	5,910	3,382	-	4,432	20,850	20,850	-	-	63,275	57,271	-	-	-	8,270,774	157,766	-
4b.1	Subtotal Period 4b Activity Costs	4,318	13,131	942	1,800	19,364	10,578	-	11,285	61,417	60,618	-	800	207,048	90,895	-	-	-	16,987,290	418,513	-
Period 4b Additional Costs																					
4b.2.1	ISFSI Decontamination	-	656	4	24	-	55	1,192	360	2,290	-	2,290	-	-	1,050	-	-	-	162,629	17,515	2,560
4b.2.2	Final Site Survey	-	-	-	-	-	-	1,205	362	1,567	1,567	-	-	-	-	-	-	-	-	-	12,480
4b.2	Subtotal Period 4b Additional Costs	-	656	4	24	-	55	2,397	722	3,857	1,567	2,290	-	-	1,050	-	-	-	162,629	17,515	15,040
Period 4b Collateral Costs																					
4b.3.1	Process liquid waste	79	-	30	161	-	183	-	113	568	568	-	-	-	639	-	-	-	38,338	125	-
4b.3.2	Small tool allowance	-	230	-	-	-	-	-	35	265	265	-	-	-	-	-	-	-	-	-	-
4b.3.3	Decommissioning Equipment Disposition	-	-	88	50	621	84	-	130	973	973	-	-	6,000	373	-	-	-	303,507	88	-
4b.3	Subtotal Period 4b Collateral Costs	79	230	118	210	621	267	-	278	1,804	1,804	-	-	6,000	1,012	-	-	-	341,844	213	-

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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			
Period 4b Period-Dependent Costs																					
4b.4.1	Decon supplies	1,252	-	-	-	-	-	-	313	1,565	1,565	-	-	-	-	-	-	-	-	-	-
4b.4.2	Insurance	-	-	-	-	-	-	1,199	120	1,319	1,319	-	-	-	-	-	-	-	-	-	-
4b.4.3	Property taxes	-	-	-	-	-	-	10	1	11	11	-	-	-	-	-	-	-	-	-	-
4b.4.4	Health physics supplies	-	2,378	-	-	-	-	-	594	2,972	2,972	-	-	-	-	-	-	-	-	-	-
4b.4.5	Heavy equipment rental	-	4,294	-	-	-	-	-	644	4,938	4,938	-	-	-	-	-	-	-	-	-	-
4b.4.6	Disposal of DAW generated	-	-	55	31	-	876	-	229	1,192	1,192	-	-	-	18,853	-	-	-	172,932	58	-
4b.4.7	Plant energy budget	-	-	-	-	-	-	1,701	255	1,956	1,956	-	-	-	-	-	-	-	-	-	-
4b.4.8	NRC Fees	-	-	-	-	-	-	1,610	161	1,771	1,771	-	-	-	-	-	-	-	-	-	-
4b.4.9	Liquid Radwaste Processing Equipment/Services	-	-	-	-	-	-	918	138	1,055	1,055	-	-	-	-	-	-	-	-	-	-
4b.4.10	Security Staff Cost	-	-	-	-	-	-	6,984	1,048	8,032	8,032	-	-	-	-	-	-	-	-	-	159,464
4b.4.11	DOC Staff Cost	-	-	-	-	-	-	24,760	3,714	28,474	28,474	-	-	-	-	-	-	-	-	-	341,891
4b.4.12	Utility Staff Cost	-	-	-	-	-	-	33,266	4,990	38,256	38,256	-	-	-	-	-	-	-	-	-	602,137
4b.4	Subtotal Period 4b Period-Dependent Costs	1,252	6,672	55	31	-	876	70,448	12,207	91,542	91,542	-	-	-	18,853	-	-	-	172,932	58	1,103,493
4b.0	TOTAL PERIOD 4b COST	5,649	20,689	1,119	2,064	19,985	11,776	72,845	24,492	158,620	155,530	2,290	800	213,048	111,810	-	-	-	17,664,700	436,298	1,118,533
PERIOD 4e - License Termination																					
Period 4e Direct Decommissioning Activities																					
4e.1.1	ORISE confirmatory survey	-	-	-	-	-	-	147	44	191	191	-	-	-	-	-	-	-	-	-	-
4e.1.2	Terminate license									a											
4e.1	Subtotal Period 4e Activity Costs	-	-	-	-	-	-	147	44	191	191	-	-	-	-	-	-	-	-	-	-
Period 4e Additional Costs																					
4e.2.1	Final Site Survey	-	-	-	-	-	-	5,998	1,799	7,797	7,797	-	-	-	-	-	-	-	-	148,435	6,240
4e.2	Subtotal Period 4e Additional Costs	-	-	-	-	-	-	5,998	1,799	7,797	7,797	-	-	-	-	-	-	-	-	148,435	6,240
Period 4e Collateral Costs																					
4e.3.1	DOC staff relocation expenses	-	-	-	-	-	-	912	137	1,049	1,049	-	-	-	-	-	-	-	-	-	-
4e.3	Subtotal Period 4e Collateral Costs	-	-	-	-	-	-	912	137	1,049	1,049	-	-	-	-	-	-	-	-	-	-
Period 4e Period-Dependent Costs																					
4e.4.1	Insurance	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4e.4.2	Property taxes	-	-	-	-	-	-	3	0	3	3	-	-	-	-	-	-	-	-	-	-
4e.4.3	Health physics supplies	-	735	-	-	-	-	-	184	919	919	-	-	-	-	-	-	-	-	-	-
4e.4.4	Disposal of DAW generated	-	-	3	1	-	42	-	11	57	57	-	-	-	904	-	-	-	8,294	3	-
4e.4.5	Plant energy budget	-	-	-	-	-	-	139	21	160	160	-	-	-	-	-	-	-	-	-	-
4e.4.6	NRC Fees	-	-	-	-	-	-	530	53	583	583	-	-	-	-	-	-	-	-	-	-
4e.4.7	Security Staff Cost	-	-	-	-	-	-	1,009	151	1,160	1,160	-	-	-	-	-	-	-	-	-	18,789
4e.4.8	DOC Staff Cost	-	-	-	-	-	-	4,442	666	5,108	5,108	-	-	-	-	-	-	-	-	-	57,149
4e.4.9	Utility Staff Cost	-	-	-	-	-	-	4,678	702	5,379	5,379	-	-	-	-	-	-	-	-	-	74,371
4e.4	Subtotal Period 4e Period-Dependent Costs	-	735	3	1	-	42	10,800	1,788	13,369	13,369	-	-	-	904	-	-	-	8,294	3	150,309
4e.0	TOTAL PERIOD 4e COST	-	735	3	1	-	42	17,857	3,768	22,407	22,407	-	-	-	904	-	-	-	8,294	148,438	156,549
PERIOD 4 TOTALS		5,840	36,775	7,765	4,470	37,168	30,307	123,139	50,330	295,793	292,606	2,290	897	384,676	155,874	1,377	344	508	28,279,480	736,765	1,781,267
PERIOD 5b - Site Restoration																					
Period 5b Direct Decommissioning Activities																					
Demolition of Remaining Site Buildings																					
5b.1.1.1	Reactor	-	1,491	-	-	-	-	-	224	1,715	-	-	1,715	-	-	-	-	-	-	14,601	-
5b.1.1.2	Augmented Radwaste	-	222	-	-	-	-	-	33	255	-	-	255	-	-	-	-	-	-	2,119	-
5b.1.1.3	Control	-	214	-	-	-	-	-	32	246	-	-	246	-	-	-	-	-	-	1,655	-
5b.1.1.4	Intake Structure	-	523	-	-	-	-	-	78	602	-	-	602	-	-	-	-	-	-	5,621	-

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Demolition of Remaining Site Buildings (continued)																					
5b.1.1.5	LLRW Storage Pad	-	145	-	-	-	-	-	22	167	-	-	167	-	-	-	-	-	-	1,227	-
5b.1.1.6	Miscellaneous Structures - Clean	-	1,196	-	-	-	-	-	179	1,375	-	-	1,375	-	-	-	-	-	-	11,837	-
5b.1.1.7	Miscellaneous Structures - Contaminated	-	27	-	-	-	-	-	4	30	-	-	30	-	-	-	-	-	-	572	-
5b.1.1.8	Multi-Purpose Facility	-	123	-	-	-	-	-	18	141	-	-	141	-	-	-	-	-	-	1,982	-
5b.1.1.9	OWC Gas Generator	-	18	-	-	-	-	-	3	20	-	-	20	-	-	-	-	-	-	283	-
5b.1.1.10	Office	-	156	-	-	-	-	-	23	179	-	-	179	-	-	-	-	-	-	1,920	-
5b.1.1.11	Radwaste	-	391	-	-	-	-	-	59	449	-	-	449	-	-	-	-	-	-	3,229	-
5b.1.1.12	Seal Well	-	17	-	-	-	-	-	3	20	-	-	20	-	-	-	-	-	-	166	-
5b.1.1.13	Sewage Treatment Area	-	4	-	-	-	-	-	1	5	-	-	5	-	-	-	-	-	-	53	-
5b.1.1.14	Transformer Yard	-	20	-	-	-	-	-	3	24	-	-	24	-	-	-	-	-	-	172	-
5b.1.1.15	Turbine	-	2,596	-	-	-	-	-	389	2,985	-	-	2,985	-	-	-	-	-	-	40,503	-
5b.1.1.16	Turbine Pedestal	-	277	-	-	-	-	-	42	318	-	-	318	-	-	-	-	-	-	2,100	-
5b.1.1	Totals	-	7,418	-	-	-	-	-	1,113	8,531	-	-	8,531	-	-	-	-	-	-	88,040	-
Site Closeout Activities																					
5b.1.2	Remove Rubble	-	424	-	-	-	-	-	64	488	-	-	488	-	-	-	-	-	-	3,286	-
5b.1.3	Grade & landscape site	-	578	-	-	-	-	-	87	665	-	-	665	-	-	-	-	-	-	1,578	-
5b.1.4	Final report to NRC	-	-	-	-	-	-	156	23	179	179	-	-	-	-	-	-	-	-	-	1,560
5b.1	Subtotal Period 5b Activity Costs	-	8,421	-	-	-	-	156	1,286	9,863	179	-	9,684	-	-	-	-	-	-	92,904	1,560
Period 5b Additional Costs																					
5b.2.1	ISFSI Demolition	-	487	-	-	-	-	44	80	611	-	611	-	-	-	-	-	-	-	4,336	160
5b.2.2	Concrete Crushing	-	499	-	-	-	-	8	76	582	-	-	582	-	-	-	-	-	-	3,045	-
5b.2.3	Cofferdam	-	458	-	-	-	-	-	69	527	-	-	527	-	-	-	-	-	-	5,130	-
5b.2	Subtotal Period 5b Additional Costs	-	1,444	-	-	-	-	52	224	1,720	-	611	1,109	-	-	-	-	-	-	12,511	160
Period 5b Collateral Costs																					
5b.3.1	Small tool allowance	-	55	-	-	-	-	-	8	63	-	-	63	-	-	-	-	-	-	-	-
5b.3	Subtotal Period 5b Collateral Costs	-	55	-	-	-	-	-	8	63	-	-	63	-	-	-	-	-	-	-	-
Period 5b Period-Dependent Costs																					
5b.4.1	Insurance	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5b.4.2	Property taxes	-	-	-	-	-	-	7	1	8	-	-	8	-	-	-	-	-	-	-	-
5b.4.3	Heavy equipment rental	-	4,233	-	-	-	-	-	635	4,869	-	-	4,869	-	-	-	-	-	-	-	-
5b.4.4	Plant energy budget	-	-	-	-	-	-	167	25	192	-	-	192	-	-	-	-	-	-	-	-
5b.4.5	Security Staff Cost	-	-	-	-	-	-	2,419	363	2,782	-	-	2,782	-	-	-	-	-	-	-	45,051
5b.4.6	DOC Staff Cost	-	-	-	-	-	-	10,212	1,532	11,744	-	-	11,744	-	-	-	-	-	-	-	127,646
5b.4.7	Utility Staff Cost	-	-	-	-	-	-	4,507	676	5,183	-	-	5,183	-	-	-	-	-	-	-	73,209
5b.4	Subtotal Period 5b Period-Dependent Costs	-	4,233	-	-	-	-	17,312	3,232	24,777	-	-	24,777	-	-	-	-	-	-	-	245,906
5b.0	TOTAL PERIOD 5b COST	-	14,153	-	-	-	-	17,520	4,751	36,424	179	611	35,634	-	-	-	-	-	-	105,415	247,626
PERIOD 5 TOTALS		-	14,153	-	-	-	-	17,520	4,751	36,424	179	611	35,634	-	-	-	-	-	-	105,415	247,626
TOTAL COST TO DECOMMISSION		13,012	59,570	8,087	5,424	37,168	34,469	618,965	131,014	907,708	674,964	195,398	37,347	384,676	227,370	1,377	344	508	29,135,660	973,379	7,882,560

Table C-3
Cooper Nuclear Station
2014 SAFSTOR Decommissioning Cost Estimate
(thousands of 2008 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 16.87% CONTINGENCY:	$907,708	thousands of 2008 dollars
TOTAL NRC LICENSE TERMINATION COST IS 74.36% OR:	$674,964	thousands of 2008 dollars
SPENT FUEL MANAGEMENT COST IS 21.53% OR:	$195,398	thousands of 2008 dollars
NON-NUCLEAR DEMOLITION COST IS 4.11% OR:	$37,347	thousands of 2008 dollars
TOTAL LOW-LEVEL RADIOACTIVE WASTE VOLUME BURIED (EXCLUDING GTCC):	229,092	cubic feet
TOTAL GREATER THAN CLASS C RADWASTE VOLUME GENERATED:	508	cubic feet
TOTAL SCRAP METAL REMOVED:	30,276	tons
TOTAL CRAFT LABOR REQUIREMENTS:	973,379	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 ANALYSES

2034 CESSATION OF OPERATIONS

Table D-1
Cooper Nuclear Station
2034 DECON Decommissioning Cost Estimate
(thousands of 2008 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
PERIOD 1a - Shutdown through Transition																					
Period 1a Direct Decommissioning Activities																					
1a.1.1	Prepare preliminary decommissioning cost	-	-	-	-	-	-	130	20	150	150	-	-	-	-	-	-	-	-	-	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	-	-	-	-	-	-	200	30	230	230	-	-	-	-	-	-	-	-	-	2,000
1a.1.7	Review plant dwgs & specs.	-	-	-	-	-	-	460	69	529	529	-	-	-	-	-	-	-	-	-	4,600
1a.1.8	Perform detailed rad survey									a											
1a.1.9	Estimate by-product inventory	-	-	-	-	-	-	100	15	115	115	-	-	-	-	-	-	-	-	-	1,000
1a.1.10	End product description	-	-	-	-	-	-	100	15	115	115	-	-	-	-	-	-	-	-	-	1,000
1a.1.11	Detailed by-product inventory	-	-	-	-	-	-	130	20	150	150	-	-	-	-	-	-	-	-	-	1,300
1a.1.12	Define major work sequence	-	-	-	-	-	-	750	113	863	863	-	-	-	-	-	-	-	-	-	7,500
1a.1.13	Perform SER and EA	-	-	-	-	-	-	310	47	357	357	-	-	-	-	-	-	-	-	-	3,100
1a.1.14	Perform Site-Specific Cost Study	-	-	-	-	-	-	500	75	575	575	-	-	-	-	-	-	-	-	-	5,000
1a.1.15	Prepare/submit License Termination Plan	-	-	-	-	-	-	410	61	471	471	-	-	-	-	-	-	-	-	-	4,096
1a.1.16	Receive NRC approval of termination plan									a											
Activity Specifications																					
1a.1.17.1	Plant & temporary facilities	-	-	-	-	-	-	492	74	566	509	-	57	-	-	-	-	-	-	-	4,920
1a.1.17.2	Plant systems	-	-	-	-	-	-	417	63	479	431	-	48	-	-	-	-	-	-	-	4,167
1a.1.17.3	NSSS Decontamination Flush	-	-	-	-	-	-	50	8	58	58	-	-	-	-	-	-	-	-	-	500
1a.1.17.4	Reactor internals	-	-	-	-	-	-	710	107	817	817	-	-	-	-	-	-	-	-	-	7,100
1a.1.17.5	Reactor vessel	-	-	-	-	-	-	650	98	748	748	-	-	-	-	-	-	-	-	-	6,500
1a.1.17.6	Sacrificial shield	-	-	-	-	-	-	50	8	58	58	-	-	-	-	-	-	-	-	-	500
1a.1.17.7	Moisture separators/reheaters	-	-	-	-	-	-	100	15	115	115	-	-	-	-	-	-	-	-	-	1,000
1a.1.17.8	Reinforced concrete	-	-	-	-	-	-	160	24	184	92	-	92	-	-	-	-	-	-	-	1,600
1a.1.17.9	Main Turbine	-	-	-	-	-	-	209	31	240	240	-	-	-	-	-	-	-	-	-	2,088
1a.1.17.10	Main Condensers	-	-	-	-	-	-	209	31	240	240	-	-	-	-	-	-	-	-	-	2,088
1a.1.17.11	Pressure suppression structure	-	-	-	-	-	-	200	30	230	230	-	-	-	-	-	-	-	-	-	2,000
1a.1.17.12	Drywell	-	-	-	-	-	-	160	24	184	184	-	-	-	-	-	-	-	-	-	1,600
1a.1.17.13	Plant structures & buildings	-	-	-	-	-	-	312	47	359	179	-	179	-	-	-	-	-	-	-	3,120
1a.1.17.14	Waste management	-	-	-	-	-	-	460	69	529	529	-	-	-	-	-	-	-	-	-	4,600
1a.1.17.15	Facility & site closeout	-	-	-	-	-	-	90	14	104	52	-	52	-	-	-	-	-	-	-	900
1a.1.17	Total	-	-	-	-	-	-	4,268	640	4,909	4,481	-	428	-	-	-	-	-	-	-	42,683
Planning & Site Preparations																					
1a.1.18	Prepare dismantling sequence	-	-	-	-	-	-	240	36	276	276	-	-	-	-	-	-	-	-	-	2,400
1a.1.19	Plant prep. & temp. svces	-	-	-	-	-	-	2,700	405	3,105	3,105	-	-	-	-	-	-	-	-	-	-
1a.1.20	Design water clean-up system	-	-	-	-	-	-	140	21	161	161	-	-	-	-	-	-	-	-	-	1,400
1a.1.21	Rigging/Cont. Cntrl Envlps/tooling/etc.	-	-	-	-	-	-	2,100	315	2,415	2,415	-	-	-	-	-	-	-	-	-	-
1a.1.22	Procure casks/liners & containers	-	-	-	-	-	-	123	18	141	141	-	-	-	-	-	-	-	-	-	1,230
1a.1	Subtotal Period 1a Activity Costs	-	-	-	-	-	-	12,661	1,899	14,560	14,132	-	428	-	-	-	-	-	-	-	78,609
Period 1a Collateral Costs																					
1a.3.1	Spent Fuel Capital and Transfer	-	-	-	-	-	-	2,721	408	3,129	-	3,129	-	-	-	-	-	-	-	-	-
1a.3.2	Corporate Overheads	-	-	-	-	-	-	3,105	466	3,570	3,570	-	-	-	-	-	-	-	-	-	-
1a.3	Subtotal Period 1a Collateral Costs	-	-	-	-	-	-	5,825	874	6,699	3,570	3,129	-	-	-	-	-	-	-	-	-
Period 1a Period-Dependent Costs																					
1a.4.1	Insurance	-	-	-	-	-	-	1,600	160	1,760	1,760	-	-	-	-	-	-	-	-	-	-
1a.4.2	Property taxes	-	-	-	-	-	-	4	0	4	4	-	-	-	-	-	-	-	-	-	-
1a.4.3	Health physics supplies	-	370	-	-	-	-	-	93	463	463	-	-	-	-	-	-	-	-	-	-
1a.4.4	Heavy equipment rental	-	368	-	-	-	-	-	55	423	423	-	-	-	-	-	-	-	-	-	-

Table D-1
Cooper Nuclear Station
2034 DECON Decommissioning Cost Estimate
(thousands of 2008 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
Period 1a	Period-Dependent Costs (continued)																				
1a.4.5	Disposal of DAW generated	-	-	5	3	-	73	-	19	100	100	-	-	-	1,575	-	-	-	14,445	5	-
1a.4.6	Plant energy budget	-	-	-	-	-	-	927	139	1,066	1,066	-	-	-	-	-	-	-	-	-	-
1a.4.7	NRC Fees	-	-	-	-	-	-	706	71	776	776	-	-	-	-	-	-	-	-	-	-
1a.4.8	Emergency Planning Fees	-	-	-	-	-	-	1,185	118	1,303	-	1,303	-	-	-	-	-	-	-	-	-
1a.4.9	Spent Fuel Pool O&M	-	-	-	-	-	-	745	112	857	-	857	-	-	-	-	-	-	-	-	-
1a.4.10	ISFSI Operating Costs	-	-	-	-	-	-	85	13	98	-	98	-	-	-	-	-	-	-	-	-
1a.4.11	Security Staff Cost	-	-	-	-	-	-	5,483	822	6,306	6,306	-	-	-	-	-	-	-	-	-	157,471
1a.4.12	Utility Staff Cost	-	-	-	-	-	-	22,690	3,403	26,093	26,093	-	-	-	-	-	-	-	-	-	423,400
1a.4	Subtotal Period 1a Period-Dependent Costs	-	738	5	3	-	73	33,424	5,008	39,249	36,991	2,258	-	-	1,575	-	-	-	14,445	5	580,871
1a.0	TOTAL PERIOD 1a COST	-	738	5	3	-	73	51,910	7,779	60,508	54,693	5,387	428	-	1,575	-	-	-	14,445	5	659,480
PERIOD 1b - Decommissioning Preparations																					
Period 1b	Direct Decommissioning Activities																				
	Detailed Work Procedures																				
1b.1.1.1	Plant systems	-	-	-	-	-	-	473	71	544	490	-	54	-	-	-	-	-	-	-	4,733
1b.1.1.2	NSSS Decontamination Flush	-	-	-	-	-	-	100	15	115	115	-	-	-	-	-	-	-	-	-	1,000
1b.1.1.3	Reactor internals	-	-	-	-	-	-	400	60	460	460	-	-	-	-	-	-	-	-	-	4,000
1b.1.1.4	Remaining buildings	-	-	-	-	-	-	135	20	155	39	-	116	-	-	-	-	-	-	-	1,350
1b.1.1.5	CRD housings & NIs	-	-	-	-	-	-	100	15	115	115	-	-	-	-	-	-	-	-	-	1,000
1b.1.1.6	Incore instrumentation	-	-	-	-	-	-	100	15	115	115	-	-	-	-	-	-	-	-	-	1,000
1b.1.1.7	Removal primary containment	-	-	-	-	-	-	200	30	230	230	-	-	-	-	-	-	-	-	-	2,000
1b.1.1.8	Reactor vessel	-	-	-	-	-	-	363	54	417	417	-	-	-	-	-	-	-	-	-	3,630
1b.1.1.9	Facility closeout	-	-	-	-	-	-	120	18	138	69	-	69	-	-	-	-	-	-	-	1,200
1b.1.1.10	Sacrificial shield	-	-	-	-	-	-	120	18	138	138	-	-	-	-	-	-	-	-	-	1,200
1b.1.1.11	Reinforced concrete	-	-	-	-	-	-	100	15	115	58	-	58	-	-	-	-	-	-	-	1,000
1b.1.1.12	Main Turbine	-	-	-	-	-	-	208	31	239	239	-	-	-	-	-	-	-	-	-	2,080
1b.1.1.13	Main Condensers	-	-	-	-	-	-	209	31	240	240	-	-	-	-	-	-	-	-	-	2,088
1b.1.1.14	Moisture separators & reheaters	-	-	-	-	-	-	200	30	230	230	-	-	-	-	-	-	-	-	-	2,000
1b.1.1.15	Radwaste building	-	-	-	-	-	-	273	41	314	283	-	31	-	-	-	-	-	-	-	2,730
1b.1.1.16	Reactor building	-	-	-	-	-	-	273	41	314	283	-	31	-	-	-	-	-	-	-	2,730
1b.1.1	Total	-	-	-	-	-	-	3,374	506	3,880	3,520	-	360	-	-	-	-	-	-	-	33,741
1b.1.2	Decon NSSS	348	-	-	-	-	-	-	174	523	523	-	-	-	-	-	-	-	-	1,067	-
1b.1	Subtotal Period 1b Activity Costs	348	-	-	-	-	-	3,374	680	4,403	4,043	-	360	-	-	-	-	-	-	1,067	33,741
Period 1b	Additional Costs																				
1b.2.1	Spent Fuel Pool Isolation	-	-	-	-	-	-	9,407	1,411	10,818	10,818	-	-	-	-	-	-	-	-	-	-
1b.2.2	Site Characterization	-	-	-	-	-	-	5,395	1,619	7,014	7,014	-	-	-	-	-	-	-	-	-	-
1b.2.3	Asbestos Insulation Disposal	-	773	1	65	-	558	-	265	1,662	1,662	-	-	-	10,333	-	-	-	134,329	10,002	-
1b.2	Subtotal Period 1b Additional Costs	-	773	1	65	-	558	14,802	3,295	19,493	19,493	-	-	-	10,333	-	-	-	134,329	10,002	-
Period 1b	Collateral Costs																				
1b.3.1	Decon equipment	713	-	-	-	-	-	-	107	820	820	-	-	-	-	-	-	-	-	-	-
1b.3.2	DOC staff relocation expenses	-	-	-	-	-	-	912	137	1,049	1,049	-	-	-	-	-	-	-	-	-	-
1b.3.3	Process liquid waste	64	-	46	249	-	1,808	-	525	2,690	2,690	-	-	-	427	543	-	-	85,905	189	-
1b.3.4	Small tool allowance	-	11	-	-	-	-	-	2	12	12	-	-	-	-	-	-	-	-	-	-
1b.3.5	Pipe cutting equipment	-	1,000	-	-	-	-	-	150	1,150	1,150	-	-	-	-	-	-	-	-	-	-
1b.3.6	Decon rig	1,400	-	-	-	-	-	-	210	1,610	1,610	-	-	-	-	-	-	-	-	-	-
1b.3.7	Spent Fuel Capital and Transfer	-	-	-	-	-	-	1,880	282	2,162	-	2,162	-	-	-	-	-	-	-	-	-
1b.3.8	Corporate Overheads	-	-	-	-	-	-	1,554	233	1,787	1,787	-	-	-	-	-	-	-	-	-	-
1b.3	Subtotal Period 1b Collateral Costs	2,177	1,011	46	249	-	1,808	4,346	1,646	11,280	9,118	2,162	-	-	427	543	-	-	85,905	189	-

Table D-1
Cooper Nuclear Station
2034 DECON Decommissioning Cost Estimate
(thousands of 2008 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
Period 1b Period-Dependent Costs																					
1b.4.1	Decon supplies	22	-	-	-	-	-	-	5	27	27	-	-	-	-	-	-	-	-	-	-
1b.4.2	Insurance	-	-	-	-	-	-	244	24	269	269	-	-	-	-	-	-	-	-	-	-
1b.4.3	Property taxes	-	-	-	-	-	-	2	0	2	2	-	-	-	-	-	-	-	-	-	-
1b.4.4	Health physics supplies	-	242	-	-	-	-	-	60	302	302	-	-	-	-	-	-	-	-	-	-
1b.4.5	Heavy equipment rental	-	183	-	-	-	-	-	27	211	211	-	-	-	-	-	-	-	-	-	-
1b.4.6	Disposal of DAW generated	-	-	3	2	-	43	-	11	58	58	-	-	-	920	-	-	-	8,439	3	-
1b.4.7	Plant energy budget	-	-	-	-	-	-	924	139	1,063	1,063	-	-	-	-	-	-	-	-	-	-
1b.4.8	NRC Fees	-	-	-	-	-	-	352	35	387	387	-	-	-	-	-	-	-	-	-	-
1b.4.9	Emergency Planning Fees	-	-	-	-	-	-	591	59	650	-	650	-	-	-	-	-	-	-	-	-
1b.4.10	Spent Fuel Pool O&M	-	-	-	-	-	-	372	56	427	-	427	-	-	-	-	-	-	-	-	-
1b.4.11	ISFSI Operating Costs	-	-	-	-	-	-	42	6	49	-	49	-	-	-	-	-	-	-	-	-
1b.4.12	Security Staff Cost	-	-	-	-	-	-	2,734	410	3,144	3,144	-	-	-	-	-	-	-	-	-	78,520
1b.4.13	DOC Staff Cost	-	-	-	-	-	-	4,759	714	5,473	5,473	-	-	-	-	-	-	-	-	-	63,440
1b.4.14	Utility Staff Cost	-	-	-	-	-	-	11,380	1,707	13,086	13,086	-	-	-	-	-	-	-	-	-	212,160
1b.4	Subtotal Period 1b Period-Dependent Costs	22	425	3	2	-	43	21,400	3,255	25,149	24,023	1,126	-	-	920	-	-	-	8,439	3	354,120
1b.0	TOTAL PERIOD 1b COST	2,547	2,209	49	316	-	2,407	43,922	8,876	60,325	56,677	3,288	360	-	11,680	543	-	-	228,674	11,261	387,861
PERIOD 1 TOTALS		2,547	2,947	54	318	-	2,480	95,833	16,655	120,833	111,370	8,675	788	-	13,255	543	-	-	243,119	11,265	1,047,341
PERIOD 2a - Large Component Removal																					
Period 2a Direct Decommissioning Activities																					
Nuclear Steam Supply System Removal																					
2a.1.1.1	Recirculation System Piping & Valves	90	71	14	20	-	303	-	142	639	639	-	-	-	997	-	-	-	120,597	4,031	-
2a.1.1.2	Recirculation Pumps & Motors	33	28	11	29	-	321	-	109	532	532	-	-	-	1,188	-	-	-	132,880	1,683	-
2a.1.1.3	CRDMs & NIs Removal	133	139	377	92	-	317	-	232	1,291	1,291	-	-	-	6,935	-	-	-	126,494	6,209	-
2a.1.1.4	Reactor Vessel Internals	119	2,362	5,343	2,009	-	16,414	218	11,909	38,374	38,374	-	-	-	1,878	976	1,205	-	376,084	28,075	1,255
2a.1.1.5	Reactor Vessel	56	5,457	1,460	762	-	5,384	218	7,401	20,739	20,739	-	-	-	11,211	2,128	-	-	1,440,354	28,075	1,255
2a.1.1	Totals	431	8,058	7,205	2,912	-	22,739	437	19,794	61,576	61,576	-	-	-	22,209	3,104	1,205	-	2,196,409	68,073	2,510
Removal of Major Equipment																					
2a.1.2	Main Turbine/Generator	-	171	828	379	6,057	389	-	1,188	9,011	9,011	-	-	58,524	1,725	-	-	-	2,788,381	4,555	-
2a.1.3	Main Condensers	-	722	552	273	3,773	812	-	1,045	7,177	7,177	-	-	36,456	3,604	-	-	-	1,963,840	19,966	-
Cascading Costs from Clean Building Demolition																					
2a.1.4.1	Reactor	-	260	-	-	-	-	-	39	299	299	-	-	-	-	-	-	-	-	2,486	-
2a.1.4.2	Augmented Radwaste	-	25	-	-	-	-	-	4	28	28	-	-	-	-	-	-	-	-	235	-
2a.1.4.3	Radwaste	-	43	-	-	-	-	-	7	50	50	-	-	-	-	-	-	-	-	359	-
2a.1.4.4	Turbine	-	285	-	-	-	-	-	43	328	328	-	-	-	-	-	-	-	-	4,419	-
2a.1.4	Totals	-	613	-	-	-	-	-	92	705	705	-	-	-	-	-	-	-	-	7,498	-
Disposal of Plant Systems																					
2a.1.5.1	Augmented Radwaste El 877 Area1A	-	207	28	28	-	432	-	167	862	862	-	-	-	2,055	-	-	-	172,205	5,783	-
2a.1.5.2	Augmented Radwaste El 903 Area1A	-	68	6	7	-	104	-	45	230	230	-	-	-	469	-	-	-	41,606	1,889	-
2a.1.5.3	Augmented Radwaste El 918 Area1A	-	53	10	9	-	139	-	50	261	261	-	-	-	765	-	-	-	55,345	1,451	-
2a.1.5.4	Augmented Radwaste El 929 Area1A	-	21	4	5	-	73	-	25	128	128	-	-	-	324	-	-	-	29,038	591	-
2a.1.5.5	Augmented Radwaste El 929 Area1B	-	3	0	0	3	0	-	1	8	8	-	-	36	1	-	-	-	1,538	77	-
2a.1.5.6	DRYWELL Area1A	-	534	85	84	-	1,289	-	477	2,470	2,470	-	-	-	5,726	-	-	-	513,827	15,069	-
2a.1.5.7	DRYWELL Area1B	-	134	3	5	54	28	-	50	274	274	-	-	577	126	-	-	-	34,718	4,142	-
2a.1.5.8	Multi-Purpose Facility	-	202	6	15	201	47	-	95	566	566	-	-	2,148	214	-	-	-	105,982	5,547	-
2a.1.5.9	Reactor El 903 Area1A	-	404	56	42	-	651	-	276	1,428	1,428	-	-	-	2,892	-	-	-	259,190	10,573	-
2a.1.5.10	Reactor El 903 Area1B	-	462	13	34	443	131	-	221	1,305	1,305	-	-	4,739	583	-	-	-	244,706	12,864	-
2a.1.5.11	Turbine El 932 Area1B	-	332	52	99	882	725	-	416	2,505	2,505	-	-	9,442	3,220	-	-	-	672,225	9,481	-
2a.1.5.12	Turbine El 932 Area2C	-	8	-	-	-	-	-	1	9	-	-	9	-	-	-	-	-	-	237	-

Table D-1
Cooper Nuclear Station
2034 DECON Decommissioning Cost Estimate
(thousands of 2008 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
Disposal of Plant Systems (continued)																					
2a.1.5.13	Turbine El 932 Area3C	-	67	-	-	-	-	-	10	78	-	-	78	-	-	-	-	-	-	2,083	-
2a.1.5.14	Yard Area1B	-	518	110	284	3,535	1,198	-	1,013	6,657	6,657	-	-	37,846	5,399	-	-	-	2,014,081	14,477	-
2a.1.5	Totals	-	3,013	374	612	5,117	4,817	-	2,847	16,780	16,693	-	87	54,788	21,774	-	-	-	4,144,259	84,262	-
2a.1.6	Scaffolding in support of decommissioning	-	2,070	24	11	168	23	-	553	2,848	2,848	-	-	1,621	101	-	-	-	81,992	28,092	-
2a.1	Subtotal Period 2a Activity Costs	431	14,647	8,983	4,186	15,116	28,780	437	25,519	98,097	98,010	-	87	151,388	49,413	3,104	1,205	-	11,174,880	212,445	2,510
Period 2a Collateral Costs																					
2a.3.1	Process liquid waste	135	-	44	231	-	264	-	173	847	847	-	-	-	921	-	-	-	55,244	180	-
2a.3.2	Small tool allowance	-	124	-	-	-	-	-	19	143	129	-	14	-	-	-	-	-	-	-	-
2a.3.3	Spent Fuel Capital and Transfer	-	-	-	-	-	-	5,279	792	6,070	-	6,070	-	-	-	-	-	-	-	-	-
2a.3.4	Corporate Overheads	-	-	-	-	-	-	3,202	480	3,682	3,682	-	-	-	-	-	-	-	-	-	-
2a.3	Subtotal Period 2a Collateral Costs	135	124	44	231	-	264	8,480	1,463	10,742	4,657	6,070	14	-	921	-	-	-	55,244	180	-
Period 2a Period-Dependent Costs																					
2a.4.1	Decon supplies	61	-	-	-	-	-	-	15	76	76	-	-	-	-	-	-	-	-	-	-
2a.4.2	Insurance	-	-	-	-	-	-	688	69	756	756	-	-	-	-	-	-	-	-	-	-
2a.4.3	Property taxes	-	-	-	-	-	-	6	1	6	6	-	1	-	-	-	-	-	-	-	-
2a.4.4	Health physics supplies	-	1,262	-	-	-	-	-	315	1,577	1,577	-	-	-	-	-	-	-	-	-	-
2a.4.5	Heavy equipment rental	-	2,480	-	-	-	-	-	372	2,852	2,852	-	-	-	-	-	-	-	-	-	-
2a.4.6	Disposal of DAW generated	-	-	34	19	-	537	-	140	730	730	-	-	-	11,545	-	-	-	105,898	35	-
2a.4.7	Plant energy budget	-	-	-	-	-	-	1,235	185	1,420	1,420	-	-	-	-	-	-	-	-	-	-
2a.4.8	NRC Fees	-	-	-	-	-	-	923	92	1,016	1,016	-	-	-	-	-	-	-	-	-	-
2a.4.9	Emergency Planning Fees	-	-	-	-	-	-	1,183	118	1,301	-	1,301	-	-	-	-	-	-	-	-	-
2a.4.10	Spent Fuel Pool O&M	-	-	-	-	-	-	1,046	157	1,203	-	1,203	-	-	-	-	-	-	-	-	-
2a.4.11	ISFSI Operating Costs	-	-	-	-	-	-	119	18	137	-	137	-	-	-	-	-	-	-	-	-
2a.4.12	Security Staff Cost	-	-	-	-	-	-	6,631	995	7,626	7,626	-	-	-	-	-	-	-	-	-	185,051
2a.4.13	DOC Staff Cost	-	-	-	-	-	-	16,275	2,441	18,716	18,716	-	-	-	-	-	-	-	-	-	222,354
2a.4.14	Utility Staff Cost	-	-	-	-	-	-	22,962	3,444	26,407	26,407	-	-	-	-	-	-	-	-	-	413,989
2a.4	Subtotal Period 2a Period-Dependent Costs	61	3,741	34	19	-	537	51,067	8,363	63,822	61,182	2,640	1	-	11,545	-	-	-	105,898	35	821,394
2a.0	TOTAL PERIOD 2a COST	627	18,513	9,060	4,437	15,116	29,580	59,985	35,345	172,662	163,849	8,711	102	151,388	61,878	3,104	1,205	-	11,336,020	212,660	823,904
PERIOD 2b - Site Decontamination																					
Period 2b Direct Decommissioning Activities																					
Disposal of Plant Systems																					
2b.1.1.1	Control El 882 Area1B	-	285	17	42	554	147	-	199	1,243	1,243	-	-	5,929	674	-	-	-	299,222	7,975	-
2b.1.1.2	Control El 903 Area1C	-	170	-	-	-	-	-	25	195	-	-	195	-	-	-	-	-	-	5,155	-
2b.1.1.3	Control El 918 Area1C	-	66	-	-	-	-	-	10	76	-	-	76	-	-	-	-	-	-	2,100	-
2b.1.1.4	Control El 932 Area1C	-	22	-	-	-	-	-	3	26	-	-	26	-	-	-	-	-	-	702	-
2b.1.1.5	Intake	-	101	-	-	-	-	-	15	116	-	-	116	-	-	-	-	-	-	3,136	-
2b.1.1.6	Radwaste El 877 Area1A	-	405	75	62	-	949	-	355	1,845	1,845	-	-	-	5,097	-	-	-	377,917	11,133	-
2b.1.1.7	Radwaste El 877 Area2A	-	44	9	7	-	113	-	41	214	214	-	-	-	613	-	-	-	44,992	1,207	-
2b.1.1.8	Radwaste El 877 Area3A	-	84	16	13	-	201	-	75	388	388	-	-	-	1,156	-	-	-	79,963	2,349	-
2b.1.1.9	Radwaste El 903 Area1A	-	113	9	10	-	153	-	69	355	355	-	-	-	684	-	-	-	61,153	3,102	-
2b.1.1.10	Radwaste El 903 Area2A	-	192	36	29	-	439	-	166	861	861	-	-	-	1,955	-	-	-	175,093	5,412	-
2b.1.1.11	Radwaste El 903 Area3A	-	37	6	7	-	104	-	37	191	191	-	-	-	463	-	-	-	41,366	1,047	-
2b.1.1.12	Radwaste El 918 Area1A	-	21	2	2	-	30	-	13	68	68	-	-	-	135	-	-	-	12,033	572	-
2b.1.1.13	Radwaste El 918 Area2A	-	17	3	3	-	39	-	15	76	76	-	-	-	201	-	-	-	15,667	455	-
2b.1.1.14	Radwaste El 918 Area3A	-	189	23	22	-	338	-	137	710	710	-	-	-	1,690	-	-	-	134,827	5,152	-
2b.1.1.15	Radwaste El 934 Area1A	-	26	3	4	-	60	-	22	115	115	-	-	-	266	-	-	-	23,735	692	-
2b.1.1.16	Radwaste El 934 Area2A	-	100	11	12	-	177	-	72	372	372	-	-	-	808	-	-	-	70,665	2,706	-
2b.1.1.17	Radwaste El 949 Area1A	-	12	1	2	-	24	-	9	47	47	-	-	-	105	-	-	-	9,381	310	-

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Cooper Nuclear Station
2034 DECON Decommissioning Cost Estimate
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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 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
Disposal of Plant Systems (continued)																					
2b.1.1.18	Reactor El 859 Area1A	-	72	15	16	-	246	-	83	432	432	-	-	-	1,091	-	-	-	97,874	2,068	-
2b.1.1.19	Reactor El 859 Area1B	-	449	28	64	712	344	-	317	1,914	1,914	-	-	7,624	1,526	-	-	-	448,483	12,748	-
2b.1.1.20	Reactor El 859 Area2A	-	73	25	26	-	401	-	125	650	650	-	-	-	1,780	-	-	-	159,714	2,137	-
2b.1.1.21	Reactor El 859 Area2B	-	70	3	8	99	40	-	44	264	264	-	-	1,055	177	-	-	-	58,760	2,009	-
2b.1.1.22	Reactor El 859 Area3A	-	48	9	9	-	137	-	49	252	252	-	-	-	608	-	-	-	54,543	1,356	-
2b.1.1.23	Reactor El 859 Area3B	-	34	2	3	23	23	-	18	103	103	-	-	249	103	-	-	-	19,362	975	-
2b.1.1.24	Reactor El 859 Area4A	-	51	9	8	-	117	-	44	229	229	-	-	-	520	-	-	-	46,666	1,416	-
2b.1.1.25	Reactor El 859 Area4B	-	17	1	2	19	14	-	11	65	65	-	-	208	62	-	-	-	14,010	467	-
2b.1.1.26	Reactor El 859 Area5A	-	64	16	17	-	262	-	86	445	445	-	-	-	1,163	-	-	-	104,381	1,839	-
2b.1.1.27	Reactor El 859 Area5B	-	38	2	3	23	23	-	19	107	107	-	-	242	102	-	-	-	18,927	1,114	-
2b.1.1.28	Reactor El 903 Area2A	-	4	0	0	-	6	-	3	14	14	-	-	-	26	-	-	-	2,372	123	-
2b.1.1.29	Reactor El 903 Area2B	-	71	5	12	149	51	-	55	342	342	-	-	1,594	225	-	-	-	84,943	1,983	-
2b.1.1.30	Reactor El 903 Area3A	-	37	10	11	-	167	-	54	279	279	-	-	-	741	-	-	-	66,516	1,109	-
2b.1.1.31	Reactor El 903 Area3B	-	25	2	3	37	17	-	17	101	101	-	-	401	77	-	-	-	23,200	744	-
2b.1.1.32	Reactor El 903 Area4A	-	31	8	9	-	136	-	44	229	229	-	-	-	606	-	-	-	54,373	928	-
2b.1.1.33	Reactor El 903 Area4B	-	24	1	3	38	17	-	17	101	101	-	-	411	75	-	-	-	23,408	717	-
2b.1.1.34	Reactor El 931 Area1A	-	25	3	3	-	52	-	20	104	104	-	-	-	232	-	-	-	20,858	681	-
2b.1.1.35	Reactor El 931 Area1B	-	307	22	45	483	256	-	222	1,334	1,334	-	-	5,169	1,137	-	-	-	311,878	8,640	-
2b.1.1.36	Reactor El 931 Area2A	-	31	2	2	-	35	-	17	87	87	-	-	-	154	-	-	-	13,824	881	-
2b.1.1.37	Reactor El 931 Area2B	-	3	0	0	1	0	-	1	5	5	-	-	7	1	-	-	-	380	91	-
2b.1.1.38	Reactor El 931 Area3A	-	123	23	22	-	336	-	120	625	625	-	-	-	1,651	-	-	-	134,007	3,509	-
2b.1.1.39	Reactor El 931 Area3B	-	3	0	0	1	0	-	1	4	4	-	-	7	0	-	-	-	345	85	-
2b.1.1.40	Reactor El 931 Area4C	-	24	-	-	-	-	-	4	28	-	-	28	-	-	-	-	-	-	767	-
2b.1.1.41	Reactor El 931 Area5C	-	7	-	-	-	-	-	1	8	-	-	8	-	-	-	-	-	-	213	-
2b.1.1.42	Reactor El 958 Area1A	-	57	9	10	-	149	-	54	279	279	-	-	-	662	-	-	-	59,432	1,492	-
2b.1.1.43	Reactor El 958 Area1B	-	171	8	18	209	88	-	100	594	594	-	-	2,238	392	-	-	-	126,002	4,814	-
2b.1.1.44	Reactor El 958 Area2A	-	49	10	10	-	153	-	53	276	276	-	-	-	681	-	-	-	61,083	1,425	-
2b.1.1.45	Reactor El 958 Area2B	-	15	1	1	6	14	-	8	46	46	-	-	66	63	-	-	-	8,331	430	-
2b.1.1.46	Reactor El 958 Area3A	-	38	4	3	-	48	-	22	116	116	-	-	-	214	-	-	-	19,185	1,070	-
2b.1.1.47	Reactor El 958 Area3B	-	17	1	1	6	12	-	8	45	45	-	-	60	54	-	-	-	7,250	491	-
2b.1.1.48	Turbine El 882 Area1A	-	38	3	3	-	50	-	23	117	117	-	-	-	222	-	-	-	19,878	1,028	-
2b.1.1.49	Turbine El 882 Area1B	-	394	46	95	1,101	476	-	402	2,515	2,515	-	-	11,784	2,117	-	-	-	668,352	11,459	-
2b.1.1.50	Turbine El 882 Area2A	-	22	2	2	-	29	-	13	68	68	-	-	-	129	-	-	-	11,556	597	-
2b.1.1.51	Turbine El 882 Area2B	-	213	10	23	301	89	-	125	762	762	-	-	3,227	405	-	-	-	166,542	5,929	-
2b.1.1.52	Turbine El 882 Area3A	-	17	2	1	-	23	-	10	53	53	-	-	-	101	-	-	-	9,017	461	-
2b.1.1.53	Turbine El 882 Area3B	-	620	62	156	1,960	633	-	637	4,068	4,068	-	-	20,984	2,817	-	-	-	1,104,460	17,788	-
2b.1.1.54	Turbine El 903 Area1A	-	9	1	1	-	15	-	6	33	33	-	-	-	68	-	-	-	6,127	239	-
2b.1.1.55	Turbine El 903 Area1B	-	995	134	271	2,726	1,717	-	1,141	6,983	6,983	-	-	29,180	7,631	-	-	-	1,868,932	28,509	-
2b.1.1.56	Turbine El 903 Area2A	-	5	1	1	-	9	-	4	20	20	-	-	-	42	-	-	-	3,729	145	-
2b.1.1.57	Turbine El 903 Area2B	-	147	3	8	105	30	-	62	355	355	-	-	1,122	133	-	-	-	57,476	4,141	-
2b.1.1.58	Turbine El 903 Area3B	-	3	0	2	33	2	-	7	48	48	-	-	357	9	-	-	-	15,340	97	-
2b.1.1.59	Turbine El 903 Area3C	-	108	-	-	-	-	-	16	124	-	-	124	-	-	-	-	-	-	3,412	-
2b.1.1.60	Turbine El 903 Area4B	-	12	0	2	26	3	-	8	50	50	-	-	276	11	-	-	-	12,251	367	-
2b.1.1.61	Yard Area1C	-	197	-	-	-	-	-	30	227	-	-	227	-	-	-	-	-	-	5,770	-
2b.1.1	Totals	-	6,646	693	1,087	8,611	8,998	-	5,365	31,398	30,598	-	800	92,188	41,662	-	-	-	7,327,776	189,487	-
2b.1.2	Scaffolding in support of decommissioning	-	2,588	30	14	210	28	-	691	3,560	3,560	-	-	2,026	126	-	-	-	102,490	35,115	-
Decontamination of Site Buildings																					
2b.1.3.1	Reactor	2,702	1,457	131	320	4,748	1,116	-	2,767	13,241	13,241	-	-	50,830	16,343	-	-	-	3,680,298	101,984	-
2b.1.3.2	Augmented Radwaste	55	32	7	10	23	119	-	71	316	316	-	-	242	2,189	-	-	-	228,383	2,299	-
2b.1.3.3	Miscellaneous Structures - Contaminated	377	174	15	43	759	74	-	372	1,815	1,815	-	-	8,129	679	-	-	-	395,527	13,327	-
2b.1.3.4	Multi-Purpose Facility	72	73	11	19	115	172	-	118	579	579	-	-	1,234	3,087	-	-	-	356,985	3,680	-
2b.1.3.5	Radwaste	167	86	18	26	38	319	-	196	850	850	-	-	404	5,886	-	-	-	603,975	6,839	-
2b.1.3.6	Turbine	552	267	70	97	84	1,261	-	689	3,001	3,001	-	-	688	23,302	-	-	-	2,357,288	21,920	-
2b.1.3	Totals	3,924	2,088	252	515	5,747	3,061	-	4,214	19,801	19,801	-	-	61,526	51,485	-	-	-	7,622,455	150,050	-

Table D-1
Cooper Nuclear Station
2034 DECON Decommissioning Cost Estimate
(thousands of 2008 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
2b.1	Subtotal Period 2b Activity Costs	3,924	11,322	975	1,616	14,567	12,086	-	10,269	54,759	53,960	-	800	155,741	93,273	-	-	-	15,052,720	374,651	-
Period 2b Collateral Costs																					
2b.3.1	Process liquid waste	164	-	54	283	-	323	-	211	1,035	1,035	-	-	-	1,126	-	-	-	67,588	220	-
2b.3.2	Small tool allowance	-	195	-	-	-	-	-	29	225	225	-	-	-	-	-	-	-	-	-	-
2b.3.3	Spent Fuel Capital and Transfer	-	-	-	-	-	-	15,867	2,380	18,247	-	18,247	-	-	-	-	-	-	-	-	-
2b.3.4	Corporate Overheads	-	-	-	-	-	-	5,754	863	6,618	6,618	-	-	-	-	-	-	-	-	-	-
2b.3	Subtotal Period 2b Collateral Costs	164	195	54	283	-	323	21,621	3,483	26,124	7,877	18,247	-	-	1,126	-	-	-	67,588	220	-
Period 2b Period-Dependent Costs																					
2b.4.1	Decon supplies	1,318	-	-	-	-	-	-	330	1,648	1,648	-	-	-	-	-	-	-	-	-	-
2b.4.2	Insurance	-	-	-	-	-	-	1,273	127	1,400	1,400	-	-	-	-	-	-	-	-	-	-
2b.4.3	Property taxes	-	-	-	-	-	-	10	1	11	11	-	-	-	-	-	-	-	-	-	-
2b.4.4	Health physics supplies	-	2,257	-	-	-	-	-	564	2,822	2,822	-	-	-	-	-	-	-	-	-	-
2b.4.5	Heavy equipment rental	-	4,559	-	-	-	-	-	684	5,243	5,243	-	-	-	-	-	-	-	-	-	-
2b.4.6	Disposal of DAW generated	-	-	53	29	-	835	-	218	1,135	1,135	-	-	-	17,954	-	-	-	164,691	55	-
2b.4.7	Plant energy budget	-	-	-	-	-	-	1,805	271	2,076	2,076	-	-	-	-	-	-	-	-	-	-
2b.4.8	NRC Fees	-	-	-	-	-	-	1,709	171	1,880	1,880	-	-	-	-	-	-	-	-	-	-
2b.4.9	Emergency Planning Fees	-	-	-	-	-	-	2,190	219	2,409	-	2,409	-	-	-	-	-	-	-	-	-
2b.4.10	Spent Fuel Pool O&M	-	-	-	-	-	-	1,936	290	2,227	-	2,227	-	-	-	-	-	-	-	-	-
2b.4.11	Liquid Radwaste Processing Equipment/Services	-	-	-	-	-	-	487	73	560	560	-	-	-	-	-	-	-	-	-	-
2b.4.12	ISFSI Operating Costs	-	-	-	-	-	-	220	33	254	-	254	-	-	-	-	-	-	-	-	-
2b.4.13	Security Staff Cost	-	-	-	-	-	-	12,279	1,842	14,120	14,120	-	-	-	-	-	-	-	-	-	342,634
2b.4.14	DOC Staff Cost	-	-	-	-	-	-	29,008	4,351	33,359	33,359	-	-	-	-	-	-	-	-	-	395,451
2b.4.15	Utility Staff Cost	-	-	-	-	-	-	40,864	6,130	46,993	46,993	-	-	-	-	-	-	-	-	-	734,023
2b.4	Subtotal Period 2b Period-Dependent Costs	1,318	6,816	53	29	-	835	91,781	15,304	116,137	111,248	4,889	-	-	17,954	-	-	-	164,691	55	1,472,109
2b.0	TOTAL PERIOD 2b COST	5,407	18,334	1,081	1,928	14,567	13,243	113,402	29,057	197,020	173,085	23,135	800	155,741	112,354	-	-	-	15,285,000	374,926	1,472,109
PERIOD 2c - Decontamination Following Wet Fuel Storage																					
Period 2c Direct Decommissioning Activities																					
2c.1.1	Remove spent fuel racks	267	33	79	88	-	1,348	-	500	2,316	2,316	-	-	-	5,986	-	-	-	537,141	1,004	-
Disposal of Plant Systems																					
2c.1.2.1	Reactor El 1001 Area1A	-	50	7	8	-	121	-	45	231	231	-	-	-	537	-	-	-	48,175	1,273	-
2c.1.2.2	Reactor El 1001 Area1B	-	64	1	4	54	13	-	28	164	164	-	-	578	57	-	-	-	28,513	1,737	-
2c.1.2.3	Reactor El 976 Area1A	-	11	1	1	-	16	-	7	36	36	-	-	-	72	-	-	-	6,482	304	-
2c.1.2.4	Reactor El 976 Area1B	-	150	11	27	328	115	-	121	752	752	-	-	3,516	511	-	-	-	188,501	4,017	-
2c.1.2.5	Reactor El 976 Area2A	-	7	1	1	-	13	-	5	26	26	-	-	-	57	-	-	-	5,136	174	-
2c.1.2.6	Reactor El 976 Area2B	-	38	1	3	42	16	-	20	121	121	-	-	449	72	-	-	-	24,474	1,056	-
2c.1.2	Totals	-	321	23	44	424	293	-	226	1,331	1,331	-	-	4,543	1,305	-	-	-	301,281	8,561	-
Decontamination of Site Buildings																					
2c.1.3.1	Reactor (post fuel)	257	510	97	138	163	1,742	-	747	3,656	3,656	-	-	1,749	32,119	-	-	-	3,281,659	18,302	-
2c.1.3	Totals	257	510	97	138	163	1,742	-	747	3,656	3,656	-	-	1,749	32,119	-	-	-	3,281,659	18,302	-
2c.1.4	Scaffolding in support of decommissioning	-	518	6	3	42	6	-	138	712	712	-	-	405	25	-	-	-	20,498	7,023	-
2c.1	Subtotal Period 2c Activity Costs	525	1,382	205	273	630	3,389	-	1,611	8,014	8,014	-	-	6,697	39,437	-	-	-	4,140,579	34,890	-
Period 2c Additional Costs																					
2c.2.1	Final Site Survey	-	-	-	-	-	-	1,205	362	1,567	1,567	-	-	-	-	-	-	-	-	-	12,480
2c.2	Subtotal Period 2c Additional Costs	-	-	-	-	-	-	1,205	362	1,567	1,567	-	-	-	-	-	-	-	-	-	12,480

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Cooper Nuclear 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 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 2c Collateral Costs																					
2c.3.1	Process liquid waste	101	-	33	175	-	200	-	130	639	639	-	-	-	696	-	-	-	41,756	136	-
2c.3.2	Small tool allowance	-	22	-	-	-	-	-	3	25	25	-	-	-	-	-	-	-	-	-	-
2c.3.3	Decommissioning Equipment Disposition	-	-	88	50	621	84	-	130	973	973	-	-	6,000	373	-	-	-	303,507	88	-
2c.3.4	Spent Fuel Capital and Transfer	-	-	-	-	-	-	1,949	292	2,242	-	2,242	-	-	-	-	-	-	-	-	-
2c.3	Subtotal Period 2c Collateral Costs	101	22	121	225	621	284	1,949	556	3,879	1,637	2,242	-	6,000	1,069	-	-	-	345,263	224	-
Period 2c Period-Dependent Costs																					
2c.4.1	Decon supplies	90	-	-	-	-	-	-	23	113	113	-	-	-	-	-	-	-	-	-	-
2c.4.2	Insurance	-	-	-	-	-	-	197	20	217	217	-	-	-	-	-	-	-	-	-	-
2c.4.3	Property taxes	-	-	-	-	-	-	2	0	2	2	-	-	-	-	-	-	-	-	-	-
2c.4.4	Health physics supplies	-	256	-	-	-	-	-	64	320	320	-	-	-	-	-	-	-	-	-	-
2c.4.5	Heavy equipment rental	-	707	-	-	-	-	-	106	813	813	-	-	-	-	-	-	-	-	-	-
2c.4.6	Disposal of DAW generated	-	-	12	6	-	184	-	48	250	250	-	-	-	3,949	-	-	-	36,227	12	-
2c.4.7	Plant energy budget	-	-	-	-	-	-	149	22	172	172	-	-	-	-	-	-	-	-	-	-
2c.4.8	NRC Fees	-	-	-	-	-	-	265	27	292	292	-	-	-	-	-	-	-	-	-	-
2c.4.9	Emergency Planning Fees	-	-	-	-	-	-	340	34	373	-	373	-	-	-	-	-	-	-	-	-
2c.4.10	Liquid Radwaste Processing Equipment/Services	-	-	-	-	-	-	151	23	174	174	-	-	-	-	-	-	-	-	-	-
2c.4.11	ISFSI Operating Costs	-	-	-	-	-	-	34	5	39	-	39	-	-	-	-	-	-	-	-	-
2c.4.12	Security Staff Cost	-	-	-	-	-	-	1,159	174	1,333	1,333	-	-	-	-	-	-	-	-	-	27,930
2c.4.13	DOC Staff Cost	-	-	-	-	-	-	3,126	469	3,595	3,595	-	-	-	-	-	-	-	-	-	42,000
2c.4.14	Utility Staff Cost	-	-	-	-	-	-	4,699	705	5,404	5,404	-	-	-	-	-	-	-	-	-	80,220
2c.4	Subtotal Period 2c Period-Dependent Costs	90	963	12	6	-	184	10,123	1,719	13,096	12,684	413	-	-	3,949	-	-	-	36,227	12	150,150
2c.0	TOTAL PERIOD 2c COST	716	2,367	337	504	1,251	3,856	13,277	4,248	26,556	23,902	2,654	-	12,697	44,455	-	-	-	4,522,069	35,126	162,830
PERIOD 2e - License Termination																					
Period 2e Direct Decommissioning Activities																					
2e.1.1	ORISE confirmatory survey	-	-	-	-	-	-	147	44	191	191	-	-	-	-	-	-	-	-	-	-
2e.1.2	Terminate license									a											
2e.1	Subtotal Period 2e Activity Costs	-	-	-	-	-	-	147	44	191	191	-	-	-	-	-	-	-	-	-	-
Period 2e Additional Costs																					
2e.2.1	Final Site Survey	-	-	-	-	-	-	5,998	1,799	7,797	7,797	-	-	-	-	-	-	-	-	148,435	6,240
2e.2	Subtotal Period 2e Additional Costs	-	-	-	-	-	-	5,998	1,799	7,797	7,797	-	-	-	-	-	-	-	-	148,435	6,240
Period 2e Collateral Costs																					
2e.3.1	DOC staff relocation expenses	-	-	-	-	-	-	912	137	1,049	1,049	-	-	-	-	-	-	-	-	-	-
2e.3.2	Spent Fuel Capital and Transfer	-	-	-	-	-	-	571	86	656	-	656	-	-	-	-	-	-	-	-	-
2e.3	Subtotal Period 2e Collateral Costs	-	-	-	-	-	-	1,483	222	1,705	1,049	656	-	-	-	-	-	-	-	-	-
Period 2e Period-Dependent Costs																					
2e.4.1	Insurance	-	-	-	-	-	-	327	33	360	360	-	-	-	-	-	-	-	-	-	-
2e.4.2	Property taxes	-	-	-	-	-	-	3	0	3	3	-	-	-	-	-	-	-	-	-	-
2e.4.3	Health physics supplies	-	737	-	-	-	-	-	184	921	921	-	-	-	-	-	-	-	-	-	-
2e.4.4	Disposal of DAW generated	-	-	3	1	-	42	-	11	58	58	-	-	-	914	-	-	-	8,380	3	-
2e.4.5	Plant energy budget	-	-	-	-	-	-	139	21	160	160	-	-	-	-	-	-	-	-	-	-
2e.4.6	NRC Fees	-	-	-	-	-	-	530	53	583	583	-	-	-	-	-	-	-	-	-	-
2e.4.7	Emergency Planning Fees	-	-	-	-	-	-	633	63	696	-	696	-	-	-	-	-	-	-	-	-
2e.4.8	ISFSI Operating Costs	-	-	-	-	-	-	64	10	73	-	73	-	-	-	-	-	-	-	-	-
2e.4.9	Security Staff Cost	-	-	-	-	-	-	2,125	319	2,444	2,444	-	-	-	-	-	-	-	-	-	50,886
2e.4.10	DOC Staff Cost	-	-	-	-	-	-	4,442	666	5,108	5,108	-	-	-	-	-	-	-	-	-	57,149
2e.4.11	Utility Staff Cost	-	-	-	-	-	-	5,071	761	5,832	5,832	-	-	-	-	-	-	-	-	-	80,634
2e.4	Subtotal Period 2e Period-Dependent Costs	-	737	3	1	-	42	13,334	2,121	16,238	15,468	769	-	-	914	-	-	-	8,380	3	188,669
2e.0	TOTAL PERIOD 2e COST	-	737	3	1	-	42	20,962	4,187	25,931	24,506	1,426	-	-	914	-	-	-	8,380	148,438	194,909

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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 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
PERIOD 2 TOTALS		6,750	39,950	10,481	6,870	30,933	46,723	207,625	72,836	422,169	385,342	35,926	901	319,826	219,601	3,104	1,205	-	31,151,470	771,150	2,653,551
PERIOD 3b - Site Restoration																					
Period 3b Direct Decommissioning Activities																					
Demolition of Remaining Site Buildings																					
3b.1.1.1	Reactor	-	1,473	-	-	-	-	-	221	1,694	-	-	1,694	-	-	-	-	-	-	14,089	-
3b.1.1.2	Augmented Radwaste	-	222	-	-	-	-	-	33	255	-	-	255	-	-	-	-	-	-	2,119	-
3b.1.1.3	Control	-	214	-	-	-	-	-	32	246	-	-	246	-	-	-	-	-	-	1,655	-
3b.1.1.4	Intake Structure	-	523	-	-	-	-	-	78	602	-	-	602	-	-	-	-	-	-	5,621	-
3b.1.1.5	LLRW Storage Pad	-	145	-	-	-	-	-	22	167	-	-	167	-	-	-	-	-	-	1,227	-
3b.1.1.6	Miscellaneous Structures - Clean	-	1,196	-	-	-	-	-	179	1,375	-	-	1,375	-	-	-	-	-	-	11,837	-
3b.1.1.7	Miscellaneous Structures - Contaminated	-	27	-	-	-	-	-	4	30	-	-	30	-	-	-	-	-	-	572	-
3b.1.1.8	Multi-Purpose Facility	-	123	-	-	-	-	-	18	141	-	-	141	-	-	-	-	-	-	1,982	-
3b.1.1.9	OWC Gas Generator	-	18	-	-	-	-	-	3	20	-	-	20	-	-	-	-	-	-	283	-
3b.1.1.10	Office	-	156	-	-	-	-	-	23	179	-	-	179	-	-	-	-	-	-	1,920	-
3b.1.1.11	Radwaste	-	391	-	-	-	-	-	59	449	-	-	449	-	-	-	-	-	-	3,229	-
3b.1.1.12	Seal Well	-	17	-	-	-	-	-	3	20	-	-	20	-	-	-	-	-	-	168	-
3b.1.1.13	Sewage Treatment Area	-	4	-	-	-	-	-	1	5	-	-	5	-	-	-	-	-	-	53	-
3b.1.1.14	Transformer Yard	-	20	-	-	-	-	-	3	24	-	-	24	-	-	-	-	-	-	172	-
3b.1.1.15	Turbine	-	2,596	-	-	-	-	-	389	2,985	-	-	2,985	-	-	-	-	-	-	40,503	-
3b.1.1.16	Turbine Pedestal	-	277	-	-	-	-	-	42	318	-	-	318	-	-	-	-	-	-	2,100	-
3b.1.1.17	Reactor (post fuel)	-	18	-	-	-	-	-	3	21	-	-	21	-	-	-	-	-	-	512	-
3b.1.1	Totals	-	7,418	-	-	-	-	-	1,113	8,531	-	-	8,531	-	-	-	-	-	-	88,040	-
Site Closeout Activities																					
3b.1.2	Remove Rubble	-	424	-	-	-	-	-	64	488	-	-	488	-	-	-	-	-	-	3,288	-
3b.1.3	Grade & landscape site	-	578	-	-	-	-	-	87	665	-	-	665	-	-	-	-	-	-	1,578	-
3b.1.4	Final report to NRC	-	-	-	-	-	-	156	23	179	179	-	-	-	-	-	-	-	-	-	1,560
3b.1	Subtotal Period 3b Activity Costs	-	8,421	-	-	-	-	156	1,286	9,863	179	-	9,684	-	-	-	-	-	-	92,904	1,560
Period 3b Additional Costs																					
3b.2.1	Concrete Crushing	-	499	-	-	-	-	8	76	582	-	-	582	-	-	-	-	-	-	3,045	-
3b.2.2	Cofferdam	-	458	-	-	-	-	-	69	527	-	-	527	-	-	-	-	-	-	5,130	-
3b.2	Subtotal Period 3b Additional Costs	-	957	-	-	-	-	8	145	1,109	-	-	1,109	-	-	-	-	-	-	8,175	-
Period 3b Collateral Costs																					
3b.3.1	Small tool allowance	-	53	-	-	-	-	-	8	61	-	-	61	-	-	-	-	-	-	-	-
3b.3.2	Spent Fuel Capital and Transfer	-	-	-	-	-	-	758	114	872	-	872	-	-	-	-	-	-	-	-	-
3b.3	Subtotal Period 3b Collateral Costs	-	53	-	-	-	-	758	122	932	-	872	61	-	-	-	-	-	-	-	-
Period 3b Period-Dependent Costs																					
3b.4.1	Insurance	-	-	-	-	-	-	751	75	826	-	826	-	-	-	-	-	-	-	-	-
3b.4.2	Property taxes	-	-	-	-	-	-	7	1	8	-	8	-	-	-	-	-	-	-	-	-
3b.4.3	Heavy equipment rental	-	4,053	-	-	-	-	-	608	4,661	-	-	4,661	-	-	-	-	-	-	-	-
3b.4.4	Plant energy budget	-	-	-	-	-	-	160	24	184	-	-	184	-	-	-	-	-	-	-	-
3b.4.5	NRC ISFSI Fees	-	-	-	-	-	-	437	44	481	-	481	-	-	-	-	-	-	-	-	-
3b.4.6	Emergency Planning Fees	-	-	-	-	-	-	1,453	145	1,598	-	1,598	-	-	-	-	-	-	-	-	-
3b.4.7	ISFSI Operating Costs	-	-	-	-	-	-	146	22	168	-	168	-	-	-	-	-	-	-	-	-
3b.4.8	Security Staff Cost	-	-	-	-	-	-	4,878	732	5,610	-	4,937	673	-	-	-	-	-	-	-	116,814
3b.4.9	DOC Staff Cost	-	-	-	-	-	-	9,777	1,467	11,244	-	-	11,244	-	-	-	-	-	-	-	122,206
3b.4.10	Utility Staff Cost	-	-	-	-	-	-	5,903	885	6,789	0	1,697	5,091	-	-	-	-	-	-	-	97,944
3b.4	Subtotal Period 3b Period-Dependent Costs	-	4,053	-	-	-	-	23,513	4,003	31,569	0	9,715	21,853	-	-	-	-	-	-	-	336,964
3b.0	TOTAL PERIOD 3b COST	-	13,483	-	-	-	-	24,435	5,555	43,473	179	10,587	32,707	-	-	-	-	-	-	101,079	338,524

Table D-1
Cooper Nuclear Station
2034 DECON Decommissioning Cost Estimate
(thousands of 2008 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
PERIOD 3c - Fuel Storage Operations/Shipping																					
Period 3c Collateral Costs																					
3c.3.1	Spent Fuel Capital and Transfer	-	-	-	-	-	-	9,855	1,478	11,334	-	11,334	-	-	-	-	-	-	-	-	-
3c.3	Subtotal Period 3c Collateral Costs	-	-	-	-	-	-	9,855	1,478	11,334	-	11,334	-	-	-	-	-	-	-	-	-
Period 3c Period-Dependent Costs																					
3c.4.1	Insurance	-	-	-	-	-	-	8,525	852	9,377	-	9,377	-	-	-	-	-	-	-	-	-
3c.4.2	Property taxes	-	-	-	-	-	-	78	8	86	-	86	-	-	-	-	-	-	-	-	-
3c.4.3	Plant energy budget	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3c.4.4	NRC ISFSI Fees	-	-	-	-	-	-	4,964	496	5,460	-	5,460	-	-	-	-	-	-	-	-	-
3c.4.5	Emergency Planning Fees	-	-	-	-	-	-	16,486	1,649	18,135	-	18,135	-	-	-	-	-	-	-	-	-
3c.4.6	ISFSI Operating Costs	-	-	-	-	-	-	1,660	249	1,909	-	1,909	-	-	-	-	-	-	-	-	-
3c.4.7	Security Staff Cost	-	-	-	-	-	-	48,727	7,309	56,036	-	56,036	-	-	-	-	-	-	-	-	1,101,291
3c.4.8	Utility Staff Cost	-	-	-	-	-	-	16,889	2,533	19,422	-	19,422	-	-	-	-	-	-	-	-	275,323
3c.4	Subtotal Period 3c Period-Dependent Costs	-	-	-	-	-	-	97,329	13,097	110,425	-	110,425	-	-	-	-	-	-	-	-	1,376,614
3c.0	TOTAL PERIOD 3c COST	-	-	-	-	-	-	107,184	14,575	121,759	-	121,759	-	-	-	-	-	-	-	-	1,376,614
PERIOD 3d - GTCC shipping																					
Period 3d Direct Decommissioning Activities																					
Nuclear Steam Supply System Removal																					
3d.1.1.1	Vessel & Internals GTCC Disposal	-	-	660	-	-	7,470	-	1,186	9,316	9,316	-	-	-	-	-	-	508	89,497	-	-
3d.1.1	Totals	-	-	660	-	-	7,470	-	1,186	9,316	9,316	-	-	-	-	-	-	508	89,497	-	-
3d.1	Subtotal Period 3d Activity Costs	-	-	660	-	-	7,470	-	1,186	9,316	9,316	-	-	-	-	-	-	508	89,497	-	-
Period 3d Collateral Costs																					
3d.3.1	Spent Fuel Capital and Transfer	-	-	-	-	-	-	76	11	87	-	87	-	-	-	-	-	-	-	-	-
3d.3	Subtotal Period 3d Collateral Costs	-	-	-	-	-	-	76	11	87	-	87	-	-	-	-	-	-	-	-	-
Period 3d Period-Dependent Costs																					
3d.4.1	Insurance	-	-	-	-	-	-	17	2	18	-	18	-	-	-	-	-	-	-	-	-
3d.4.2	Property taxes	-	-	-	-	-	-	0	0	0	-	0	-	-	-	-	-	-	-	-	-
3d.4.3	Plant energy budget	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3d.4.4	NRC ISFSI Fees	-	-	-	-	-	-	8	1	8	-	8	-	-	-	-	-	-	-	-	-
3d.4.5	Emergency Planning Fees	-	-	-	-	-	-	32	3	36	-	36	-	-	-	-	-	-	-	-	-
3d.4.6	ISFSI Operating Costs	-	-	-	-	-	-	3	0	4	-	4	-	-	-	-	-	-	-	-	-
3d.4.7	Security Staff Cost	-	-	-	-	-	-	96	14	110	-	110	-	-	-	-	-	-	-	-	2,160
3d.4.8	Utility Staff Cost	-	-	-	-	-	-	33	5	38	-	38	-	-	-	-	-	-	-	-	540
3d.4	Subtotal Period 3d Period-Dependent Costs	-	-	-	-	-	-	189	25	214	-	214	-	-	-	-	-	-	-	-	2,700
3d.0	TOTAL PERIOD 3d COST	-	-	660	-	-	7,470	265	1,223	9,618	9,316	302	-	-	-	-	-	508	89,497	-	2,700
PERIOD 3e - ISFSI Decontamination																					
Period 3e Direct Decommissioning Activities																					
Period 3e Additional Costs																					
3e.2.1	ISFSI Decontamination	-	1,012	6	24	-	60	1,250	460	2,811	-	2,811	-	-	1,175	-	-	-	165,113	26,509	2,560
3e.2	Subtotal Period 3e Additional Costs	-	1,012	6	24	-	60	1,250	460	2,811	-	2,811	-	-	1,175	-	-	-	165,113	26,509	2,560
Period 3e Collateral Costs																					
3e.3.1	Small tool allowance	-	14	-	-	-	-	-	2	16	-	16	-	-	-	-	-	-	-	-	-
3e.3.2	Spent Fuel Capital and Transfer	-	-	-	-	-	-	5	1	6	-	6	-	-	-	-	-	-	-	-	-
3e.3	Subtotal Period 3e Collateral Costs	-	14	-	-	-	-	5	3	22	-	22	-	-	-	-	-	-	-	-	-

Table D-1
Cooper Nuclear Station
2034 DECON Decommissioning Cost Estimate
(thousands of 2008 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
Period 3e Period-Dependent Costs																					
3e.4.1	Insurance	-	-	-	-	-	-	145	14	159	-	159	-	-	-	-	-	-	-	-	-
3e.4.2	Property taxes	-	-	-	-	-	-	1	0	1	-	1	-	-	-	-	-	-	-	-	-
3e.4.3	Heavy equipment rental	-	232	-	-	-	-	-	35	267	-	267	-	-	-	-	-	-	-	-	-
3e.4.4	Plant energy budget	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3e.4.5	Security Staff Cost	-	-	-	-	-	-	303	46	349	-	349	-	-	-	-	-	-	-	-	5,013
3e.4.6	Utility Staff Cost	-	-	-	-	-	-	249	37	287	-	287	-	-	-	-	-	-	-	-	3,803
3e.4	Subtotal Period 3e Period-Dependent Costs	-	232	-	-	-	-	699	132	1,063	-	1,063	-	-	-	-	-	-	-	-	8,816
3e.0	TOTAL PERIOD 3e COST	-	1,258	6	24	-	60	1,954	595	3,896	-	3,896	-	-	1,175	-	-	-	165,113	28,509	11,376
PERIOD 3f - ISFSI Site Restoration																					
Period 3f Direct Decommissioning Activities																					
Period 3f Additional Costs																					
3f.2.1	ISFSI Demolition	-	672	-	-	-	-	44	107	824	-	824	-	-	-	-	-	-	-	5,898	160
3f.2	Subtotal Period 3f Additional Costs	-	672	-	-	-	-	44	107	824	-	824	-	-	-	-	-	-	-	5,898	160
Period 3f Collateral Costs																					
3f.3.1	Small tool allowance	-	3	-	-	-	-	-	0	4	-	4	-	-	-	-	-	-	-	-	-
3f.3	Subtotal Period 3f Collateral Costs	-	3	-	-	-	-	-	0	4	-	4	-	-	-	-	-	-	-	-	-
Period 3f Period-Dependent Costs																					
3f.4.1	Insurance	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3f.4.2	Property taxes	-	-	-	-	-	-	1	0	1	-	1	-	-	-	-	-	-	-	-	-
3f.4.3	Heavy equipment rental	-	79	-	-	-	-	-	12	91	-	91	-	-	-	-	-	-	-	-	-
3f.4.4	Plant energy budget	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3f.4.5	Security Staff Cost	-	-	-	-	-	-	155	23	179	-	179	-	-	-	-	-	-	-	-	2,569
3f.4.6	Utility Staff Cost	-	-	-	-	-	-	110	16	126	-	126	-	-	-	-	-	-	-	-	1,594
3f.4	Subtotal Period 3f Period-Dependent Costs	-	79	-	-	-	-	266	52	396	-	396	-	-	-	-	-	-	-	-	4,163
3f.0	TOTAL PERIOD 3f COST	-	754	-	-	-	-	310	160	1,224	-	1,224	-	-	-	-	-	-	-	5,898	4,323
PERIOD 3 TOTALS		-	15,495	666	24	-	7,530	134,148	22,108	179,970	9,495	137,768	32,707	-	1,175	-	-	508	254,610	133,486	1,733,537
TOTAL COST TO DECOMMISSION		9,296	58,392	11,201	7,212	30,933	56,732	437,605	111,599	722,972	506,207	182,388	34,396	319,826	234,031	3,647	1,205	508	31,649,200	915,901	5,434,429

Table D-1
Cooper Nuclear Station
2034 DECON Decommissioning Cost Estimate
(thousands of 2008 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 18.25% CONTINGENCY:	$722,972	thousands of 2008 dollars
TOTAL NRC LICENSE TERMINATION COST IS 70.02% OR:	$506,207	thousands of 2008 dollars
SPENT FUEL MANAGEMENT COST IS 25.22% OR:	$182,368	thousands of 2008 dollars
NON-NUCLEAR DEMOLITION COST IS 4.76% OR:	$34,396	thousands of 2008 dollars
TOTAL LOW-LEVEL RADIOACTIVE WASTE VOLUME BURIED (EXCLUDING GTCC):	238,883	cubic feet
TOTAL GREATER THAN CLASS C RADWASTE VOLUME GENERATED:	508	cubic feet
TOTAL SCRAP METAL REMOVED:	30,345	tons
TOTAL CRAFT LABOR REQUIREMENTS:	915,901	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

Table D-2
Cooper Nuclear Station
2034 Delayed DECON Decommissioning Cost Estimate
(thousands of 2008 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
PERIOD 1a - Shutdown through Transition																					
Period 1a Direct Decommissioning Activities																					
1a.1.1	SAFSTOR site characterization survey	-	-	-	-	-	-	346	104	450	450	-	-	-	-	-	-	-	-	-	-
1a.1.2	Prepare preliminary decommissioning cost	-	-	-	-	-	-	130	20	150	150	-	-	-	-	-	-	-	-	-	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	-	-	-	-	-	-	200	30	230	230	-	-	-	-	-	-	-	-	-	2,000
1a.1.8	Review plant dwgs & specs.	-	-	-	-	-	-	130	20	150	150	-	-	-	-	-	-	-	-	-	1,300
1a.1.9	Perform detailed rad survey									a											
1a.1.10	Estimate by-product inventory	-	-	-	-	-	-	100	15	115	115	-	-	-	-	-	-	-	-	-	1,000
1a.1.11	End product description	-	-	-	-	-	-	100	15	115	115	-	-	-	-	-	-	-	-	-	1,000
1a.1.12	Detailed by-product inventory	-	-	-	-	-	-	150	23	173	173	-	-	-	-	-	-	-	-	-	1,500
1a.1.13	Define major work sequence	-	-	-	-	-	-	100	15	115	115	-	-	-	-	-	-	-	-	-	1,000
1a.1.14	Perform SER and EA	-	-	-	-	-	-	310	47	357	357	-	-	-	-	-	-	-	-	-	3,100
1a.1.15	Perform Site-Specific Cost Study	-	-	-	-	-	-	500	75	575	575	-	-	-	-	-	-	-	-	-	5,000
Activity Specifications																					
1a.1.16.1	Prepare plant and facilities for SAFSTOR	-	-	-	-	-	-	492	74	566	566	-	-	-	-	-	-	-	-	-	4,920
1a.1.16.2	Plant systems	-	-	-	-	-	-	417	63	479	479	-	-	-	-	-	-	-	-	-	4,167
1a.1.16.3	Plant structures and buildings	-	-	-	-	-	-	312	47	359	359	-	-	-	-	-	-	-	-	-	3,120
1a.1.16.4	Waste management	-	-	-	-	-	-	200	30	230	230	-	-	-	-	-	-	-	-	-	2,000
1a.1.16.5	Facility and site dormancy	-	-	-	-	-	-	200	30	230	230	-	-	-	-	-	-	-	-	-	2,000
1a.1.16	Total	-	-	-	-	-	-	1,621	243	1,864	1,864	-	-	-	-	-	-	-	-	-	16,207
Detailed Work Procedures																					
1a.1.17.1	Plant systems	-	-	-	-	-	-	118	18	136	138	-	-	-	-	-	-	-	-	-	1,183
1a.1.17.2	Facility closeout & dormancy	-	-	-	-	-	-	120	18	138	138	-	-	-	-	-	-	-	-	-	1,200
1a.1.17	Total	-	-	-	-	-	-	238	36	274	274	-	-	-	-	-	-	-	-	-	2,383
1a.1.18	Procure vacuum drying system	-	-	-	-	-	-	10	2	12	12	-	-	-	-	-	-	-	-	-	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	-	-	-	-	-	-	3,935	642	4,577	4,577	-	-	-	-	-	-	-	-	-	35,890
Period 1a Collateral Costs																					
1a.3.1	Spent Fuel Capital and Transfer	-	-	-	-	-	-	2,721	408	3,129	-	3,129	-	-	-	-	-	-	-	-	-
1a.3.2	Corporate Overheads	-	-	-	-	-	-	3,105	466	3,570	3,570	-	-	-	-	-	-	-	-	-	-
1a.3	Subtotal Period 1a Collateral Costs	-	-	-	-	-	-	5,825	874	6,699	3,570	3,129	-	-	-	-	-	-	-	-	-
Period 1a Period-Dependent Costs																					
1a.4.1	Insurance	-	-	-	-	-	-	1,600	160	1,760	1,760	-	-	-	-	-	-	-	-	-	-
1a.4.2	Property taxes	-	-	-	-	-	-	4	0	4	4	-	-	-	-	-	-	-	-	-	-
1a.4.3	Health physics supplies	-	370	-	-	-	-	-	93	463	463	-	-	-	-	-	-	-	-	-	-
1a.4.4	Heavy equipment rental	-	368	-	-	-	-	-	55	423	423	-	-	-	-	-	-	-	-	-	-
1a.4.5	Disposal of DAW generated	-	-	5	3	-	73	-	19	100	100	-	-	-	1,575	-	-	-	14,445	5	-
1a.4.6	Plant energy budget	-	-	-	-	-	-	927	139	1,066	1,066	-	-	-	-	-	-	-	-	-	-
1a.4.7	NRC Fees	-	-	-	-	-	-	706	71	776	776	-	-	-	-	-	-	-	-	-	-
1a.4.8	Emergency Planning Fees	-	-	-	-	-	-	1,185	118	1,303	-	1,303	-	-	-	-	-	-	-	-	-
1a.4.9	Spent Fuel Pool O&M	-	-	-	-	-	-	745	112	857	-	857	-	-	-	-	-	-	-	-	-
1a.4.10	ISFSI Operating Costs	-	-	-	-	-	-	85	13	98	-	98	-	-	-	-	-	-	-	-	-
1a.4.11	Security Staff Cost	-	-	-	-	-	-	6,021	903	6,924	6,924	-	-	-	-	-	-	-	-	-	157,471

Table D-2
Cooper Nuclear Station
2034 Delayed DECON Decommissioning Cost Estimate
(thousands of 2008 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.4.12	Utility Staff Cost	-	-	-	-	-	-	22,690	3,403	26,093	26,093	-	-	-	-	-	-	-	-	-	423,400
1a.4	Subtotal Period 1a Period-Dependent Costs	-	738	5	3	-	73	33,962	5,087	39,867	37,609	2,258	-	-	1,575	-	-	-	14,445	5	580,871
1a.0	TOTAL PERIOD 1a COST	-	738	5	3	-	73	43,723	6,603	51,144	45,757	5,387	-	-	1,575	-	-	-	14,445	5	616,761
PERIOD 1b - SAFSTOR Limited DECON Activities																					
Period 1b Direct Decommissioning Activities																					
Decontamination of Site Buildings																					
1b.1.1.1	Reactor	2,929	-	-	-	-	-	-	1,465	4,394	4,394	-	-	-	-	-	-	-	-	68,438	-
1b.1.1.2	Augmented Radwaste	52	-	-	-	-	-	-	26	78	78	-	-	-	-	-	-	-	-	1,562	-
1b.1.1.3	Miscellaneous Structures - Contaminated	376	-	-	-	-	-	-	188	565	565	-	-	-	-	-	-	-	-	8,542	-
1b.1.1.4	Multi-Purpose Facility	68	-	-	-	-	-	-	34	101	101	-	-	-	-	-	-	-	-	2,036	-
1b.1.1.5	Radwaste	158	-	-	-	-	-	-	79	237	237	-	-	-	-	-	-	-	-	4,761	-
1b.1.1.6	Turbine	520	-	-	-	-	-	-	260	780	780	-	-	-	-	-	-	-	-	15,667	-
1b.1.1	Totals	4,103	-	-	-	-	-	-	2,052	6,155	6,155	-	-	-	-	-	-	-	-	101,006	-
1b.1	Subtotal Period 1b Activity Costs	4,103	-	-	-	-	-	-	2,052	6,155	6,155	-	-	-	-	-	-	-	-	101,006	-
Period 1b Additional Costs																					
1b.2.1	Spent Fuel Pool Isolation	-	-	-	-	-	-	9,407	1,411	10,818	10,818	-	-	-	-	-	-	-	-	-	-
1b.2.2	Asbestos Insulation Disposal	-	773	1	65	-	558	-	265	1,662	1,662	-	-	-	10,333	-	-	-	134,329	10,002	-
1b.2	Subtotal Period 1b Additional Costs	-	773	1	65	-	558	9,407	1,676	12,480	12,480	-	-	-	10,333	-	-	-	134,329	10,002	-
Period 1b Collateral Costs																					
1b.3.1	Decon equipment	713	-	-	-	-	-	-	107	820	820	-	-	-	-	-	-	-	-	-	-
1b.3.2	Process liquid waste	229	-	74	392	-	448	-	293	1,436	1,436	-	-	-	1,561	-	-	-	93,644	304	-
1b.3.3	Small tool allowance	-	70	-	-	-	-	-	11	81	81	-	-	-	-	-	-	-	-	-	-
1b.3.4	Spent Fuel Capital and Transfer	-	-	-	-	-	-	930	139	1,069	-	1,069	-	-	-	-	-	-	-	-	-
1b.3.5	Corporate Overheads	-	-	-	-	-	-	766	115	880	880	-	-	-	-	-	-	-	-	-	-
1b.3	Subtotal Period 1b Collateral Costs	942	70	74	392	-	448	1,695	665	4,286	3,217	1,069	-	-	1,561	-	-	-	93,644	304	-
Period 1b Period-Dependent Costs																					
1b.4.1	Decon supplies	1,156	-	-	-	-	-	-	289	1,445	1,445	-	-	-	-	-	-	-	-	-	-
1b.4.2	Insurance	-	-	-	-	-	-	121	12	133	133	-	-	-	-	-	-	-	-	-	-
1b.4.3	Property taxes	-	-	-	-	-	-	1	0	1	1	-	-	-	-	-	-	-	-	-	-
1b.4.4	Health physics supplies	-	473	-	-	-	-	-	118	592	592	-	-	-	-	-	-	-	-	-	-
1b.4.5	Heavy equipment rental	-	91	-	-	-	-	-	14	104	104	-	-	-	-	-	-	-	-	-	-
1b.4.6	Disposal of DAW generated	-	-	5	3	-	81	-	21	110	110	-	-	-	1,741	-	-	-	15,968	5	-
1b.4.7	Plant energy budget	-	-	-	-	-	-	229	34	263	263	-	-	-	-	-	-	-	-	-	-
1b.4.8	NRC Fees	-	-	-	-	-	-	174	17	191	191	-	-	-	-	-	-	-	-	-	-
1b.4.9	Emergency Planning Fees	-	-	-	-	-	-	292	29	321	-	321	-	-	-	-	-	-	-	-	-
1b.4.10	Spent Fuel Pool O&M	-	-	-	-	-	-	184	28	211	-	211	-	-	-	-	-	-	-	-	-
1b.4.11	ISFSI Operating Costs	-	-	-	-	-	-	21	3	24	-	24	-	-	-	-	-	-	-	-	-
1b.4.12	Security Staff Cost	-	-	-	-	-	-	1,485	223	1,707	1,707	-	-	-	-	-	-	-	-	-	38,829
1b.4.13	Utility Staff Cost	-	-	-	-	-	-	5,595	839	6,434	6,434	-	-	-	-	-	-	-	-	-	104,400
1b.4	Subtotal Period 1b Period-Dependent Costs	1,156	564	5	3	-	81	8,101	1,628	11,536	10,981	557	-	-	1,741	-	-	-	15,968	5	143,229
1b.0	TOTAL PERIOD 1b COST	6,201	1,407	80	460	-	1,087	19,203	6,020	34,458	32,833	1,626	-	-	13,635	-	-	-	243,942	111,318	143,229

Table D-2
Cooper Nuclear Station
2034 Delayed DECON Decommissioning Cost Estimate
(thousands of 2008 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 - Preparations for SAFSTOR Dormancy																					
Period 1c Direct Decommissioning Activities																					
1c.1.1	Prepare support equipment for storage	-	387	-	-	-	-	-	58	445	445	-	-	-	-	-	-	-	-	3,000	-
1c.1.2	Install containment pressure equal. lines	-	31	-	-	-	-	-	5	36	36	-	-	-	-	-	-	-	-	700	-
1c.1.3	Interim survey prior to dormancy	-	-	-	-	-	-	733	220	953	953	-	-	-	-	-	-	-	-	15,696	-
1c.1.4	Secure building accesses									a											
1c.1.5	Prepare & submit interim report	-	-	-	-	-	-	58	9	67	67	-	-	-	-	-	-	-	-	-	583
1c.1	Subtotal Period 1c Activity Costs	-	419	-	-	-	-	791	291	1,501	1,501	-	-	-	-	-	-	-	-	19,396	583
Period 1c Collateral Costs																					
1c.3.1	Process liquid waste	235	-	76	403	-	460	-	301	1,475	1,475	-	-	-	1,603	-	-	-	96,195	313	-
1c.3.2	Small tool allowance	-	3	-	-	-	-	-	0	3	3	-	-	-	-	-	-	-	-	-	-
1c.3.3	Spent Fuel Capital and Transfer	-	-	-	-	-	-	940	141	1,081	-	1,081	-	-	-	-	-	-	-	-	-
1c.3.4	Corporate Overheads	-	-	-	-	-	-	774	116	890	890	-	-	-	-	-	-	-	-	-	-
1c.3	Subtotal Period 1c Collateral Costs	235	3	76	403	-	460	1,714	558	3,449	2,368	1,081	-	-	1,603	-	-	-	96,195	313	-
Period 1c Period-Dependent Costs																					
1c.4.1	Insurance	-	-	-	-	-	-	122	12	134	134	-	-	-	-	-	-	-	-	-	-
1c.4.2	Property taxes	-	-	-	-	-	-	1	0	1	1	-	-	-	-	-	-	-	-	-	-
1c.4.3	Health physics supplies	-	160	-	-	-	-	-	40	200	200	-	-	-	-	-	-	-	-	-	-
1c.4.4	Heavy equipment rental	-	92	-	-	-	-	-	14	105	105	-	-	-	-	-	-	-	-	-	-
1c.4.5	Disposal of DAW generated	-	-	1	1	-	18	-	5	25	25	-	-	-	393	-	-	-	3,601	1	-
1c.4.6	Plant energy budget	-	-	-	-	-	-	231	35	266	266	-	-	-	-	-	-	-	-	-	-
1c.4.7	NRC Fees	-	-	-	-	-	-	176	18	194	194	-	-	-	-	-	-	-	-	-	-
1c.4.8	Emergency Planning Fees	-	-	-	-	-	-	295	30	325	-	325	-	-	-	-	-	-	-	-	-
1c.4.9	Spent Fuel Pool O&M	-	-	-	-	-	-	188	28	214	-	214	-	-	-	-	-	-	-	-	-
1c.4.10	ISFSI Operating Costs	-	-	-	-	-	-	21	3	24	-	24	-	-	-	-	-	-	-	-	-
1c.4.11	Security Staff Cost	-	-	-	-	-	-	1,501	225	1,726	1,726	-	-	-	-	-	-	-	-	-	39,260
1c.4.12	Utility Staff Cost	-	-	-	-	-	-	5,657	849	6,505	6,505	-	-	-	-	-	-	-	-	-	105,560
1c.4	Subtotal Period 1c Period-Dependent Costs	-	252	1	1	-	18	8,191	1,257	9,720	9,157	563	-	-	393	-	-	-	3,601	1	144,820
1c.0	TOTAL PERIOD 1c COST	235	673	77	404	-	478	10,696	2,107	14,670	13,026	1,644	-	-	1,996	-	-	-	99,796	19,710	145,403
PERIOD 1 TOTALS		6,437	2,818	162	866	-	1,638	73,621	14,730	100,272	91,616	8,657	-	-	17,205	-	-	-	358,183	131,033	905,393
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	-	-	-	-	-	-	63	9	72	72	-	-	-	-	-	-	-	-	-	-
2a.1.5	Maintenance supplies	-	-	-	-	-	-	503	126	629	629	-	-	-	-	-	-	-	-	-	-
2a.1	Subtotal Period 2a Activity Costs	-	-	-	-	-	-	566	135	701	701	-	-	-	-	-	-	-	-	-	-
Period 2a Collateral Costs																					
2a.3.1	Spent Fuel Capital and Transfer	-	-	-	-	-	-	21,155	3,173	24,329	-	24,329	-	-	-	-	-	-	-	-	-
2a.3.2	Corporate Overheads	-	-	-	-	-	-	4,139	621	4,759	4,759	-	-	-	-	-	-	-	-	-	-
2a.3	Subtotal Period 2a Collateral Costs	-	-	-	-	-	-	25,294	3,794	29,088	4,759	24,329	-	-	-	-	-	-	-	-	-
Period 2a Period-Dependent Costs																					
2a.4.1	Insurance	-	-	-	-	-	-	1,962	196	2,158	-	2,158	-	-	-	-	-	-	-	-	-
2a.4.2	Property taxes	-	-	-	-	-	-	16	2	18	-	18	-	-	-	-	-	-	-	-	-
2a.4.3	Health physics supplies	-	344	-	-	-	-	-	86	430	430	-	-	-	-	-	-	-	-	-	-

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Cooper Nuclear Station
2034 Delayed DECON Decommissioning Cost Estimate
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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 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
Period 2a Period-Dependent Costs (continued)																					
2a.4.4	Disposal of DAW generated	-	-	13	7	-	198	-	52	270	270	-	-	-	4,267	-	-	-	39,139	13	-
2a.4.5	Plant energy budget	-	-	-	-	-	-	742	111	853	-	853	-	-	-	-	-	-	-	-	-
2a.4.6	NRC Fees	-	-	-	-	-	-	807	81	887	887	-	-	-	-	-	-	-	-	-	-
2a.4.7	Emergency Planning Fees	-	-	-	-	-	-	3,374	337	3,712	-	3,712	-	-	-	-	-	-	-	-	-
2a.4.8	Spent Fuel Pool O&M	-	-	-	-	-	-	2,984	448	3,431	-	3,431	-	-	-	-	-	-	-	-	-
2a.4.9	ISFSI Operating Costs	-	-	-	-	-	-	340	51	391	-	391	-	-	-	-	-	-	-	-	-
2a.4.10	Security Staff Cost	-	-	-	-	-	-	17,728	2,659	20,387	-	20,387	-	-	-	-	-	-	-	-	444,561
2a.4.11	Utility Staff Cost	-	-	-	-	-	-	18,816	2,822	21,639	-	21,639	-	-	-	-	-	-	-	-	329,769
2a.4	Subtotal Period 2a Period-Dependent Costs	-	344	13	7	-	198	46,768	6,845	54,176	1,587	52,588	-	-	4,267	-	-	-	39,139	13	774,330
2a.0	TOTAL PERIOD 2a COST	-	344	13	7	-	198	72,628	10,775	83,965	7,048	76,917	-	-	4,267	-	-	-	39,139	13	774,330
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	-	-	-	-	-	-	354	53	407	407	-	-	-	-	-	-	-	-	-	-
2b.1.5	Maintenance supplies	-	-	-	-	-	-	2,825	706	3,531	3,531	-	-	-	-	-	-	-	-	-	-
2b.1	Subtotal Period 2b Activity Costs	-	-	-	-	-	-	3,178	759	3,938	3,938	-	-	-	-	-	-	-	-	-	-
Period 2b Collateral Costs																					
2b.3.1	Spent Fuel Capital and Transfer	-	-	-	-	-	-	13,214	1,982	15,197	-	15,197	-	-	-	-	-	-	-	-	-
2b.3	Subtotal Period 2b Collateral Costs	-	-	-	-	-	-	13,214	1,982	15,197	-	15,197	-	-	-	-	-	-	-	-	-
Period 2b Period-Dependent Costs																					
2b.4.1	Insurance	-	-	-	-	-	-	9,796	980	10,775	-	10,775	-	-	-	-	-	-	-	-	-
2b.4.2	Property taxes	-	-	-	-	-	-	90	9	99	-	99	-	-	-	-	-	-	-	-	-
2b.4.3	Health physics supplies	-	1,620	-	-	-	-	-	405	2,025	2,025	-	-	-	-	-	-	-	-	-	-
2b.4.4	Disposal of DAW generated	-	-	66	36	-	1,037	-	271	1,411	1,411	-	-	-	22,311	-	-	-	204,651	68	-
2b.4.5	Plant energy budget	-	-	-	-	-	-	2,083	312	2,395	-	2,395	-	-	-	-	-	-	-	-	-
2b.4.6	NRC Fees	-	-	-	-	-	-	4,528	453	4,981	4,981	-	-	-	-	-	-	-	-	-	-
2b.4.7	Emergency Planning Fees	-	-	-	-	-	-	18,944	1,894	20,838	-	20,838	-	-	-	-	-	-	-	-	-
2b.4.8	ISFSI Operating Costs	-	-	-	-	-	-	1,908	286	2,194	-	2,194	-	-	-	-	-	-	-	-	-
2b.4.9	Security Staff Cost	-	-	-	-	-	-	57,312	8,597	65,909	-	65,909	-	-	-	-	-	-	-	-	1,265,451
2b.4.10	Utility Staff Cost	-	-	-	-	-	-	41,970	6,295	48,265	-	48,265	-	-	-	-	-	-	-	-	749,897
2b.4	Subtotal Period 2b Period-Dependent Costs	-	1,620	66	36	-	1,037	136,630	19,503	158,892	8,416	150,476	-	-	22,311	-	-	-	204,651	68	2,015,349
2b.0	TOTAL PERIOD 2b COST	-	1,620	66	36	-	1,037	153,023	22,244	178,026	12,354	165,672	-	-	22,311	-	-	-	204,651	68	2,015,349
PERIOD 2 TOTALS		-	1,964	78	43	-	1,236	225,651	33,019	261,991	19,402	242,589	-	-	26,578	-	-	-	243,790	81	2,789,679
PERIOD 3a - Reactivate Site Following SAFSTOR Dormancy																					
Period 3a Direct Decommissioning Activities																					
3a.1.1	Prepare preliminary decommissioning cost	-	-	-	-	-	-	130	20	150	150	-	-	-	-	-	-	-	-	-	1,300
3a.1.2	Review plant dwgs & specs.	-	-	-	-	-	-	460	69	529	529	-	-	-	-	-	-	-	-	-	4,600
3a.1.3	Perform detailed rad survey									a											
3a.1.4	End product description	-	-	-	-	-	-	100	15	115	115	-	-	-	-	-	-	-	-	-	1,000
3a.1.5	Detailed by-product inventory	-	-	-	-	-	-	130	20	150	150	-	-	-	-	-	-	-	-	-	1,300
3a.1.6	Define major work sequence	-	-	-	-	-	-	750	113	863	863	-	-	-	-	-	-	-	-	-	7,500
3a.1.7	Perform SER and EA	-	-	-	-	-	-	310	47	357	357	-	-	-	-	-	-	-	-	-	3,100
3a.1.8	Perform Site-Specific Cost Study	-	-	-	-	-	-	500	75	575	575	-	-	-	-	-	-	-	-	-	5,000
3a.1.9	Prepare/submit License Termination Plan	-	-	-	-	-	-	410	61	471	471	-	-	-	-	-	-	-	-	-	4,096
3a.1.10	Receive NRC approval of termination plan									a											

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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 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																					
3a.1.11.1	Re-activate plant & temporary facilities	-	-	-	-	-	-	737	111	848	763	-	85	-	-	-	-	-	-	-	7,370
3a.1.11.2	Plant systems	-	-	-	-	-	-	417	63	479	431	-	48	-	-	-	-	-	-	-	4,167
3a.1.11.3	Reactor internals	-	-	-	-	-	-	710	107	817	817	-	-	-	-	-	-	-	-	-	7,100
3a.1.11.4	Reactor vessel	-	-	-	-	-	-	650	98	748	748	-	-	-	-	-	-	-	-	-	6,500
3a.1.11.5	Sacrificial shield	-	-	-	-	-	-	50	8	58	58	-	-	-	-	-	-	-	-	-	500
3a.1.11.6	Moisture separators/reheaters	-	-	-	-	-	-	100	15	115	115	-	-	-	-	-	-	-	-	-	1,000
3a.1.11.7	Reinforced concrete	-	-	-	-	-	-	160	24	184	92	-	92	-	-	-	-	-	-	-	1,600
3a.1.11.8	Main Turbine	-	-	-	-	-	-	209	31	240	240	-	-	-	-	-	-	-	-	-	2,088
3a.1.11.9	Main Condensers	-	-	-	-	-	-	209	31	240	240	-	-	-	-	-	-	-	-	-	2,088
3a.1.11.10	Pressure suppression structure	-	-	-	-	-	-	200	30	230	230	-	-	-	-	-	-	-	-	-	2,000
3a.1.11.11	Drywell	-	-	-	-	-	-	160	24	184	184	-	-	-	-	-	-	-	-	-	1,600
3a.1.11.12	Plant structures & buildings	-	-	-	-	-	-	312	47	359	179	-	179	-	-	-	-	-	-	-	3,120
3a.1.11.13	Waste management	-	-	-	-	-	-	460	69	529	529	-	-	-	-	-	-	-	-	-	4,600
3a.1.11.14	Facility & site closeout	-	-	-	-	-	-	90	14	104	52	-	52	-	-	-	-	-	-	-	900
3a.1.11	Total	-	-	-	-	-	-	4,463	669	5,133	4,677	-	456	-	-	-	-	-	-	-	44,633
Planning & Site Preparations																					
3a.1.12	Prepare dismantling sequence	-	-	-	-	-	-	240	36	276	276	-	-	-	-	-	-	-	-	-	2,400
3a.1.13	Plant prep. & temp. svces	-	-	-	-	-	-	2,700	405	3,105	3,105	-	-	-	-	-	-	-	-	-	-
3a.1.14	Design water clean-up system	-	-	-	-	-	-	140	21	161	161	-	-	-	-	-	-	-	-	-	1,400
3a.1.15	Rigging/Cont. Cntrl Envlps/tooling/etc.	-	-	-	-	-	-	2,100	315	2,415	2,415	-	-	-	-	-	-	-	-	-	-
3a.1.16	Procure casks/liners & containers	-	-	-	-	-	-	123	18	141	141	-	-	-	-	-	-	-	-	-	1,230
3a.1	Subtotal Period 3a Activity Costs	-	-	-	-	-	-	12,556	1,883	14,439	13,983	-	456	-	-	-	-	-	-	-	77,559
Period 3a Period-Dependent Costs																					
3a.4.1	Insurance	-	-	-	-	-	-	420	42	462	462	-	-	-	-	-	-	-	-	-	-
3a.4.2	Property taxes	-	-	-	-	-	-	4	0	4	4	-	-	-	-	-	-	-	-	-	-
3a.4.3	Health physics supplies	-	324	-	-	-	-	-	81	405	405	-	-	-	-	-	-	-	-	-	-
3a.4.4	Heavy equipment rental	-	368	-	-	-	-	-	55	423	423	-	-	-	-	-	-	-	-	-	-
3a.4.5	Disposal of DAW generated	-	-	4	2	-	62	-	16	84	84	-	-	-	1,329	-	-	-	12,190	4	-
3a.4.6	Plant energy budget	-	-	-	-	-	-	927	139	1,066	1,066	-	-	-	-	-	-	-	-	-	-
3a.4.7	NRC Fees	-	-	-	-	-	-	249	25	274	274	-	-	-	-	-	-	-	-	-	-
3a.4.8	Security Staff Cost	-	-	-	-	-	-	2,855	428	3,283	3,283	-	-	-	-	-	-	-	-	-	65,179
3a.4.9	Utility Staff Cost	-	-	-	-	-	-	14,190	2,128	16,318	16,318	-	-	-	-	-	-	-	-	-	258,629
3a.4	Subtotal Period 3a Period-Dependent Costs	-	691	4	2	-	62	18,644	2,915	22,318	22,318	-	-	-	1,329	-	-	-	12,190	4	323,807
3a.0	TOTAL PERIOD 3a COST	-	691	4	2	-	62	31,200	4,799	36,758	36,302	-	456	-	1,329	-	-	-	12,190	4	401,366
PERIOD 3b - Decommissioning Preparations																					
Period 3b Direct Decommissioning Activities																					
Detailed Work Procedures																					
3b.1.1.1	Plant systems	-	-	-	-	-	-	473	71	544	490	-	54	-	-	-	-	-	-	-	4,733
3b.1.1.2	Reactor internals	-	-	-	-	-	-	400	60	460	460	-	-	-	-	-	-	-	-	-	4,000
3b.1.1.3	Remaining buildings	-	-	-	-	-	-	135	20	155	39	-	116	-	-	-	-	-	-	-	1,350
3b.1.1.4	CRD housings & NIs	-	-	-	-	-	-	100	15	115	115	-	-	-	-	-	-	-	-	-	1,000
3b.1.1.5	Incore instrumentation	-	-	-	-	-	-	100	15	115	115	-	-	-	-	-	-	-	-	-	1,000
3b.1.1.6	Removal primary containment	-	-	-	-	-	-	200	30	230	230	-	-	-	-	-	-	-	-	-	2,000
3b.1.1.7	Reactor vessel	-	-	-	-	-	-	363	54	417	417	-	-	-	-	-	-	-	-	-	3,630
3b.1.1.8	Facility closeout	-	-	-	-	-	-	120	18	138	69	-	69	-	-	-	-	-	-	-	1,200
3b.1.1.9	*Sacrificial shield*	-	-	-	-	-	-	120	18	138	138	-	-	-	-	-	-	-	-	-	1,200
3b.1.1.10	Reinforced concrete	-	-	-	-	-	-	100	15	115	58	-	58	-	-	-	-	-	-	-	1,000
3b.1.1.11	Main Turbine	-	-	-	-	-	-	208	31	239	239	-	-	-	-	-	-	-	-	-	2,080
3b.1.1.12	Main Condensers	-	-	-	-	-	-	209	31	240	240	-	-	-	-	-	-	-	-	-	2,088

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Cooper Nuclear 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 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
Detailed Work Procedures (continued)																					
3b.1.1.13	Moisture separators & reheaters	-	-	-	-	-	-	200	30	230	230	-	-	-	-	-	-	-	-	-	2,000
3b.1.1.14	Radwaste building	-	-	-	-	-	-	273	41	314	283	-	31	-	-	-	-	-	-	-	2,730
3b.1.1.15	Reactor building	-	-	-	-	-	-	273	41	314	283	-	31	-	-	-	-	-	-	-	2,730
3b.1.1	Total	-	-	-	-	-	-	3,274	491	3,765	3,405	-	360	-	-	-	-	-	-	-	32,741
3b.1	Subtotal Period 3b Activity Costs	-	-	-	-	-	-	3,274	491	3,765	3,405	-	360	-	-	-	-	-	-	-	32,741
Period 3b Additional Costs																					
3b.2.1	Site Characterization	-	-	-	-	-	-	5,395	1,619	7,014	7,014	-	-	-	-	-	-	-	-	-	-
3b.2	Subtotal Period 3b Additional Costs	-	-	-	-	-	-	5,395	1,619	7,014	7,014	-	-	-	-	-	-	-	-	-	-
Period 3b Collateral Costs																					
3b.3.1	Decon equipment	713	-	-	-	-	-	-	107	820	820	-	-	-	-	-	-	-	-	-	-
3b.3.2	DOC staff relocation expenses	-	-	-	-	-	-	912	137	1,049	1,049	-	-	-	-	-	-	-	-	-	-
3b.3.3	Pipe cutting equipment	-	1,000	-	-	-	-	-	150	1,150	1,150	-	-	-	-	-	-	-	-	-	-
3b.3	Subtotal Period 3b Collateral Costs	713	1,000	-	-	-	-	912	394	3,019	3,019	-	-	-	-	-	-	-	-	-	-
Period 3b Period-Dependent Costs																					
3b.4.1	Decon supplies	22	-	-	-	-	-	-	5	27	27	-	-	-	-	-	-	-	-	-	-
3b.4.2	Insurance	-	-	-	-	-	-	246	25	270	270	-	-	-	-	-	-	-	-	-	-
3b.4.3	Property taxes	-	-	-	-	-	-	2	0	2	2	-	-	-	-	-	-	-	-	-	-
3b.4.4	Health physics supplies	-	179	-	-	-	-	-	45	224	224	-	-	-	-	-	-	-	-	-	-
3b.4.5	Heavy equipment rental	-	184	-	-	-	-	-	28	212	212	-	-	-	-	-	-	-	-	-	-
3b.4.6	Disposal of DAW generated	-	-	2	1	-	35	-	9	48	48	-	-	-	754	-	-	-	6,913	2	-
3b.4.7	Plant energy budget	-	-	-	-	-	-	465	70	534	534	-	-	-	-	-	-	-	-	-	-
3b.4.8	NRC Fees	-	-	-	-	-	-	125	12	137	137	-	-	-	-	-	-	-	-	-	-
3b.4.9	Security Staff Cost	-	-	-	-	-	-	1,431	215	1,646	1,646	-	-	-	-	-	-	-	-	-	32,679
3b.4.10	DOC Staff Cost	-	-	-	-	-	-	4,378	657	5,035	5,035	-	-	-	-	-	-	-	-	-	58,560
3b.4.11	Utility Staff Cost	-	-	-	-	-	-	7,114	1,067	8,181	8,181	-	-	-	-	-	-	-	-	-	129,669
3b.4	Subtotal Period 3b Period-Dependent Costs	22	363	2	1	-	35	13,761	2,133	16,317	16,317	-	-	-	754	-	-	-	6,913	2	220,907
3b.0	TOTAL PERIOD 3b COST	735	1,363	2	1	-	35	23,342	4,638	30,115	29,755	-	360	-	754	-	-	-	6,913	2	253,648
PERIOD 3 TOTALS		735	2,055	6	3	-	97	54,542	9,435	66,872	66,056	-	816	-	2,083	-	-	-	19,104	6	655,014
PERIOD 4a - Large Component Removal																					
Period 4a Direct Decommissioning Activities																					
Nuclear Steam Supply System Removal																					
4a.1.1.1	Recirculation System Piping & Valves	16	70	14	14	25	272	-	101	512	512	-	-	100	897	-	-	-	119,606	2,487	-
4a.1.1.2	Recirculation Pumps & Motors	6	28	11	28	-	321	-	95	488	488	-	-	-	1,188	-	-	-	132,880	1,125	-
4a.1.1.3	CRDMs & NIs Removal	24	139	377	68	-	317	-	174	1,099	1,099	-	-	-	6,935	-	-	-	126,494	3,972	-
4a.1.1.4	Reactor Vessel Internals	86	1,959	3,871	912	-	5,607	155	5,535	18,124	18,124	-	-	-	1,878	1,252	470	-	359,044	18,900	888
4a.1.1.5	Vessel & Internals GTCC Disposal	-	-	-	-	-	7,470	-	1,120	8,590	8,590	-	-	-	-	-	-	508	89,497	-	-
4a.1.1.6	Reactor Vessel	-	5,054	906	351	-	4,408	155	6,332	17,205	17,205	-	-	-	11,247	2,859	-	-	1,447,089	18,900	888
4a.1.1	Totals	132	7,250	5,179	1,371	25	18,395	309	13,357	46,018	46,018	-	-	100	22,145	4,111	470	508	2,274,610	45,384	1,776
Removal of Major Equipment																					
4a.1.2	Main Turbine/Generator	-	167	845	372	6,376	-	-	1,138	8,898	8,898	-	-	61,604	-	-	-	-	2,772,179	4,438	-
4a.1.3	Main Condensers	-	706	588	259	4,439	-	-	940	6,932	6,932	-	-	42,889	-	-	-	-	1,930,000	19,519	-
Cascading Costs from Clean Building Demolition																					
4a.1.4.1	Reactor	-	260	-	-	-	-	-	39	299	299	-	-	-	-	-	-	-	-	2,486	-
4a.1.4.2	Augmented Radwaste	-	25	-	-	-	-	-	4	28	28	-	-	-	-	-	-	-	-	235	-
4a.1.4.3	Radwaste	-	43	-	-	-	-	-	7	50	50	-	-	-	-	-	-	-	-	359	-

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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 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
Cascading Costs from Clean Building Demolition (continued)																					
4a.1.4.4	Turbine	-	285	-	-	-	-	-	43	328	328	-	-	-	-	-	-	-	-	4,419	-
4a.1.4	Totals	-	613	-	-	-	-	-	92	705	705	-	-	-	-	-	-	-	-	7,498	-
Disposal of Plant Systems																					
4a.1.5.1	Augmented Radwaste El 877 Area1A	-	203	28	28	-	432	-	166	857	857	-	-	-	2,055	-	-	-	172,205	5,668	-
4a.1.5.2	Augmented Radwaste El 903 Area1A	-	66	6	7	-	104	-	44	228	228	-	-	-	469	-	-	-	41,606	1,842	-
4a.1.5.3	Augmented Radwaste El 918 Area1A	-	52	10	9	-	139	-	50	260	260	-	-	-	765	-	-	-	55,345	1,432	-
4a.1.5.4	Augmented Radwaste El 929 Area1A	-	21	4	5	-	73	-	25	127	127	-	-	-	324	-	-	-	29,038	579	-
4a.1.5.5	Augmented Radwaste El 929 Area1B	-	3	0	0	4	-	-	1	8	8	-	-	38	-	-	-	-	1,529	75	-
4a.1.5.6	DRYWELL Area1A	-	457	85	84	-	1,289	-	458	2,373	2,373	-	-	-	5,726	-	-	-	513,627	12,634	-
4a.1.5.7	DRYWELL Area1B	-	112	1	5	75	2	-	41	235	235	-	-	806	10	-	-	-	33,576	3,384	-
4a.1.5.8	Turbine El 932 Area1B	-	324	16	86	1,477	-	-	317	2,220	2,220	-	-	15,808	-	-	-	-	641,963	9,170	-
4a.1.5.9	Turbine El 932 Area2C	-	8	-	-	-	-	-	1	9	-	-	9	-	-	-	-	-	-	237	-
4a.1.5.10	Turbine El 932 Area3C	-	67	-	-	-	-	-	10	78	-	-	78	-	-	-	-	-	-	2,083	-
4a.1.5.11	Yard Area1B	-	518	50	264	4,517	-	-	852	6,201	6,201	-	-	48,365	-	-	-	-	1,964,114	14,340	-
4a.1.5	Totals	-	1,831	202	487	6,073	2,040	-	1,984	12,597	12,510	-	87	65,016	9,348	-	-	-	3,453,003	51,444	-
4a.1.6	Scaffolding in support of decommissioning	-	2,049	24	11	168	23	-	547	2,821	2,821	-	-	1,621	101	-	-	-	81,992	27,411	-
4a.1	Subtotal Period 4a Activity Costs	132	12,616	6,838	2,500	17,081	20,457	309	18,039	77,972	77,885	-	87	171,229	31,594	4,111	470	508	10,511,780	155,694	1,776
Period 4a Collateral Costs																					
4a.3.1	Process liquid waste	69	-	24	125	-	143	-	91	451	451	-	-	-	498	-	-	-	29,865	97	-
4a.3.2	Small tool allowance	-	90	-	-	-	-	-	14	104	94	-	10	-	-	-	-	-	-	-	-
4a.3	Subtotal Period 4a Collateral Costs	69	90	24	125	-	143	-	105	555	545	-	10	-	498	-	-	-	29,865	97	-
Period 4a Period-Dependent Costs																					
4a.4.1	Decon supplies	49	-	-	-	-	-	-	12	61	61	-	-	-	-	-	-	-	-	-	-
4a.4.2	Insurance	-	-	-	-	-	-	549	55	604	604	-	-	-	-	-	-	-	-	-	-
4a.4.3	Property taxes	-	-	-	-	-	-	4	0	5	4	-	0	-	-	-	-	-	-	-	-
4a.4.4	Health physics supplies	-	944	-	-	-	-	-	236	1,180	1,180	-	-	-	-	-	-	-	-	-	-
4a.4.5	Heavy equipment rental	-	1,981	-	-	-	-	-	297	2,278	2,278	-	-	-	-	-	-	-	-	-	-
4a.4.6	Disposal of DAW generated	-	-	26	14	-	405	-	106	551	551	-	-	-	8,708	-	-	-	79,878	27	-
4a.4.7	Plant energy budget	-	-	-	-	-	-	987	148	1,135	1,135	-	-	-	-	-	-	-	-	-	-
4a.4.8	NRC Fees	-	-	-	-	-	-	737	74	811	811	-	-	-	-	-	-	-	-	-	-
4a.4.9	Liquid Radwaste Processing Equipment/Services	-	-	-	-	-	-	420	63	483	483	-	-	-	-	-	-	-	-	-	-
4a.4.10	Security Staff Cost	-	-	-	-	-	-	3,199	480	3,679	3,679	-	-	-	-	-	-	-	-	-	73,036
4a.4.11	DOC Staff Cost	-	-	-	-	-	-	11,638	1,746	13,384	13,384	-	-	-	-	-	-	-	-	-	161,263
4a.4.12	Utility Staff Cost	-	-	-	-	-	-	16,014	2,402	18,416	18,416	-	-	-	-	-	-	-	-	-	292,143
4a.4	Subtotal Period 4a Period-Dependent Costs	49	2,925	26	14	-	405	33,548	5,619	42,586	42,585	-	0	-	8,708	-	-	-	79,878	27	526,441
4a.0	TOTAL PERIOD 4a COST	250	15,631	6,887	2,640	17,081	21,005	33,858	23,762	121,113	121,016	-	98	171,229	40,800	4,111	470	508	10,621,530	155,818	528,217
PERIOD 4b - Site Decontamination																					
Period 4b Direct Decommissioning Activities																					
4b.1.1	Remove spent fuel racks	262	33	79	88	-	1,348	-	498	2,308	2,308	-	-	-	5,986	-	-	-	537,141	1,004	-
Disposal of Plant Systems																					
4b.1.2.1	Control El 882 Area1B	-	280	7	39	674	-	-	178	1,178	1,178	-	-	7,213	-	-	-	-	292,908	7,797	-
4b.1.2.2	Control El 903 Area1C	-	170	-	-	-	-	-	25	195	-	-	195	-	-	-	-	-	-	5,155	-
4b.1.2.3	Control El 918 Area1C	-	66	-	-	-	-	-	10	76	-	-	76	-	-	-	-	-	-	2,100	-
4b.1.2.4	Control El 932 Area1C	-	22	-	-	-	-	-	3	26	-	-	26	-	-	-	-	-	-	702	-
4b.1.2.5	Intake	-	101	-	-	-	-	-	15	116	-	-	118	-	-	-	-	-	-	3,136	-
4b.1.2.6	Multi-Purpose Facility	-	198	3	14	239	-	-	88	541	541	-	-	2,558	-	-	-	-	103,862	5,430	-
4b.1.2.7	Radwaste El 877 Area1A	-	398	75	62	-	949	-	353	1,836	1,836	-	-	-	5,097	-	-	-	377,917	10,930	-

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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 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
Disposal of Plant Systems (continued)																					
4b.1.2.8	Radwaste El 877 Area2A	-	43	9	7	-	113	-	41	213	213	-	-	-	613	-	-	-	44,992	1,189	-
4b.1.2.9	Radwaste El 877 Area3A	-	71	16	13	-	201	-	72	372	372	-	-	-	1,156	-	-	-	79,963	1,969	-
4b.1.2.10	Radwaste El 903 Area1A	-	110	9	10	-	153	-	68	351	351	-	-	-	684	-	-	-	61,153	3,015	-
4b.1.2.11	Radwaste El 903 Area2A	-	188	36	29	-	439	-	165	856	856	-	-	-	1,955	-	-	-	175,093	5,282	-
4b.1.2.12	Radwaste El 903 Area3A	-	37	6	7	-	104	-	37	190	190	-	-	-	463	-	-	-	41,366	1,029	-
4b.1.2.13	Radwaste El 918 Area1A	-	18	2	2	-	30	-	12	64	64	-	-	-	135	-	-	-	12,033	477	-
4b.1.2.14	Radwaste El 918 Area2A	-	16	3	3	-	39	-	15	75	75	-	-	-	201	-	-	-	15,667	448	-
4b.1.2.15	Radwaste El 918 Area3A	-	165	23	22	-	338	-	138	705	705	-	-	-	1,690	-	-	-	134,827	5,045	-
4b.1.2.16	Radwaste El 934 Area1A	-	26	3	4	-	60	-	22	115	115	-	-	-	266	-	-	-	23,735	680	-
4b.1.2.17	Radwaste El 934 Area2A	-	98	11	12	-	177	-	72	370	370	-	-	-	808	-	-	-	70,665	2,663	-
4b.1.2.18	Radwaste El 949 Area1A	-	12	1	2	-	24	-	9	47	47	-	-	-	105	-	-	-	9,381	305	-
4b.1.2.19	Reactor El 1001 Area1A	-	50	7	8	-	121	-	45	230	230	-	-	-	537	-	-	-	48,175	1,261	-
4b.1.2.20	Reactor El 1001 Area1B	-	62	1	4	64	-	-	26	157	157	-	-	689	-	-	-	-	27,979	1,681	-
4b.1.2.21	Reactor El 859 Area1A	-	71	15	16	-	246	-	83	430	430	-	-	-	1,091	-	-	-	97,874	2,024	-
4b.1.2.22	Reactor El 859 Area1B	-	440	11	58	994	-	-	269	1,771	1,771	-	-	10,641	-	-	-	-	432,136	12,411	-
4b.1.2.23	Reactor El 859 Area2A	-	72	25	26	-	401	-	125	648	648	-	-	-	1,780	-	-	-	159,714	2,094	-
4b.1.2.24	Reactor El 859 Area2B	-	69	1	8	131	-	-	38	247	247	-	-	1,406	-	-	-	-	57,093	1,954	-
4b.1.2.25	Reactor El 859 Area3A	-	47	9	9	-	137	-	48	251	251	-	-	-	608	-	-	-	54,543	1,321	-
4b.1.2.26	Reactor El 859 Area3B	-	33	0	2	42	-	-	15	93	93	-	-	453	-	-	-	-	18,381	951	-
4b.1.2.27	Reactor El 859 Area4A	-	50	9	8	-	117	-	44	227	227	-	-	-	520	-	-	-	46,666	1,374	-
4b.1.2.28	Reactor El 859 Area4B	-	17	0	2	31	-	-	9	59	59	-	-	331	-	-	-	-	13,424	476	-
4b.1.2.29	Reactor El 859 Area5A	-	63	16	17	-	262	-	85	443	443	-	-	-	1,163	-	-	-	104,381	1,798	-
4b.1.2.30	Reactor El 859 Area5B	-	37	0	2	41	-	-	16	98	98	-	-	442	-	-	-	-	17,962	1,087	-
4b.1.2.31	Reactor El 903 Area1A	-	401	56	42	-	651	-	275	1,424	1,424	-	-	-	2,892	-	-	-	259,190	10,497	-
4b.1.2.32	Reactor El 903 Area1B	-	451	6	32	550	-	-	201	1,240	1,240	-	-	5,890	-	-	-	-	239,197	12,496	-
4b.1.2.33	Reactor El 903 Area2A	-	4	0	0	-	6	-	3	14	14	-	-	-	26	-	-	-	2,372	120	-
4b.1.2.34	Reactor El 903 Area2B	-	69	2	11	190	-	-	48	320	320	-	-	2,039	-	-	-	-	82,815	1,915	-
4b.1.2.35	Reactor El 903 Area3A	-	32	10	11	-	167	-	52	272	272	-	-	-	741	-	-	-	66,516	929	-
4b.1.2.36	Reactor El 903 Area3B	-	21	1	3	52	-	-	14	90	90	-	-	553	-	-	-	-	22,464	618	-
4b.1.2.37	Reactor El 903 Area4A	-	27	8	9	-	136	-	43	223	223	-	-	-	606	-	-	-	54,373	776	-
4b.1.2.38	Reactor El 903 Area4B	-	21	1	3	52	-	-	14	90	90	-	-	559	-	-	-	-	22,692	597	-
4b.1.2.39	Reactor El 931 Area1A	-	25	3	3	-	52	-	20	104	104	-	-	-	232	-	-	-	20,858	670	-
4b.1.2.40	Reactor El 931 Area1B	-	300	8	40	692	-	-	186	1,227	1,227	-	-	7,412	-	-	-	-	301,017	8,410	-
4b.1.2.41	Reactor El 931 Area2A	-	20	2	2	-	35	-	14	74	74	-	-	-	154	-	-	-	13,824	544	-
4b.1.2.42	Reactor El 931 Area2B	-	2	0	0	1	0	-	1	3	3	-	-	9	0	-	-	-	371	53	-
4b.1.2.43	Reactor El 931 Area3A	-	77	23	22	-	336	-	109	567	567	-	-	-	1,651	-	-	-	134,007	2,165	-
4b.1.2.44	Reactor El 931 Area3B	-	2	0	0	1	-	-	1	3	3	-	-	8	-	-	-	-	340	49	-
4b.1.2.45	Reactor El 931 Area4C	-	24	-	-	-	-	-	4	28	-	-	28	-	-	-	-	-	-	767	-
4b.1.2.46	Reactor El 931 Area5C	-	7	-	-	-	-	-	1	8	-	-	8	-	-	-	-	-	-	213	-
4b.1.2.47	Reactor El 958 Area1A	-	56	9	10	-	149	-	54	278	278	-	-	-	662	-	-	-	59,432	1,472	-
4b.1.2.48	Reactor El 958 Area1B	-	167	3	16	281	-	-	87	554	554	-	-	3,009	-	-	-	-	122,212	4,693	-
4b.1.2.49	Reactor El 958 Area2A	-	31	10	10	-	153	-	49	253	253	-	-	-	681	-	-	-	61,083	880	-
4b.1.2.50	Reactor El 958 Area2B	-	10	1	1	12	7	-	6	37	37	-	-	125	33	-	-	-	8,024	263	-
4b.1.2.51	Reactor El 958 Area3A	-	33	4	3	-	48	-	21	109	109	-	-	-	214	-	-	-	19,185	898	-
4b.1.2.52	Reactor El 958 Area3B	-	14	1	1	10	6	-	7	39	39	-	-	109	29	-	-	-	7,011	410	-
4b.1.2.53	Reactor El 976 Area1A	-	11	1	1	-	16	-	7	36	36	-	-	-	72	-	-	-	6,482	298	-
4b.1.2.54	Reactor El 976 Area1B	-	147	5	25	422	-	-	104	703	703	-	-	4,521	-	-	-	-	183,615	3,931	-
4b.1.2.55	Reactor El 976 Area2A	-	7	1	1	-	13	-	5	26	26	-	-	-	57	-	-	-	5,138	172	-
4b.1.2.56	Reactor El 976 Area2B	-	37	1	3	55	-	-	18	114	114	-	-	586	-	-	-	-	23,813	1,033	-
4b.1.2.57	Turbine El 882 Area1A	-	37	3	3	-	50	-	23	116	116	-	-	-	222	-	-	-	19,878	1,004	-
4b.1.2.58	Turbine El 882 Area1B	-	386	16	87	1,490	-	-	335	2,313	2,313	-	-	15,948	-	-	-	-	647,659	11,113	-
4b.1.2.59	Turbine El 882 Area2A	-	21	2	2	-	29	-	13	67	67	-	-	-	129	-	-	-	11,556	584	-
4b.1.2.60	Turbine El 882 Area2B	-	209	4	22	374	-	-	112	721	721	-	-	4,006	-	-	-	-	162,678	5,781	-
4b.1.2.61	Turbine El 882 Area3A	-	16	2	1	-	23	-	10	52	52	-	-	-	101	-	-	-	9,017	451	-
4b.1.2.62	Turbine El 882 Area3B	-	607	27	145	2,478	-	-	548	3,805	3,805	-	-	26,533	-	-	-	-	1,077,531	17,302	-
4b.1.2.63	Turbine El 903 Area1A	-	9	1	1	-	15	-	6	32	32	-	-	-	68	-	-	-	6,127	232	-

Table D-2
Cooper Nuclear 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 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
Disposal of Plant Systems (continued)																					
4b.1.2.64	Turbine El 903 Area1B	-	974	46	241	4,133	-	-	904	6,299	6,299	-	-	44,251	-	-	-	-	1,797,054	27,674	-
4b.1.2.65	Turbine El 903 Area2A	-	5	1	1	-	9	-	4	20	20	-	-	-	42	-	-	-	3,729	142	-
4b.1.2.66	Turbine El 903 Area2B	-	144	1	7	128	-	-	56	337	337	-	-	1,375	-	-	-	-	55,851	4,040	-
4b.1.2.67	Turbine El 903 Area3B	-	3	0	2	35	-	-	6	47	47	-	-	376	-	-	-	-	15,251	97	-
4b.1.2.68	Turbine El 903 Area3C	-	108	-	-	-	-	-	16	124	-	-	124	-	-	-	-	-	-	3,412	-
4b.1.2.69	Turbine El 903 Area4B	-	12	0	2	28	-	-	7	49	49	-	-	299	-	-	-	-	12,139	367	-
4b.1.2.70	Yard Area1C	-	197	-	-	-	-	-	30	227	-	-	227	-	-	-	-	-	-	5,770	-
4b.1.2	Totals	-	7,771	556	1,148	13,202	5,814	-	5,535	34,027	33,227	-	800	141,342	27,486	-	-	-	8,056,388	218,627	-
4b.1.3	Scaffolding in support of decommissioning	-	3,073	36	17	252	34	-	821	4,232	4,232	-	-	2,431	151	-	-	-	122,988	41,117	-
Decontamination of Site Buildings																					
4b.1.4.1	Reactor	2,880	1,820	202	422	4,911	2,378	-	3,310	15,922	15,922	-	-	52,579	39,536	-	-	-	6,069,283	115,053	-
4b.1.4.2	Augmented Radwaste	52	19	4	6	23	60	-	51	215	215	-	-	242	1,099	-	-	-	119,386	1,978	-
4b.1.4.3	Miscellaneous Structures - Contaminated	368	167	15	42	759	62	-	363	1,777	1,777	-	-	8,129	452	-	-	-	372,774	12,956	-
4b.1.4.4	Multi-Purpose Facility	68	55	6	12	115	89	-	90	437	437	-	-	1,234	1,567	-	-	-	205,068	3,237	-
4b.1.4.5	Radwaste	159	50	9	14	38	161	-	141	572	572	-	-	404	2,953	-	-	-	310,769	5,863	-
4b.1.4.6	Turbine	526	142	35	51	64	633	-	477	1,928	1,928	-	-	688	11,664	-	-	-	1,193,496	18,679	-
4b.1.4	Totals	4,055	2,253	271	547	5,910	3,382	-	4,432	20,850	20,850	-	-	63,275	57,271	-	-	-	8,270,774	157,766	-
4b.1	Subtotal Period 4b Activity Costs	4,318	13,131	942	1,800	19,364	10,578	-	11,285	61,417	60,618	-	800	207,048	90,895	-	-	-	16,987,290	418,513	-
Period 4b Additional Costs																					
4b.2.1	ISFSI Decontamination	-	1,012	6	24	-	60	1,250	460	2,811	-	2,811	-	-	1,175	-	-	-	165,113	26,509	2,560
4b.2.2	Final Site Survey	-	-	-	-	-	-	1,205	362	1,567	1,567	-	-	-	-	-	-	-	-	-	12,480
4b.2	Subtotal Period 4b Additional Costs	-	1,012	6	24	-	60	2,455	821	4,378	1,567	2,811	-	-	1,175	-	-	-	165,113	26,509	15,040
Period 4b Collateral Costs																					
4b.3.1	Process liquid waste	143	-	49	262	-	299	-	190	944	944	-	-	-	1,042	-	-	-	62,521	203	-
4b.3.2	Small tool allowance	-	235	-	-	-	-	-	35	270	270	-	-	-	-	-	-	-	-	-	-
4b.3.3	Decommissioning Equipment Disposition	-	-	88	50	621	84	-	130	973	973	-	-	6,000	373	-	-	-	303,507	88	-
4b.3	Subtotal Period 4b Collateral Costs	143	235	137	312	621	383	-	356	2,187	2,187	-	-	6,000	1,415	-	-	-	366,028	291	-
Period 4b Period-Dependent Costs																					
4b.4.1	Decon supplies	1,252	-	-	-	-	-	-	313	1,564	1,564	-	-	-	-	-	-	-	-	-	-
4b.4.2	Insurance	-	-	-	-	-	-	1,192	119	1,312	1,312	-	-	-	-	-	-	-	-	-	-
4b.4.3	Property taxes	-	-	-	-	-	-	10	1	11	11	-	-	-	-	-	-	-	-	-	-
4b.4.4	Health physics supplies	-	2,404	-	-	-	-	-	601	3,005	3,005	-	-	-	-	-	-	-	-	-	-
4b.4.5	Heavy equipment rental	-	4,270	-	-	-	-	-	641	4,911	4,911	-	-	-	-	-	-	-	-	-	-
4b.4.6	Disposal of DAW generated	-	-	55	31	-	876	-	229	1,191	1,191	-	-	-	18,832	-	-	-	172,741	58	-
4b.4.7	Plant energy budget	-	-	-	-	-	-	1,691	254	1,945	1,945	-	-	-	-	-	-	-	-	-	-
4b.4.8	NRC Fees	-	-	-	-	-	-	1,601	160	1,761	1,761	-	-	-	-	-	-	-	-	-	-
4b.4.9	Liquid Radwaste Processing Equipment/Services	-	-	-	-	-	-	913	137	1,049	1,049	-	-	-	-	-	-	-	-	-	-
4b.4.10	Security Staff Cost	-	-	-	-	-	-	6,945	1,042	7,987	7,987	-	-	-	-	-	-	-	-	-	158,571
4b.4.11	DOC Staff Cost	-	-	-	-	-	-	24,622	3,693	28,315	28,315	-	-	-	-	-	-	-	-	-	339,977
4b.4.12	Utility Staff Cost	-	-	-	-	-	-	33,080	4,962	38,042	38,042	-	-	-	-	-	-	-	-	-	598,766
4b.4	Subtotal Period 4b Period-Dependent Costs	1,252	6,674	55	31	-	876	70,053	12,151	91,092	91,092	-	-	-	18,832	-	-	-	172,741	58	1,097,314
4b.0	TOTAL PERIOD 4b COST	5,712	21,052	1,140	2,166	19,985	11,897	72,508	24,614	159,074	155,463	2,811	800	213,048	112,318	-	-	-	17,691,170	445,371	1,112,354
PERIOD 4e - License Termination																					
Period 4e Direct Decommissioning Activities																					
4e.1.1	ORISE confirmatory survey	-	-	-	-	-	-	147	44	191	191	-	-	-	-	-	-	-	-	-	-
4e.1.2	Terminate license									a											
4e.1	Subtotal Period 4e Activity Costs	-	-	-	-	-	-	147	44	191	191	-	-	-	-	-	-	-	-	-	-

Table D-2
Cooper Nuclear 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 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
Period 4e Additional Costs																					
4e.2.1	*Final Site Survey*	-	-	-	-	-	-	5,998	1,799	7,797	7,797	-	-	-	-	-	-	-	-	148,435	6,240
4e.2	Subtotal Period 4e Additional Costs	-	-	-	-	-	-	5,998	1,799	7,797	7,797	-	-	-	-	-	-	-	-	148,435	6,240
Period 4e Collateral Costs																					
4e.3.1	DOC staff relocation expenses	-	-	-	-	-	-	912	137	1,049	1,049	-	-	-	-	-	-	-	-	-	-
4e.3	Subtotal Period 4e Collateral Costs	-	-	-	-	-	-	912	137	1,049	1,049	-	-	-	-	-	-	-	-	-	-
Period 4e Period-Dependent Costs																					
4e.4.1	Insurance	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4e.4.2	Property taxes	-	-	-	-	-	-	3	0	3	3	-	-	-	-	-	-	-	-	-	-
4e.4.3	Health physics supplies	-	736	-	-	-	-	-	184	920	920	-	-	-	-	-	-	-	-	-	-
4e.4.4	Disposal of DAW generated	-	-	3	1	-	42	-	11	57	57	-	-	-	907	-	-	-	8,324	3	-
4e.4.5	Plant energy budget	-	-	-	-	-	-	140	21	161	161	-	-	-	-	-	-	-	-	-	-
4e.4.6	NRC Fees	-	-	-	-	-	-	532	53	585	585	-	-	-	-	-	-	-	-	-	-
4e.4.7	Security Staff Cost	-	-	-	-	-	-	1,012	152	1,164	1,164	-	-	-	-	-	-	-	-	-	18,857
4e.4.8	DOC Staff Cost	-	-	-	-	-	-	4,458	669	5,126	5,126	-	-	-	-	-	-	-	-	-	57,357
4e.4.9	Utility Staff Cost	-	-	-	-	-	-	4,695	704	5,399	5,399	-	-	-	-	-	-	-	-	-	74,643
4e.4	Subtotal Period 4e Period-Dependent Costs	-	736	3	1	-	42	10,839	1,794	13,416	13,416	-	-	-	907	-	-	-	8,324	3	150,857
4e.0	TOTAL PERIOD 4e COST	-	736	3	1	-	42	17,897	3,774	22,453	22,453	-	-	-	907	-	-	-	8,324	148,438	157,097
PERIOD 4 TOTALS		5,962	37,419	8,030	4,807	37,066	32,944	124,262	52,151	302,640	298,932	2,811	897	384,277	154,025	4,111	470	508	28,321,020	749,627	1,797,669
PERIOD 5b - Site Restoration																					
Period 5b Direct Decommissioning Activities																					
Demolition of Remaining Site Buildings																					
5b.1.1.1	Reactor	-	1,491	-	-	-	-	-	224	1,715	-	-	1,715	-	-	-	-	-	-	14,601	-
5b.1.1.2	Augmented Radwaste	-	222	-	-	-	-	-	33	255	-	-	255	-	-	-	-	-	-	2,119	-
5b.1.1.3	Control	-	214	-	-	-	-	-	32	246	-	-	246	-	-	-	-	-	-	1,655	-
5b.1.1.4	Intake Structure	-	523	-	-	-	-	-	78	602	-	-	602	-	-	-	-	-	-	5,621	-
5b.1.1.5	LLRW Storage Pad	-	145	-	-	-	-	-	22	167	-	-	167	-	-	-	-	-	-	1,227	-
5b.1.1.6	Miscellaneous Structures - Clean	-	1,196	-	-	-	-	-	179	1,375	-	-	1,375	-	-	-	-	-	-	11,837	-
5b.1.1.7	Miscellaneous Structures - Contaminated	-	27	-	-	-	-	-	4	30	-	-	30	-	-	-	-	-	-	572	-
5b.1.1.8	Multi-Purpose Facility	-	123	-	-	-	-	-	18	141	-	-	141	-	-	-	-	-	-	1,982	-
5b.1.1.9	OWC Gas Generator	-	18	-	-	-	-	-	3	20	-	-	20	-	-	-	-	-	-	283	-
5b.1.1.10	Office	-	156	-	-	-	-	-	23	179	-	-	179	-	-	-	-	-	-	1,920	-
5b.1.1.11	Radwaste	-	391	-	-	-	-	-	59	449	-	-	449	-	-	-	-	-	-	3,229	-
5b.1.1.12	Seal Well	-	17	-	-	-	-	-	3	20	-	-	20	-	-	-	-	-	-	166	-
5b.1.1.13	Sewage Treatment Area	-	4	-	-	-	-	-	1	5	-	-	5	-	-	-	-	-	-	53	-
5b.1.1.14	Transformer Yard	-	20	-	-	-	-	-	3	24	-	-	24	-	-	-	-	-	-	172	-
5b.1.1.15	Turbine	-	2,596	-	-	-	-	-	389	2,985	-	-	2,985	-	-	-	-	-	-	40,503	-
5b.1.1.16	Turbine Pedestal	-	277	-	-	-	-	-	42	318	-	-	318	-	-	-	-	-	-	2,100	-
5b.1.1	Totals	-	7,418	-	-	-	-	-	1,113	8,531	-	-	8,531	-	-	-	-	-	-	88,040	-
Site Closeout Activities																					
5b.1.2	Remove Rubble	-	424	-	-	-	-	-	64	488	-	-	488	-	-	-	-	-	-	3,286	-
5b.1.3	Grade & landscape site	-	578	-	-	-	-	-	87	665	-	-	665	-	-	-	-	-	-	1,578	-
5b.1.4	Final report to NRC	-	-	-	-	-	-	156	23	179	179	-	-	-	-	-	-	-	-	-	1,560
5b.1	Subtotal Period 5b Activity Costs	-	8,421	-	-	-	-	156	1,286	9,863	179	-	9,684	-	-	-	-	-	-	92,904	1,560
Period 5b Additional Costs																					
5b.2.1	ISFSI Demolition	-	672	-	-	-	-	44	107	824	-	824	-	-	-	-	-	-	-	5,898	160
5b.2.2	Concrete Crushing	-	499	-	-	-	-	8	76	582	-	-	582	-	-	-	-	-	-	3,045	-
5b.2.3	Cofferdam	-	458	-	-	-	-	-	69	527	-	-	527	-	-	-	-	-	-	5,130	-

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5b.2	Subtotal Period 5b Additional Costs	-	1,629	-	-	-	-	52	252	1,933	-	824	1,109	-	-	-	-	-	-	14,073	160
Period 5b Collateral Costs																					
5b.3.1	Small tool allowance	-	56	-	-	-	-	-	8	64	-	-	64	-	-	-	-	-	-	-	-
5b.3	Subtotal Period 5b Collateral Costs	-	56	-	-	-	-	-	8	64	-	-	64	-	-	-	-	-	-	-	-
Period 5b Period-Dependent Costs																					
5b.4.1	Insurance	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5b.4.2	Property taxes	-	-	-	-	-	-	7	1	8	-	-	8	-	-	-	-	-	-	-	-
5b.4.3	Heavy equipment rental	-	4,233	-	-	-	-	-	635	4,869	-	-	4,869	-	-	-	-	-	-	-	-
5b.4.4	Plant energy budget	-	-	-	-	-	-	167	25	192	-	-	192	-	-	-	-	-	-	-	-
5b.4.5	Security Staff Cost	-	-	-	-	-	-	2,419	363	2,782	-	-	2,782	-	-	-	-	-	-	-	45,051
5b.4.6	DOC Staff Cost	-	-	-	-	-	-	10,212	1,532	11,744	-	-	11,744	-	-	-	-	-	-	-	127,646
5b.4.7	Utility Staff Cost	-	-	-	-	-	-	4,507	676	5,183	-	-	5,183	-	-	-	-	-	-	-	73,209
5b.4	Subtotal Period 5b Period-Dependent Costs	-	4,233	-	-	-	-	17,312	3,232	24,777	-	-	24,777	-	-	-	-	-	-	-	245,906
5b.0	TOTAL PERIOD 5b COST	-	14,339	-	-	-	-	17,520	4,779	36,638	179	824	35,634	-	-	-	-	-	-	106,977	247,626
PERIOD 5 TOTALS		-	14,339	-	-	-	-	17,520	4,779	36,638	179	824	35,634	-	-	-	-	-	-	106,977	247,626
TOTAL COST TO DECOMMISSION		13,133	58,595	8,276	5,720	37,066	35,914	495,597	114,112	768,414	476,185	254,881	37,348	384,277	199,891	4,111	470	508	28,942,100	987,724	6,395,380

TOTAL COST TO DECOMMISSION WITH 17.44% CONTINGENCY:	**$768,414**	**thousands of 2008 dollars**
TOTAL NRC LICENSE TERMINATION COST IS 61.97% OR:	**$476,185**	**thousands of 2008 dollars**
SPENT FUEL MANAGEMENT COST IS 33.17% OR:	**$254,881**	**thousands of 2008 dollars**
NON-NUCLEAR DEMOLITION COST IS 4.86% OR:	**$37,348**	**thousands of 2008 dollars**
TOTAL LOW-LEVEL RADIOACTIVE WASTE VOLUME BURIED (EXCLUDING GTCC):	**204,472**	**cubic feet**
TOTAL GREATER THAN CLASS C RADWASTE VOLUME GENERATED:	**508**	**cubic feet**
TOTAL SCRAP METAL REMOVED:	**30,276**	**tons**
TOTAL CRAFT LABOR REQUIREMENTS:	**987,724**	**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

Table D-3
Cooper Nuclear Station
2034 SAFSTOR Decommissioning Cost Estimate
(thousands of 2008 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
PERIOD 1a - Shutdown through Transition																					
Period 1a Direct Decommissioning Activities																					
1a.1.1	SAFSTOR site characterization survey	-	-	-	-	-	-	346	104	450	450	-	-	-	-	-	-	-	-	-	-
1a.1.2	Prepare preliminary decommissioning cost	-	-	-	-	-	-	130	20	150	150	-	-	-	-	-	-	-	-	-	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	-	-	-	-	-	-	200	30	230	230	-	-	-	-	-	-	-	-	-	2,000
1a.1.8	Review plant dwgs & specs.	-	-	-	-	-	-	130	20	150	150	-	-	-	-	-	-	-	-	-	1,300
1a.1.9	Perform detailed rad survey									a											
1a.1.10	Estimate by-product inventory	-	-	-	-	-	-	100	15	115	115	-	-	-	-	-	-	-	-	-	1,000
1a.1.11	End product description	-	-	-	-	-	-	100	15	115	115	-	-	-	-	-	-	-	-	-	1,000
1a.1.12	Detailed by-product inventory	-	-	-	-	-	-	150	23	173	173	-	-	-	-	-	-	-	-	-	1,500
1a.1.13	Define major work sequence	-	-	-	-	-	-	100	15	115	115	-	-	-	-	-	-	-	-	-	1,000
1a.1.14	Perform SER and EA	-	-	-	-	-	-	310	47	357	357	-	-	-	-	-	-	-	-	-	3,100
1a.1.15	Perform Site-Specific Cost Study	-	-	-	-	-	-	500	75	575	575	-	-	-	-	-	-	-	-	-	5,000
Activity Specifications																					
1a.1.16.1	Prepare plant and facilities for SAFSTOR	-	-	-	-	-	-	492	74	566	566	-	-	-	-	-	-	-	-	-	4,920
1a.1.16.2	Plant systems	-	-	-	-	-	-	417	63	479	479	-	-	-	-	-	-	-	-	-	4,167
1a.1.16.3	Plant structures and buildings	-	-	-	-	-	-	312	47	359	359	-	-	-	-	-	-	-	-	-	3,120
1a.1.16.4	Waste management	-	-	-	-	-	-	200	30	230	230	-	-	-	-	-	-	-	-	-	2,000
1a.1.16.5	Facility and site dormancy	-	-	-	-	-	-	200	30	230	230	-	-	-	-	-	-	-	-	-	2,000
1a.1.16	Total	-	-	-	-	-	-	1,621	243	1,864	1,864	-	-	-	-	-	-	-	-	-	16,207
Detailed Work Procedures																					
1a.1.17.1	Plant systems	-	-	-	-	-	-	118	18	136	136	-	-	-	-	-	-	-	-	-	1,183
1a.1.17.2	Facility closeout & dormancy	-	-	-	-	-	-	120	18	138	138	-	-	-	-	-	-	-	-	-	1,200
1a.1.17	Total	-	-	-	-	-	-	238	36	274	274	-	-	-	-	-	-	-	-	-	2,383
1a.1.18	Procure vacuum drying system	-	-	-	-	-	-	10	2	12	12	-	-	-	-	-	-	-	-	-	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	-	-	-	-	-	-	3,935	642	4,577	4,577	-	-	-	-	-	-	-	-	-	35,890
Period 1a Collateral Costs																					
1a.3.1	Spent Fuel Capital and Transfer	-	-	-	-	-	-	2,721	408	3,129	-	3,129	-	-	-	-	-	-	-	-	-
1a.3.2	Corporate Overheads	-	-	-	-	-	-	3,105	466	3,570	3,570	-	-	-	-	-	-	-	-	-	-
1a.3	Subtotal Period 1a Collateral Costs	-	-	-	-	-	-	5,825	874	6,699	3,570	3,129	-	-	-	-	-	-	-	-	-
Period 1a Period-Dependent Costs																					
1a.4.1	Insurance	-	-	-	-	-	-	1,600	160	1,760	1,760	-	-	-	-	-	-	-	-	-	-
1a.4.2	Property taxes	-	-	-	-	-	-	4	0	4	4	-	-	-	-	-	-	-	-	-	-
1a.4.3	Health physics supplies	-	370	-	-	-	-	-	93	463	463	-	-	-	-	-	-	-	-	-	-
1a.4.4	Heavy equipment rental	-	368	-	-	-	-	-	55	423	423	-	-	-	-	-	-	-	-	-	-
1a.4.5	Disposal of DAW generated	-	-	5	3	-	73	-	19	100	100	-	-	-	1,575	-	-	-	14,445	5	-
1a.4.6	Plant energy budget	-	-	-	-	-	-	927	139	1,066	1,066	-	-	-	-	-	-	-	-	-	-
1a.4.7	NRC Fees	-	-	-	-	-	-	706	71	776	776	-	-	-	-	-	-	-	-	-	-
1a.4.8	Emergency Planning Fees	-	-	-	-	-	-	1,185	118	1,303	-	1,303	-	-	-	-	-	-	-	-	-
1a.4.9	Spent Fuel Pool O&M	-	-	-	-	-	-	745	112	857	-	857	-	-	-	-	-	-	-	-	-
1a.4.10	ISFSI Operating Costs	-	-	-	-	-	-	85	13	98	-	98	-	-	-	-	-	-	-	-	-
1a.4.11	Security Staff Cost	-	-	-	-	-	-	6,021	903	6,924	6,924	-	-	-	-	-	-	-	-	-	157,471

Table D-3
Cooper Nuclear Station
2034 SAFSTOR Decommissioning Cost Estimate
(thousands of 2008 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
Period 1a Period-Dependent Costs (continued)																					
1a.4.12	Utility Staff Cost	-	-	-	-	-	-	22,690	3,403	26,093	26,093	-	-	-	-	-	-	-	-	-	423,400
1a.4	Subtotal Period 1a Period-Dependent Costs	-	738	5	3	-	73	33,962	5,087	39,867	37,609	2,258	-	-	1,575	-	-	-	14,445	5	580,871
1a.0	TOTAL PERIOD 1a COST	-	738	5	3	-	73	43,723	6,603	51,144	45,757	5,387	-	-	1,575	-	-	-	14,445	5	616,761
PERIOD 1b - SAFSTOR Limited DECON Activities																					
Period 1b Direct Decommissioning Activities																					
Decontamination of Site Buildings																					
1b.1.1.1	Reactor	2,929	-	-	-	-	-	-	1,465	4,394	4,394	-	-	-	-	-	-	-	-	68,438	-
1b.1.1.2	Augmented Radwaste	52	-	-	-	-	-	-	26	78	78	-	-	-	-	-	-	-	-	1,562	-
1b.1.1.3	Miscellaneous Structures - Contaminated	376	-	-	-	-	-	-	188	565	565	-	-	-	-	-	-	-	-	8,542	-
1b.1.1.4	Multi-Purpose Facility	68	-	-	-	-	-	-	34	101	101	-	-	-	-	-	-	-	-	2,036	-
1b.1.1.5	Radwaste	158	-	-	-	-	-	-	79	237	237	-	-	-	-	-	-	-	-	4,761	-
1b.1.1.6	Turbine	520	-	-	-	-	-	-	260	780	780	-	-	-	-	-	-	-	-	15,667	-
1b.1.1	Totals	4,103	-	-	-	-	-	-	2,052	6,155	6,155	-	-	-	-	-	-	-	-	101,006	-
1b.1	Subtotal Period 1b Activity Costs	4,103	-	-	-	-	-	-	2,052	6,155	6,155	-	-	-	-	-	-	-	-	101,006	-
Period 1b Additional Costs																					
1b.2.1	Spent Fuel Pool Isolation	-	-	-	-	-	-	9,407	1,411	10,818	10,818	-	-	-	-	-	-	-	-	-	-
1b.2.2	Asbestos Insulation Disposal	-	773	1	65	-	558	-	265	1,662	1,662	-	-	-	10,333	-	-	-	134,329	10,002	-
1b.2	Subtotal Period 1b Additional Costs	-	773	1	65	-	558	9,407	1,676	12,480	12,480	-	-	-	10,333	-	-	-	134,329	10,002	-
Period 1b Collateral Costs																					
1b.3.1	Decon equipment	713	-	-	-	-	-	-	107	820	820	-	-	-	-	-	-	-	-	-	-
1b.3.2	Process liquid waste	229	-	74	392	-	448	-	293	1,436	1,436	-	-	-	1,561	-	-	-	93,644	304	-
1b.3.3	Small tool allowance	-	70	-	-	-	-	-	11	81	81	-	-	-	-	-	-	-	-	-	-
1b.3.4	Spent Fuel Capital and Transfer	-	-	-	-	-	-	930	139	1,069	-	1,069	-	-	-	-	-	-	-	-	-
1b.3.5	Corporate Overheads	-	-	-	-	-	-	766	115	880	880	-	-	-	-	-	-	-	-	-	-
1b.3	Subtotal Period 1b Collateral Costs	942	70	74	392	-	448	1,695	665	4,286	3,217	1,069	-	-	1,561	-	-	-	93,644	304	-
Period 1b Period-Dependent Costs																					
1b.4.1	Decon supplies	1,156	-	-	-	-	-	-	289	1,445	1,445	-	-	-	-	-	-	-	-	-	-
1b.4.2	Insurance	-	-	-	-	-	-	121	12	133	133	-	-	-	-	-	-	-	-	-	-
1b.4.3	Property taxes	-	-	-	-	-	-	1	0	1	1	-	-	-	-	-	-	-	-	-	-
1b.4.4	Health physics supplies	-	473	-	-	-	-	-	118	592	592	-	-	-	-	-	-	-	-	-	-
1b.4.5	Heavy equipment rental	-	91	-	-	-	-	-	14	104	104	-	-	-	-	-	-	-	-	-	-
1b.4.6	Disposal of DAW generated	-	-	5	3	-	81	-	21	110	110	-	-	-	1,741	-	-	-	15,968	5	-
1b.4.7	Plant energy budget	-	-	-	-	-	-	229	34	263	263	-	-	-	-	-	-	-	-	-	-
1b.4.8	NRC Fees	-	-	-	-	-	-	174	17	191	191	-	-	-	-	-	-	-	-	-	-
1b.4.9	Emergency Planning Fees	-	-	-	-	-	-	292	29	321	-	321	-	-	-	-	-	-	-	-	-
1b.4.10	Spent Fuel Pool O&M	-	-	-	-	-	-	184	28	211	-	211	-	-	-	-	-	-	-	-	-
1b.4.11	ISFSI Operating Costs	-	-	-	-	-	-	21	3	24	-	24	-	-	-	-	-	-	-	-	-
1b.4.12	Security Staff Cost	-	-	-	-	-	-	1,485	223	1,707	1,707	-	-	-	-	-	-	-	-	-	38,829
1b.4.13	Utility Staff Cost	-	-	-	-	-	-	5,595	839	6,434	6,434	-	-	-	-	-	-	-	-	-	104,400
1b.4	Subtotal Period 1b Period-Dependent Costs	1,156	564	5	3	-	81	8,101	1,628	11,538	10,981	557	-	-	1,741	-	-	-	15,968	5	143,229
1b.0	TOTAL PERIOD 1b COST	6,201	1,407	80	460	-	1,087	19,203	6,020	34,458	32,833	1,626	-	-	13,635	-	-	-	243,942	111,318	143,229

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Cooper Nuclear Station
2034 SAFSTOR Decommissioning Cost Estimate
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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 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
PERIOD 1c - Preparations for SAFSTOR Dormancy																					
Period 1c Direct Decommissioning Activities																					
1c.1.1	Prepare support equipment for storage	-	387	-	-	-	-	-	58	445	445	-	-	-	-	-	-	-	-	3,000	-
1c.1.2	Install containment pressure equal. lines	-	31	-	-	-	-	-	5	36	36	-	-	-	-	-	-	-	-	700	-
1c.1.3	Interim survey prior to dormancy	-	-	-	-	-	-	733	220	953	953	-	-	-	-	-	-	-	-	15,696	-
1c.1.4	Secure building accesses									a											
1c.1.5	Prepare & submit interim report	-	-	-	-	-	-	58	9	67	67	-	-	-	-	-	-	-	-	-	583
1c.1	Subtotal Period 1c Activity Costs	-	419	-	-	-	-	791	291	1,501	1,501	-	-	-	-	-	-	-	-	19,396	583
Period 1c Collateral Costs																					
1c.3.1	Process liquid waste	235	-	76	403	-	460	-	301	1,475	1,475	-	-	-	1,603	-	-	-	96,195	313	-
1c.3.2	Small tool allowance	-	3	-	-	-	-	-	0	3	3	-	-	-	-	-	-	-	-	-	-
1c.3.3	Spent Fuel Capital and Transfer	-	-	-	-	-	-	940	141	1,081	-	1,081	-	-	-	-	-	-	-	-	-
1c.3.4	Corporate Overheads	-	-	-	-	-	-	774	116	890	890	-	-	-	-	-	-	-	-	-	-
1c.3	Subtotal Period 1c Collateral Costs	235	3	76	403	-	460	1,714	558	3,449	2,368	1,081	-	-	1,603	-	-	-	96,195	313	-
Period 1c Period-Dependent Costs																					
1c.4.1	Insurance	-	-	-	-	-	-	122	12	134	134	-	-	-	-	-	-	-	-	-	-
1c.4.2	Property taxes	-	-	-	-	-	-	1	0	1	1	-	-	-	-	-	-	-	-	-	-
1c.4.3	Health physics supplies	-	160	-	-	-	-	-	40	200	200	-	-	-	-	-	-	-	-	-	-
1c.4.4	Heavy equipment rental	-	92	-	-	-	-	-	14	105	105	-	-	-	-	-	-	-	-	-	-
1c.4.5	Disposal of DAW generated	-	-	1	1	-	18	-	5	25	25	-	-	-	393	-	-	-	3,601	1	-
1c.4.6	Plant energy budget	-	-	-	-	-	-	231	35	266	266	-	-	-	-	-	-	-	-	-	-
1c.4.7	NRC Fees	-	-	-	-	-	-	176	18	194	194	-	-	-	-	-	-	-	-	-	-
1c.4.8	Emergency Planning Fees	-	-	-	-	-	-	295	30	325	-	325	-	-	-	-	-	-	-	-	-
1c.4.9	Spent Fuel Pool O&M	-	-	-	-	-	-	186	28	214	-	214	-	-	-	-	-	-	-	-	-
1c.4.10	ISFSI Operating Costs	-	-	-	-	-	-	21	3	24	-	24	-	-	-	-	-	-	-	-	-
1c.4.11	Security Staff Cost	-	-	-	-	-	-	1,501	225	1,726	1,726	-	-	-	-	-	-	-	-	-	39,260
1c.4.12	Utility Staff Cost	-	-	-	-	-	-	5,657	849	6,505	6,505	-	-	-	-	-	-	-	-	-	105,560
1c.4	Subtotal Period 1c Period-Dependent Costs	-	252	1	1	-	18	8,191	1,257	9,720	9,157	563	-	-	393	-	-	-	3,601	1	144,820
1c.0	TOTAL PERIOD 1c COST	235	673	77	404	-	478	10,696	2,107	14,670	13,026	1,644	-	-	1,996	-	-	-	99,796	19,710	145,403
PERIOD 1 TOTALS		6,437	2,818	162	868	-	1,638	73,621	14,730	100,272	91,616	8,657	-	-	17,205	-	-	-	358,183	131,033	905,393
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	-	-	-	-	-	-	63	9	72	72	-	-	-	-	-	-	-	-	-	-
2a.1.5	Maintenance supplies	-	-	-	-	-	-	503	126	629	629	-	-	-	-	-	-	-	-	-	-
2a.1	Subtotal Period 2a Activity Costs	-	-	-	-	-	-	566	135	701	701	-	-	-	-	-	-	-	-	-	-
Period 2a Collateral Costs																					
2a.3.1	Spent Fuel Capital and Transfer	-	-	-	-	-	-	21,155	3,173	24,329	-	24,329	-	-	-	-	-	-	-	-	-
2a.3.2	Corporate Overheads	-	-	-	-	-	-	4,139	621	4,759	4,759	-	-	-	-	-	-	-	-	-	-
2a.3	Subtotal Period 2a Collateral Costs	-	-	-	-	-	-	25,294	3,794	29,088	4,759	24,329	-	-	-	-	-	-	-	-	-
Period 2a Period-Dependent Costs																					
2a.4.1	Insurance	-	-	-	-	-	-	1,962	196	2,158	1,848	310	-	-	-	-	-	-	-	-	-
2a.4.2	Property taxes	-	-	-	-	-	-	16	2	18	18	-	-	-	-	-	-	-	-	-	-
2a.4.3	Health physics supplies	-	344	-	-	-	-	-	86	430	430	-	-	-	-	-	-	-	-	-	-

Table D-3
Cooper Nuclear Station
2034 SAFSTOR Decommissioning Cost Estimate
(thousands of 2008 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
Period 2a Period-Dependent Costs (continued)																					
2a.4.4	Disposal of DAW generated	-	-	13	7	-	198	-	52	270	270	-	-	-	4,267	-	-	-	39,139	13	-
2a.4.5	Plant energy budget	-	-	-	-	-	-	742	111	853	427	427	-	-	-	-	-	-	-	-	-
2a.4.6	NRC Fees	-	-	-	-	-	-	807	81	887	887	-	-	-	-	-	-	-	-	-	-
2a.4.7	Emergency Planning Fees	-	-	-	-	-	-	3,374	337	3,712	-	3,712	-	-	-	-	-	-	-	-	-
2a.4.8	Spent Fuel Pool O&M	-	-	-	-	-	-	2,984	448	3,431	-	3,431	-	-	-	-	-	-	-	-	-
2a.4.9	ISFSI Operating Costs	-	-	-	-	-	-	340	51	391	-	391	-	-	-	-	-	-	-	-	-
2a.4.10	Security Staff Cost	-	-	-	-	-	-	17,728	2,659	20,387	7,788	12,599	-	-	-	-	-	-	-	-	444,561
2a.4.11	Utility Staff Cost	-	-	-	-	-	-	18,816	2,822	21,639	4,426	17,213	-	-	-	-	-	-	-	-	329,769
2a.4	Subtotal Period 2a Period-Dependent Costs	-	344	13	7	-	198	46,768	6,845	54,176	16,092	38,083	-	-	4,267	-	-	-	39,139	13	774,330
2a.0	TOTAL PERIOD 2a COST	-	344	13	7	-	198	72,628	10,775	83,965	21,553	62,412	-	-	4,267	-	-	-	39,139	13	774,330
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	-	-	-	-	-	-	354	53	407	407	-	-	-	-	-	-	-	-	-	-
2b.1.5	Maintenance supplies	-	-	-	-	-	-	2,825	706	3,531	3,531	-	-	-	-	-	-	-	-	-	-
2b.1	Subtotal Period 2b Activity Costs	-	-	-	-	-	-	3,178	759	3,938	3,938	-	-	-	-	-	-	-	-	-	-
Period 2b Collateral Costs																					
2b.3.1	Spent Fuel Capital and Transfer	-	-	-	-	-	-	13,214	1,982	15,197	-	15,197	-	-	-	-	-	-	-	-	-
2b.3	Subtotal Period 2b Collateral Costs	-	-	-	-	-	-	13,214	1,982	15,197	-	15,197	-	-	-	-	-	-	-	-	-
Period 2b Period-Dependent Costs																					
2b.4.1	Insurance	-	-	-	-	-	-	9,796	980	10,775	10,373	402	-	-	-	-	-	-	-	-	-
2b.4.2	Property taxes	-	-	-	-	-	-	90	9	99	99	-	-	-	-	-	-	-	-	-	-
2b.4.3	Health physics supplies	-	1,620	-	-	-	-	-	405	2,025	2,025	-	-	-	-	-	-	-	-	-	-
2b.4.4	Disposal of DAW generated	-	-	66	36	-	1,037	-	271	1,411	1,411	-	-	-	22,311	-	-	-	204,651	68	-
2b.4.5	Plant energy budget	-	-	-	-	-	-	2,083	312	2,395	2,395	-	-	-	-	-	-	-	-	-	-
2b.4.6	NRC Fees	-	-	-	-	-	-	4,528	453	4,981	4,981	-	-	-	-	-	-	-	-	-	-
2b.4.7	Emergency Planning Fees	-	-	-	-	-	-	16,944	1,894	20,838	-	20,838	-	-	-	-	-	-	-	-	-
2b.4.8	ISFSI Operating Costs	-	-	-	-	-	-	1,908	286	2,194	-	2,194	-	-	-	-	-	-	-	-	-
2b.4.9	Security Staff Cost	-	-	-	-	-	-	57,312	8,597	65,909	43,719	22,190	-	-	-	-	-	-	-	-	1,265,451
2b.4.10	Utility Staff Cost	-	-	-	-	-	-	41,970	6,295	48,265	24,845	23,420	-	-	-	-	-	-	-	-	749,897
2b.4	Subtotal Period 2b Period-Dependent Costs	-	1,620	66	36	-	1,037	136,630	19,503	158,892	89,847	69,045	-	-	22,311	-	-	-	204,651	68	2,015,349
2b.0	TOTAL PERIOD 2b COST	-	1,620	66	36	-	1,037	153,023	22,244	178,026	93,785	84,241	-	-	22,311	-	-	-	204,651	68	2,015,349
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	-	-	-	-	-	-	414	62	476	476	-	-	-	-	-	-	-	-	-	-
2c.1.5	Maintenance supplies	-	-	-	-	-	-	3,306	826	4,132	4,132	-	-	-	-	-	-	-	-	-	-
2c.1	Subtotal Period 2c Activity Costs	-	-	-	-	-	-	3,720	889	4,608	4,608	-	-	-	-	-	-	-	-	-	-
Period 2c Period-Dependent Costs																					
2c.4.1	Insurance	-	-	-	-	-	-	11,037	1,104	12,140	12,140	-	-	-	-	-	-	-	-	-	-
2c.4.2	Property taxes	-	-	-	-	-	-	105	11	116	116	-	-	-	-	-	-	-	-	-	-
2c.4.3	Health physics supplies	-	1,783	-	-	-	-	-	446	2,229	2,229	-	-	-	-	-	-	-	-	-	-
2c.4.4	Disposal of DAW generated	-	-	75	42	-	1,186	-	310	1,613	1,613	-	-	-	25,518	-	-	-	234,065	78	-

Table D-3
Cooper Nuclear Station
2034 SAFSTOR Decommissioning Cost Estimate
(thousands of 2008 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 2c Period-Dependent Costs (continued)																					
2c.4.5	Plant energy budget	-	-	-	-	-	-	2,437	366	2,803	2,803	-	-	-	-	-	-	-	-	-	-
2c.4.6	NRC Fees	-	-	-	-	-	-	4,799	480	5,279	5,279	-	-	-	-	-	-	-	-	-	-
2c.4.7	Security Staff Cost	-	-	-	-	-	-	44,492	6,674	51,165	51,165	-	-	-	-	-	-	-	-	-	822,771
2c.4.8	Utility Staff Cost	-	-	-	-	-	-	25,284	3,793	29,076	29,076	-	-	-	-	-	-	-	-	-	479,950
2c.4	Subtotal Period 2c Period-Dependent Costs	-	1,783	75	42	-	1,186	88,153	13,182	104,422	104,422	-	-	-	25,518	-	-	-	234,065	78	1,302,721
2c.0	TOTAL PERIOD 2c COST	-	1,783	75	42	-	1,186	91,873	14,071	109,030	109,030	-	-	-	25,518	-	-	-	234,065	78	1,302,721
PERIOD 2 TOTALS		-	3,748	153	85	-	2,422	317,524	47,090	371,021	224,368	146,654	-	-	52,095	-	-	-	477,855	160	4,092,400
PERIOD 3a - Reactivate Site Following SAFSTOR Dormancy																					
Period 3a Direct Decommissioning Activities																					
3a.1.1	Prepare preliminary decommissioning cost	-	-	-	-	-	-	130	20	150	150	-	-	-	-	-	-	-	-	-	1,300
3a.1.2	Review plant dwgs & specs.	-	-	-	-	-	-	460	69	529	529	-	-	-	-	-	-	-	-	-	4,800
3a.1.3	Perform detailed rad survey									a											
3a.1.4	End product description	-	-	-	-	-	-	100	15	115	115	-	-	-	-	-	-	-	-	-	1,000
3a.1.5	Detailed by-product inventory	-	-	-	-	-	-	130	20	150	150	-	-	-	-	-	-	-	-	-	1,300
3a.1.6	Define major work sequence	-	-	-	-	-	-	750	113	863	863	-	-	-	-	-	-	-	-	-	7,500
3a.1.7	Perform SER and EA	-	-	-	-	-	-	310	47	357	357	-	-	-	-	-	-	-	-	-	3,100
3a.1.8	Perform Site-Specific Cost Study	-	-	-	-	-	-	500	75	575	575	-	-	-	-	-	-	-	-	-	5,000
3a.1.9	Prepare/submit License Termination Plan	-	-	-	-	-	-	410	61	471	471	-	-	-	-	-	-	-	-	-	4,096
3a.1.10	Receive NRC approval of termination plan									a											
Activity Specifications																					
3a.1.11.1	Re-activate plant & temporary facilities	-	-	-	-	-	-	737	111	848	763	-	85	-	-	-	-	-	-	-	7,370
3a.1.11.2	Plant systems	-	-	-	-	-	-	417	63	479	431	-	48	-	-	-	-	-	-	-	4,167
3a.1.11.3	Reactor internals	-	-	-	-	-	-	710	107	817	817	-	-	-	-	-	-	-	-	-	7,100
3a.1.11.4	Reactor vessel	-	-	-	-	-	-	650	98	748	748	-	-	-	-	-	-	-	-	-	6,500
3a.1.11.5	Sacrificial shield	-	-	-	-	-	-	50	8	58	58	-	-	-	-	-	-	-	-	-	500
3a.1.11.6	Moisture separators/reheaters	-	-	-	-	-	-	100	15	115	115	-	-	-	-	-	-	-	-	-	1,000
3a.1.11.7	Reinforced concrete	-	-	-	-	-	-	160	24	184	92	-	92	-	-	-	-	-	-	-	1,600
3a.1.11.8	Main Turbine	-	-	-	-	-	-	209	31	240	240	-	-	-	-	-	-	-	-	-	2,088
3a.1.11.9	Main Condensers	-	-	-	-	-	-	209	31	240	240	-	-	-	-	-	-	-	-	-	2,088
3a.1.11.10	Pressure suppression structure	-	-	-	-	-	-	200	30	230	230	-	-	-	-	-	-	-	-	-	2,000
3a.1.11.11	Drywell	-	-	-	-	-	-	160	24	184	184	-	-	-	-	-	-	-	-	-	1,600
3a.1.11.12	Plant structures & buildings	-	-	-	-	-	-	312	47	359	179	-	179	-	-	-	-	-	-	-	3,120
3a.1.11.13	Waste management	-	-	-	-	-	-	460	69	529	529	-	-	-	-	-	-	-	-	-	4,600
3a.1.11.14	Facility & site closeout	-	-	-	-	-	-	90	14	104	52	-	52	-	-	-	-	-	-	-	900
3a.1.11	Total	-	-	-	-	-	-	4,463	669	5,133	4,677	-	456	-	-	-	-	-	-	-	44,633
Planning & Site Preparations																					
3a.1.12	Prepare dismantling sequence	-	-	-	-	-	-	240	36	276	276	-	-	-	-	-	-	-	-	-	2,400
3a.1.13	Plant prep. & temp. svces	-	-	-	-	-	-	2,700	405	3,105	3,105	-	-	-	-	-	-	-	-	-	-
3a.1.14	Design water clean-up system	-	-	-	-	-	-	140	21	161	161	-	-	-	-	-	-	-	-	-	1,400
3a.1.15	Rigging/Cont. Cntrl Envlps/tooling/etc.	-	-	-	-	-	-	2,100	315	2,415	2,415	-	-	-	-	-	-	-	-	-	-
3a.1.16	Procure casks/liners & containers	-	-	-	-	-	-	123	18	141	141	-	-	-	-	-	-	-	-	-	1,230
3a.1	Subtotal Period 3a Activity Costs	-	-	-	-	-	-	12,556	1,883	14,439	13,983	-	456	-	-	-	-	-	-	-	77,559
Period 3a Period-Dependent Costs																					
3a.4.1	Insurance	-	-	-	-	-	-	420	42	462	462	-	-	-	-	-	-	-	-	-	-
3a.4.2	Property taxes	-	-	-	-	-	-	4	0	4	4	-	-	-	-	-	-	-	-	-	-
3a.4.3	Health physics supplies	-	324	-	-	-	-	-	81	405	405	-	-	-	-	-	-	-	-	-	-
3a.4.4	Heavy equipment rental	-	368	-	-	-	-	-	55	423	423	-	-	-	-	-	-	-	-	-	-
3a.4.5	Disposal of DAW generated	-	-	4	2	-	62	-	16	84	84	-	-	-	1,329	-	-	-	12,190	4	-

Table D-3
Cooper Nuclear Station
2034 SAFSTOR Decommissioning Cost Estimate
(thousands of 2008 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 3a Period-Dependent Costs (continued)																					
3a.4.6	Plant energy budget	-	-	-	-	-	-	927	139	1,066	1,066	-	-	-	-	-	-	-	-	-	-
3a.4.7	NRC Fees	-	-	-	-	-	-	249	25	274	274	-	-	-	-	-	-	-	-	-	-
3a.4.8	Security Staff Cost	-	-	-	-	-	-	2,855	428	3,283	3,283	-	-	-	-	-	-	-	-	-	65,179
3a.4.9	Utility Staff Cost	-	-	-	-	-	-	14,190	2,128	16,318	16,318	-	-	-	-	-	-	-	-	-	258,629
3a.4	Subtotal Period 3a Period-Dependent Costs	-	691	4	2	-	62	18,644	2,915	22,318	22,318	-	-	-	1,329	-	-	-	12,190	4	323,807
3a.0	TOTAL PERIOD 3a COST	-	691	4	2	-	62	31,200	4,799	36,758	36,302	-	456	-	1,329	-	-	-	12,190	4	401,366
PERIOD 3b - Decommissioning Preparations																					
Period 3b Direct Decommissioning Activities																					
Detailed Work Procedures																					
3b.1.1.1	Plant systems	-	-	-	-	-	-	473	71	544	490	-	54	-	-	-	-	-	-	-	4,733
3b.1.1.2	Reactor internals	-	-	-	-	-	-	400	60	460	460	-	-	-	-	-	-	-	-	-	4,000
3b.1.1.3	Remaining buildings	-	-	-	-	-	-	135	20	155	39	-	116	-	-	-	-	-	-	-	1,350
3b.1.1.4	CRD housings & NIs	-	-	-	-	-	-	100	15	115	115	-	-	-	-	-	-	-	-	-	1,000
3b.1.1.5	Incore instrumentation	-	-	-	-	-	-	100	15	115	115	-	-	-	-	-	-	-	-	-	1,000
3b.1.1.6	Removal primary containment	-	-	-	-	-	-	200	30	230	230	-	-	-	-	-	-	-	-	-	2,000
3b.1.1.7	Reactor vessel	-	-	-	-	-	-	363	54	417	417	-	-	-	-	-	-	-	-	-	3,630
3b.1.1.8	Facility closeout	-	-	-	-	-	-	120	18	138	69	-	69	-	-	-	-	-	-	-	1,200
3b.1.1.9	Sacrificial shield	-	-	-	-	-	-	120	18	138	138	-	-	-	-	-	-	-	-	-	1,200
3b.1.1.10	Reinforced concrete	-	-	-	-	-	-	100	15	115	58	-	58	-	-	-	-	-	-	-	1,000
3b.1.1.11	Main Turbine	-	-	-	-	-	-	208	31	239	239	-	-	-	-	-	-	-	-	-	2,080
3b.1.1.12	Main Condensers	-	-	-	-	-	-	209	31	240	240	-	-	-	-	-	-	-	-	-	2,088
3b.1.1.13	Moisture separators & reheaters	-	-	-	-	-	-	200	30	230	230	-	-	-	-	-	-	-	-	-	2,000
3b.1.1.14	Radwaste building	-	-	-	-	-	-	273	41	314	283	-	31	-	-	-	-	-	-	-	2,730
3b.1.1.15	Reactor building	-	-	-	-	-	-	273	41	314	283	-	31	-	-	-	-	-	-	-	2,730
3b.1.1	Total	-	-	-	-	-	-	3,274	491	3,765	3,405	-	360	-	-	-	-	-	-	-	32,741
3b.1	Subtotal Period 3b Activity Costs	-	-	-	-	-	-	3,274	491	3,765	3,405	-	360	-	-	-	-	-	-	-	32,741
Period 3b Additional Costs																					
3b.2.1	Site Characterization	-	-	-	-	-	-	5,395	1,619	7,014	7,014	-	-	-	-	-	-	-	-	-	-
3b.2	Subtotal Period 3b Additional Costs	-	-	-	-	-	-	5,395	1,619	7,014	7,014	-	-	-	-	-	-	-	-	-	-
Period 3b Collateral Costs																					
3b.3.1	Decon equipment	713	-	-	-	-	-	-	107	820	820	-	-	-	-	-	-	-	-	-	-
3b.3.2	DOC staff relocation expenses	-	-	-	-	-	-	912	137	1,049	1,049	-	-	-	-	-	-	-	-	-	-
3b.3.3	Pipe cutting equipment	-	1,000	-	-	-	-	-	150	1,150	1,150	-	-	-	-	-	-	-	-	-	-
3b.3	Subtotal Period 3b Collateral Costs	713	1,000	-	-	-	-	912	394	3,019	3,019	-	-	-	-	-	-	-	-	-	-
Period 3b Period-Dependent Costs																					
3b.4.1	Decon supplies	22	-	-	-	-	-	-	5	27	27	-	-	-	-	-	-	-	-	-	-
3b.4.2	Insurance	-	-	-	-	-	-	246	25	270	270	-	-	-	-	-	-	-	-	-	-
3b.4.3	Property taxes	-	-	-	-	-	-	2	0	2	2	-	-	-	-	-	-	-	-	-	-
3b.4.4	Health physics supplies	-	179	-	-	-	-	-	45	224	224	-	-	-	-	-	-	-	-	-	-
3b.4.5	Heavy equipment rental	-	184	-	-	-	-	-	28	212	212	-	-	-	-	-	-	-	-	-	-
3b.4.6	Disposal of DAW generated	-	-	2	1	-	35	-	9	48	48	-	-	-	754	-	-	-	6,913	2	-
3b.4.7	Plant energy budget	-	-	-	-	-	-	465	70	534	534	-	-	-	-	-	-	-	-	-	-
3b.4.8	NRC Fees	-	-	-	-	-	-	125	12	137	137	-	-	-	-	-	-	-	-	-	-
3b.4.9	Security Staff Cost	-	-	-	-	-	-	1,431	215	1,646	1,646	-	-	-	-	-	-	-	-	-	32,679
3b.4.10	DOC Staff Cost	-	-	-	-	-	-	4,378	657	5,035	5,035	-	-	-	-	-	-	-	-	-	58,560
3b.4.11	Utility Staff Cost	-	-	-	-	-	-	7,114	1,067	8,181	8,181	-	-	-	-	-	-	-	-	-	129,669
3b.4	Subtotal Period 3b Period-Dependent Costs	22	363	2	1	-	35	13,761	2,133	16,317	16,317	-	-	-	754	-	-	-	6,913	2	220,907

Table D-3
Cooper Nuclear Station
2034 SAFSTOR Decommissioning Cost Estimate
(thousands of 2008 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
3b.0	TOTAL PERIOD 3b COST	735	1,363	2	1	-	35	23,342	4,636	30,115	29,755	-	360	-	754	-	-	-	6,913	2	253,648
PERIOD 3 TOTALS		735	2,055	6	3	-	97	54,542	9,435	66,872	66,056	-	816	-	2,083	-	-	-	19,104	6	655,014
PERIOD 4a - Large Component Removal																					
Period 4a Direct Decommissioning Activities																					
Nuclear Steam Supply System Removal																					
4a.1.1.1	Recirculation System Piping & Valves	16	70	14	13	127	151	-	86	477	477	-	-	499	499	-	-	-	115,643	2,487	-
4a.1.1.2	Recirculation Pumps & Motors	6	28	11	26	-	321	-	95	488	488	-	-	-	1,188	-	-	-	132,880	1,125	-
4a.1.1.3	CRDMs & NIs Removal	24	139	377	68	-	317	-	174	1,099	1,099	-	-	-	6,935	-	-	-	126,494	3,972	-
4a.1.1.4	Reactor Vessel Internals	86	1,959	3,871	912	-	5,166	155	5,314	17,462	17,462	-	-	-	1,878	1,252	470	-	359,044	18,900	888
4a.1.1.5	Vessel & Internals GTCC Disposal	-	-	-	-	-	7,470	-	1,120	8,590	8,590	-	-	-	-	-	-	508	89,497	-	-
4a.1.1.6	Reactor Vessel	-	5,054	906	351	-	3,006	155	5,631	15,103	15,103	-	-	-	14,106	-	-	-	1,447,089	18,900	888
4a.1.1	Totals	132	7,250	5,179	1,370	127	16,431	309	12,420	43,219	43,219	-	-	499	24,605	1,252	470	508	2,270,647	45,384	1,776
Removal of Major Equipment																					
4a.1.2	Main Turbine/Generator	-	167	845	372	6,376	-	-	1,138	8,898	8,898	-	-	61,604	-	-	-	-	2,772,179	4,438	-
4a.1.3	Main Condensers	-	708	568	259	4,439	-	-	940	6,932	6,932	-	-	42,889	-	-	-	-	1,930,000	19,519	-
Cascading Costs from Clean Building Demolition																					
4a.1.4.1	Reactor	-	260	-	-	-	-	-	39	299	299	-	-	-	-	-	-	-	-	2,486	-
4a.1.4.2	Augmented Radwaste	-	25	-	-	-	-	-	4	28	28	-	-	-	-	-	-	-	-	235	-
4a.1.4.3	Radwaste	-	43	-	-	-	-	-	7	50	50	-	-	-	-	-	-	-	-	359	-
4a.1.4.4	Turbine	-	285	-	-	-	-	-	43	328	328	-	-	-	-	-	-	-	-	4,419	-
4a.1.4	Totals	-	613	-	-	-	-	-	92	705	705	-	-	-	-	-	-	-	-	7,498	-
Disposal of Plant Systems																					
4a.1.5.1	Augmented Radwaste El 877 Area1A	-	203	28	28	-	432	-	166	857	857	-	-	-	2,055	-	-	-	172,205	5,668	-
4a.1.5.2	Augmented Radwaste El 903 Area1A	-	66	6	7	-	104	-	44	228	228	-	-	-	469	-	-	-	41,606	1,842	-
4a.1.5.3	Augmented Radwaste El 918 Area1A	-	52	10	9	-	139	-	50	260	260	-	-	-	765	-	-	-	55,345	1,432	-
4a.1.5.4	Augmented Radwaste El 929 Area1A	-	21	4	5	-	73	-	25	127	127	-	-	-	324	-	-	-	29,038	579	-
4a.1.5.5	Augmented Radwaste El 929 Area1B	-	3	0	0	4	-	-	1	8	8	-	-	38	-	-	-	-	1,529	75	-
4a.1.5.6	DRYWELL Area1A	-	457	85	84	-	1,289	-	458	2,373	2,373	-	-	-	5,726	-	-	-	513,627	12,634	-
4a.1.5.7	DRYWELL Area1B	-	112	1	5	75	2	-	41	235	235	-	-	806	10	-	-	-	33,576	3,384	-
4a.1.5.8	Turbine El 932 Area1B	-	324	16	86	1,477	-	-	317	2,220	2,220	-	-	15,808	-	-	-	-	641,963	9,170	-
4a.1.5.9	Turbine El 932 Area2C	-	8	-	-	-	-	-	1	9	-	-	9	-	-	-	-	-	-	237	-
4a.1.5.10	Turbine El 932 Area3C	-	67	-	-	-	-	-	10	78	-	-	78	-	-	-	-	-	-	2,083	-
4a.1.5.11	Yard Area1B	-	518	50	264	4,517	-	-	852	6,201	6,201	-	-	48,365	-	-	-	-	1,964,114	14,340	-
4a.1.5	Totals	-	1,831	202	487	6,073	2,040	-	1,964	12,597	12,510	-	87	65,016	9,348	-	-	-	3,453,003	51,444	-
4a.1.6	Scaffolding in support of decommissioning	-	2,049	24	11	168	23	-	547	2,821	2,821	-	-	1,621	101	-	-	-	81,992	27,411	-
4a.1	Subtotal Period 4a Activity Costs	132	12,616	6,838	2,499	17,183	18,493	309	17,102	75,172	75,085	-	87	171,628	34,055	1,252	470	508	10,507,820	155,694	1,776
Period 4a Collateral Costs																					
4a.3.1	Process liquid waste	38	-	14	76	-	87	-	54	270	270	-	-	-	304	-	-	-	18,226	59	-
4a.3.2	Small tool allowance	-	90	-	-	-	-	-	14	104	94	-	10	-	-	-	-	-	-	-	-
4a.3	Subtotal Period 4a Collateral Costs	38	90	14	76	-	87	-	67	374	363	-	10	-	304	-	-	-	18,226	59	-
Period 4a Period-Dependent Costs																					
4a.4.1	Decon supplies	47	-	-	-	-	-	-	12	59	59	-	-	-	-	-	-	-	-	-	-
4a.4.2	Insurance	-	-	-	-	-	-	526	53	579	579	-	-	-	-	-	-	-	-	-	-
4a.4.3	Property taxes	-	-	-	-	-	-	4	0	5	4	-	0	-	-	-	-	-	-	-	-
4a.4.4	Health physics supplies	-	927	-	-	-	-	-	232	1,159	1,159	-	-	-	-	-	-	-	-	-	-
4a.4.5	Heavy equipment rental	-	1,899	-	-	-	-	-	285	2,183	2,183	-	-	-	-	-	-	-	-	-	-

Table D-3
Cooper Nuclear Station
2034 SAFSTOR Decommissioning Cost Estimate
(thousands of 2008 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
Period 4a Period-Dependent Costs (continued)																					
4a.4.6	Disposal of DAW generated	-	-	25	14	-	401	-	105	546	546	-	-	-	8,636	-	-	-	79,217	26	-
4a.4.7	Plant energy budget	-	-	-	-	-	-	946	142	1,087	1,087	-	-	-	-	-	-	-	-	-	-
4a.4.8	NRC Fees	-	-	-	-	-	-	707	71	778	778	-	-	-	-	-	-	-	-	-	-
4a.4.9	Liquid Radwaste Processing Equipment/Services	-	-	-	-	-	-	403	60	463	463	-	-	-	-	-	-	-	-	-	-
4a.4.10	Security Staff Cost	-	-	-	-	-	-	3,066	460	3,526	3,526	-	-	-	-	-	-	-	-	-	70,000
4a.4.11	DOC Staff Cost	-	-	-	-	-	-	11,154	1,673	12,828	12,828	-	-	-	-	-	-	-	-	-	154,560
4a.4.12	Utility Staff Cost	-	-	-	-	-	-	15,348	2,302	17,650	17,650	-	-	-	-	-	-	-	-	-	280,000
4a.4	Subtotal Period 4a Period-Dependent Costs	47	2,825	25	14	-	401	32,154	5,394	40,862	40,861	-	0	-	8,636	-	-	-	79,217	26	504,560
4a.0	TOTAL PERIOD 4a COST	217	15,531	6,878	2,590	17,183	18,982	32,463	22,564	116,408	116,310	-	98	171,628	42,895	1,252	470	508	10,605,260	155,780	506,336
PERIOD 4b - Site Decontamination																					
Period 4b Direct Decommissioning Activities																					
4b.1.1	Remove spent fuel racks	262	33	79	88	-	1,348	-	498	2,308	2,308	-	-	-	5,986	-	-	-	537,141	1,004	-
Disposal of Plant Systems																					
4b.1.2.1	Control El 882 Area1B	-	280	7	39	674	-	-	178	1,178	1,178	-	-	7,213	-	-	-	-	292,908	7,797	-
4b.1.2.2	Control El 903 Area1C	-	170	-	-	-	-	-	25	195	-	-	195	-	-	-	-	-	-	5,155	-
4b.1.2.3	Control El 918 Area1C	-	66	-	-	-	-	-	10	76	-	-	76	-	-	-	-	-	-	2,100	-
4b.1.2.4	Control El 932 Area1C	-	22	-	-	-	-	-	3	26	-	-	26	-	-	-	-	-	-	702	-
4b.1.2.5	Intake	-	101	-	-	-	-	-	15	116	-	-	116	-	-	-	-	-	-	3,136	-
4b.1.2.6	Multi-Purpose Facility	-	198	3	14	239	-	-	88	541	541	-	-	2,558	-	-	-	-	103,862	5,430	-
4b.1.2.7	Radwaste El 877 Area1A	-	398	75	62	-	949	-	353	1,836	1,836	-	-	-	5,097	-	-	-	377,917	10,930	-
4b.1.2.8	Radwaste El 877 Area2A	-	43	9	7	-	113	-	41	213	213	-	-	-	613	-	-	-	44,992	1,189	-
4b.1.2.9	Radwaste El 877 Area3A	-	71	16	13	-	201	-	72	372	372	-	-	-	1,156	-	-	-	79,963	1,969	-
4b.1.2.10	Radwaste El 903 Area1A	-	110	9	10	-	153	-	68	351	351	-	-	-	684	-	-	-	61,153	3,015	-
4b.1.2.11	Radwaste El 903 Area2A	-	188	38	29	-	439	-	165	856	856	-	-	-	1,955	-	-	-	175,093	5,282	-
4b.1.2.12	Radwaste El 903 Area3A	-	37	6	7	-	104	-	37	190	190	-	-	-	463	-	-	-	41,366	1,029	-
4b.1.2.13	Radwaste El 918 Area1A	-	18	2	2	-	30	-	12	64	64	-	-	-	135	-	-	-	12,033	477	-
4b.1.2.14	Radwaste El 918 Area2A	-	16	3	3	-	39	-	15	75	75	-	-	-	201	-	-	-	15,667	448	-
4b.1.2.15	Radwaste El 918 Area3A	-	185	23	22	-	338	-	136	705	705	-	-	-	1,690	-	-	-	134,827	5,045	-
4b.1.2.16	Radwaste El 934 Area1A	-	26	3	4	-	60	-	22	115	115	-	-	-	266	-	-	-	23,735	680	-
4b.1.2.17	Radwaste El 934 Area2A	-	98	11	12	-	177	-	72	370	370	-	-	-	808	-	-	-	70,665	2,663	-
4b.1.2.18	Radwaste El 949 Area1A	-	12	1	2	-	24	-	9	47	47	-	-	-	105	-	-	-	9,381	305	-
4b.1.2.19	Reactor El 1001 Area1A	-	50	7	8	-	121	-	45	230	230	-	-	-	537	-	-	-	48,175	1,261	-
4b.1.2.20	Reactor El 1001 Area1B	-	62	1	4	64	-	-	26	157	157	-	-	689	-	-	-	-	27,979	1,681	-
4b.1.2.21	Reactor El 859 Area1A	-	71	15	16	-	246	-	83	430	430	-	-	-	1,091	-	-	-	97,874	2,024	-
4b.1.2.22	Reactor El 859 Area1B	-	440	11	58	994	-	-	269	1,771	1,771	-	-	10,641	-	-	-	-	432,136	12,411	-
4b.1.2.23	Reactor El 859 Area2A	-	72	25	26	-	401	-	125	648	648	-	-	-	1,780	-	-	-	159,714	2,094	-
4b.1.2.24	Reactor El 859 Area2B	-	69	1	8	131	-	-	38	247	247	-	-	1,406	-	-	-	-	57,093	1,954	-
4b.1.2.25	Reactor El 859 Area3A	-	47	9	9	-	137	-	48	251	251	-	-	-	608	-	-	-	54,543	1,321	-
4b.1.2.26	Reactor El 859 Area3B	-	33	0	2	42	-	-	15	93	93	-	-	453	-	-	-	-	18,381	951	-
4b.1.2.27	Reactor El 859 Area4A	-	50	9	8	-	117	-	44	227	227	-	-	-	520	-	-	-	46,666	1,374	-
4b.1.2.28	Reactor El 859 Area4B	-	17	0	2	31	-	-	9	59	59	-	-	331	-	-	-	-	13,424	476	-
4b.1.2.29	Reactor El 859 Area5A	-	63	16	17	-	262	-	85	443	443	-	-	-	1,163	-	-	-	104,381	1,798	-
4b.1.2.30	Reactor El 859 Area5B	-	37	0	2	41	-	-	16	98	98	-	-	442	-	-	-	-	17,962	1,087	-
4b.1.2.31	Reactor El 903 Area1A	-	401	56	42	-	651	-	275	1,424	1,424	-	-	-	2,892	-	-	-	259,190	10,497	-
4b.1.2.32	Reactor El 903 Area1B	-	451	6	32	550	-	-	201	1,240	1,240	-	-	5,890	-	-	-	-	239,197	12,496	-
4b.1.2.33	Reactor El 903 Area2A	-	4	0	0	-	6	-	3	14	14	-	-	-	26	-	-	-	2,372	120	-
4b.1.2.34	Reactor El 903 Area2B	-	69	2	11	190	-	-	48	320	320	-	-	2,039	-	-	-	-	82,815	1,915	-
4b.1.2.35	Reactor El 903 Area3A	-	32	10	11	-	167	-	52	272	272	-	-	-	741	-	-	-	66,516	929	-
4b.1.2.36	Reactor El 903 Area3B	-	21	1	3	52	-	-	14	90	90	-	-	553	-	-	-	-	22,464	618	-
4b.1.2.37	Reactor El 903 Area4A	-	27	8	9	-	136	-	43	223	223	-	-	-	606	-	-	-	54,373	776	-
4b.1.2.38	Reactor El 903 Area4B	-	21	1	3	52	-	-	14	90	90	-	-	559	-	-	-	-	22,692	597	-
4b.1.2.39	Reactor El 931 Area1A	-	25	3	3	-	52	-	20	104	104	-	-	-	232	-	-	-	20,858	670	-

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Cooper Nuclear Station
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(thousands of 2008 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
Disposal of Plant Systems (continued)																					
4b.1.2.40	Reactor El 931 Area1B	-	300	8	40	692	-	-	186	1,227	1,227	-	-	7,412	-	-	-	-	301,017	8,410	-
4b.1.2.41	Reactor El 931 Area2A	-	20	2	2	-	35	-	14	74	74	-	-	-	154	-	-	-	13,824	544	-
4b.1.2.42	Reactor El 931 Area2B	-	2	0	0	1	0	-	1	3	3	-	-	9	0	-	-	-	371	53	-
4b.1.2.43	Reactor El 931 Area3A	-	77	23	22	-	336	-	109	567	567	-	-	-	1,651	-	-	-	134,007	2,165	-
4b.1.2.44	Reactor El 931 Area3B	-	2	0	0	1	-	-	1	3	3	-	-	8	-	-	-	-	340	49	-
4b.1.2.45	Reactor El 931 Area4C	-	24	-	-	-	-	-	4	28	-	-	28	-	-	-	-	-	-	767	-
4b.1.2.46	Reactor El 931 Area5C	-	7	-	-	-	-	-	1	8	-	-	8	-	-	-	-	-	-	213	-
4b.1.2.47	Reactor El 958 Area1A	-	56	9	10	-	149	-	54	278	278	-	-	-	662	-	-	-	59,432	1,472	-
4b.1.2.48	Reactor El 958 Area1B	-	167	3	16	281	-	-	87	554	554	-	-	3,009	-	-	-	-	122,212	4,693	-
4b.1.2.49	Reactor El 958 Area2A	-	31	10	10	-	153	-	49	253	253	-	-	-	681	-	-	-	61,083	880	-
4b.1.2.50	Reactor El 958 Area2B	-	10	1	1	12	7	-	6	37	37	-	-	125	33	-	-	-	8,024	263	-
4b.1.2.51	Reactor El 958 Area3A	-	33	4	3	-	48	-	21	109	109	-	-	-	214	-	-	-	19,185	898	-
4b.1.2.52	Reactor El 958 Area3B	-	14	1	1	10	6	-	7	39	39	-	-	109	29	-	-	-	7,011	410	-
4b.1.2.53	Reactor El 976 Area1A	-	11	1	1	-	18	-	7	38	38	-	-	-	72	-	-	-	6,482	298	-
4b.1.2.54	Reactor El 976 Area1B	-	147	5	25	422	-	-	104	703	703	-	-	4,521	-	-	-	-	183,615	3,931	-
4b.1.2.55	Reactor El 976 Area2A	-	7	1	1	-	13	-	5	26	26	-	-	-	57	-	-	-	5,136	172	-
4b.1.2.56	Reactor El 976 Area2B	-	37	1	3	55	-	-	18	114	114	-	-	586	-	-	-	-	23,813	1,033	-
4b.1.2.57	Turbine El 882 Area1A	-	37	3	3	-	50	-	23	116	116	-	-	-	222	-	-	-	19,878	1,004	-
4b.1.2.58	Turbine El 882 Area1B	-	386	16	87	1,490	-	-	335	2,313	2,313	-	-	15,948	-	-	-	-	647,659	11,113	-
4b.1.2.59	Turbine El 882 Area2A	-	21	2	2	-	29	-	13	67	67	-	-	-	129	-	-	-	11,556	584	-
4b.1.2.60	Turbine El 882 Area2B	-	209	4	22	374	-	-	112	721	721	-	-	4,006	-	-	-	-	162,678	5,781	-
4b.1.2.61	Turbine El 882 Area3A	-	16	2	1	-	23	-	10	52	52	-	-	-	101	-	-	-	9,017	451	-
4b.1.2.62	Turbine El 882 Area3B	-	607	27	145	2,478	-	-	548	3,805	3,805	-	-	26,533	-	-	-	-	1,077,531	17,302	-
4b.1.2.63	Turbine El 903 Area1A	-	9	1	1	-	15	-	6	32	32	-	-	-	68	-	-	-	6,127	232	-
4b.1.2.64	Turbine El 903 Area1B	-	974	46	241	4,133	-	-	904	6,299	6,299	-	-	44,251	-	-	-	-	1,797,054	27,674	-
4b.1.2.65	Turbine El 903 Area2A	-	5	1	1	-	9	-	4	20	20	-	-	-	42	-	-	-	3,729	142	-
4b.1.2.66	Turbine El 903 Area2B	-	144	1	7	128	-	-	56	337	337	-	-	1,375	-	-	-	-	55,851	4,040	-
4b.1.2.67	Turbine El 903 Area3B	-	3	0	2	35	-	-	6	47	47	-	-	376	-	-	-	-	15,251	97	-
4b.1.2.68	Turbine El 903 Area3C	-	108	-	-	-	-	-	16	124	-	-	124	-	-	-	-	-	-	3,412	-
4b.1.2.69	Turbine El 903 Area4B	-	12	0	2	28	-	-	7	49	49	-	-	299	-	-	-	-	12,139	367	-
4b.1.2.70	Yard Area1C	-	197	-	-	-	-	-	30	227	-	-	227	-	-	-	-	-	-	5,770	-
4b.1.2	Totals	-	7,771	556	1,148	13,202	5,814	-	5,535	34,027	33,227	-	800	141,342	27,486	-	-	-	8,056,388	218,627	-
4b.1.3	Scaffolding in support of decommissioning	-	3,073	36	17	252	34	-	821	4,232	4,232	-	-	2,431	151	-	-	-	122,988	41,117	-
Decontamination of Site Buildings																					
4b.1.4.1	Reactor	2,880	1,820	202	422	4,911	2,376	-	3,310	15,922	15,922	-	-	52,579	39,536	-	-	-	6,069,283	115,053	-
4b.1.4.2	Augmented Radwaste	52	19	4	6	23	60	-	51	215	215	-	-	242	1,099	-	-	-	119,386	1,978	-
4b.1.4.3	Miscellaneous Structures - Contaminated	368	167	15	42	759	62	-	363	1,777	1,777	-	-	8,129	452	-	-	-	372,774	12,956	-
4b.1.4.4	Multi-Purpose Facility	68	55	6	12	115	89	-	90	437	437	-	-	1,234	1,567	-	-	-	205,066	3,237	-
4b.1.4.5	Radwaste	159	50	9	14	38	161	-	141	572	572	-	-	404	2,953	-	-	-	310,769	5,863	-
4b.1.4.6	Turbine	526	142	35	51	64	633	-	477	1,928	1,928	-	-	688	11,664	-	-	-	1,193,496	18,679	-
4b.1.4	Totals	4,055	2,253	271	547	5,910	3,382	-	4,432	20,850	20,850	-	-	63,275	57,271	-	-	-	8,270,774	157,766	-
4b.1	Subtotal Period 4b Activity Costs	4,318	13,131	942	1,800	19,364	10,578	-	11,285	61,417	60,618	-	800	207,048	90,895	-	-	-	16,987,290	418,513	-
Period 4b Additional Costs																					
4b.2.1	ISFSI Decontamination	-	1,012	6	24	-	60	1,250	460	2,811	-	2,811	-	-	1,175	-	-	-	165,113	26,509	2,560
4b.2.2	Final Site Survey	-	-	-	-	-	-	1,205	362	1,567	1,567	-	-	-	-	-	-	-	-	-	12,480
4b.2	Subtotal Period 4b Additional Costs	-	1,012	6	24	-	60	2,455	821	4,378	1,567	2,811	-	-	1,175	-	-	-	165,113	26,509	15,040
Period 4b Collateral Costs																					
4b.3.1	Process liquid waste	79	-	30	161	-	183	-	113	566	566	-	-	-	639	-	-	-	38,338	125	-
4b.3.2	Small tool allowance	-	235	-	-	-	-	-	35	270	270	-	-	-	-	-	-	-	-	-	-
4b.3.3	Decommissioning Equipment Disposition	-	-	88	50	621	84	-	130	973	973	-	-	6,000	373	-	-	-	303,507	88	-
4b.3	Subtotal Period 4b Collateral Costs	79	235	118	210	621	267	-	278	1,810	1,810	-	-	6,000	1,012	-	-	-	341,844	213	-

Table D-3
Cooper Nuclear Station
2034 SAFSTOR Decommissioning Cost Estimate
(thousands of 2008 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
Period 4b Period-Dependent Costs																					
4b.4.1	Decon supplies	1,252	-	-	-	-	-	-	313	1,565	1,565	-	-	-	-	-	-	-	-	-	-
4b.4.2	Insurance	-	-	-	-	-	-	1,199	120	1,319	1,319	-	-	-	-	-	-	-	-	-	-
4b.4.3	Property taxes	-	-	-	-	-	-	10	1	11	11	-	-	-	-	-	-	-	-	-	-
4b.4.4	Health physics supplies	-	2,409	-	-	-	-	-	602	3,011	3,011	-	-	-	-	-	-	-	-	-	-
4b.4.5	Heavy equipment rental	-	4,294	-	-	-	-	-	644	4,938	4,938	-	-	-	-	-	-	-	-	-	-
4b.4.6	Disposal of DAW generated	-	-	55	31	-	876	-	229	1,192	1,192	-	-	-	18,853	-	-	-	172,932	58	-
4b.4.7	Plant energy budget	-	-	-	-	-	-	1,701	255	1,956	1,956	-	-	-	-	-	-	-	-	-	-
4b.4.8	NRC Fees	-	-	-	-	-	-	1,610	161	1,771	1,771	-	-	-	-	-	-	-	-	-	-
4b.4.9	Liquid Radwaste Processing Equipment/Services	-	-	-	-	-	-	918	138	1,055	1,055	-	-	-	-	-	-	-	-	-	-
4b.4.10	Security Staff Cost	-	-	-	-	-	-	6,984	1,048	8,032	8,032	-	-	-	-	-	-	-	-	-	159,464
4b.4.11	DOC Staff Cost	-	-	-	-	-	-	24,760	3,714	28,474	28,474	-	-	-	-	-	-	-	-	-	341,891
4b.4.12	Utility Staff Cost	-	-	-	-	-	-	33,266	4,990	38,256	38,256	-	-	-	-	-	-	-	-	-	602,137
4b.4	Subtotal Period 4b Period-Dependent Costs	1,252	6,703	55	31	-	876	70,448	12,215	91,580	91,580	-	-	-	18,853	-	-	-	172,932	58	1,103,493
4b.0	TOTAL PERIOD 4b COST	5,649	21,081	1,121	2,065	19,985	11,782	72,902	24,600	159,185	155,574	2,811	800	213,048	111,935	-	-	-	17,667,180	445,292	1,118,533
PERIOD 4e - License Termination																					
Period 4e Direct Decommissioning Activities																					
4e.1.1	ORISE confirmatory survey	-	-	-	-	-	-	147	44	191	191	-	-	-	-	-	-	-	-	-	-
4e.1.2	Terminate license									a											
4e.1	Subtotal Period 4e Activity Costs	-	-	-	-	-	-	147	44	191	191	-	-	-	-	-	-	-	-	-	-
Period 4e Additional Costs																					
4e.2.1	Final Site Survey	-	-	-	-	-	-	5,998	1,799	7,797	7,797	-	-	-	-	-	-	-	-	148,435	6,240
4e.2	Subtotal Period 4e Additional Costs	-	-	-	-	-	-	5,998	1,799	7,797	7,797	-	-	-	-	-	-	-	-	148,435	6,240
Period 4e Collateral Costs																					
4e.3.1	DOC staff relocation expenses	-	-	-	-	-	-	912	137	1,049	1,049	-	-	-	-	-	-	-	-	-	-
4e.3	Subtotal Period 4e Collateral Costs	-	-	-	-	-	-	912	137	1,049	1,049	-	-	-	-	-	-	-	-	-	-
Period 4e Period-Dependent Costs																					
4e.4.1	Insurance	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4e.4.2	Property taxes	-	-	-	-	-	-	3	0	3	3	-	-	-	-	-	-	-	-	-	-
4e.4.3	Health physics supplies	-	735	-	-	-	-	-	184	919	919	-	-	-	-	-	-	-	-	-	-
4e.4.4	Disposal of DAW generated	-	-	3	1	-	42	-	11	57	57	-	-	-	904	-	-	-	8,294	3	-
4e.4.5	Plant energy budget	-	-	-	-	-	-	139	21	160	160	-	-	-	-	-	-	-	-	-	-
4e.4.6	NRC Fees	-	-	-	-	-	-	530	53	583	583	-	-	-	-	-	-	-	-	-	-
4e.4.7	Security Staff Cost	-	-	-	-	-	-	1,009	151	1,160	1,160	-	-	-	-	-	-	-	-	-	18,789
4e.4.8	DOC Staff Cost	-	-	-	-	-	-	4,442	666	5,108	5,108	-	-	-	-	-	-	-	-	-	57,149
4e.4.9	Utility Staff Cost	-	-	-	-	-	-	4,678	702	5,379	5,379	-	-	-	-	-	-	-	-	-	74,371
4e.4	Subtotal Period 4e Period-Dependent Costs	-	735	3	1	-	42	10,800	1,788	13,369	13,369	-	-	-	904	-	-	-	8,294	3	150,309
4e.0	TOTAL PERIOD 4e COST	-	735	3	1	-	42	17,857	3,768	22,407	22,407	-	-	-	904	-	-	-	8,294	148,438	156,549
PERIOD 4 TOTALS		5,866	37,348	8,001	4,656	37,168	30,806	123,223	50,932	297,999	294,291	2,811	897	384,678	155,834	1,252	470	508	28,280,740	749,510	1,781,417
PERIOD 5b - Site Restoration																					
Period 5b Direct Decommissioning Activities																					
Demolition of Remaining Site Buildings																					
5b.1.1.1	Reactor	-	1,491	-	-	-	-	-	224	1,715	-	-	1,715	-	-	-	-	-	-	14,601	-
5b.1.1.2	Augmented Radwaste	-	222	-	-	-	-	-	33	255	-	-	255	-	-	-	-	-	-	2,119	-
5b.1.1.3	Control	-	214	-	-	-	-	-	32	246	-	-	246	-	-	-	-	-	-	1,655	-
5b.1.1.4	Intake Structure	-	523	-	-	-	-	-	78	602	-	-	602	-	-	-	-	-	-	5,621	-

Table D-3
Cooper Nuclear Station
2034 SAFSTOR Decommissioning Cost Estimate
(thousands of 2008 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
Demolition of Remaining Site Buildings (continued)																					
5b.1.1.5	LLRW Storage Pad	-	145	-	-	-	-	-	22	167	-	-	167	-	-	-	-	-	-	1,227	-
5b.1.1.6	Miscellaneous Structures - Clean	-	1,196	-	-	-	-	-	179	1,375	-	-	1,375	-	-	-	-	-	-	11,837	-
5b.1.1.7	Miscellaneous Structures - Contaminated	-	27	-	-	-	-	-	4	30	-	-	30	-	-	-	-	-	-	572	-
5b.1.1.8	Multi-Purpose Facility	-	123	-	-	-	-	-	18	141	-	-	141	-	-	-	-	-	-	1,982	-
5b.1.1.9	OWC Gas Generator	-	18	-	-	-	-	-	3	20	-	-	20	-	-	-	-	-	-	283	-
5b.1.1.10	Office	-	156	-	-	-	-	-	23	179	-	-	179	-	-	-	-	-	-	1,920	-
5b.1.1.11	Radwaste	-	391	-	-	-	-	-	59	449	-	-	449	-	-	-	-	-	-	3,229	-
5b.1.1.12	Seal Well	-	17	-	-	-	-	-	3	20	-	-	20	-	-	-	-	-	-	166	-
5b.1.1.13	Sewage Treatment Area	-	4	-	-	-	-	-	1	5	-	-	5	-	-	-	-	-	-	53	-
5b.1.1.14	Transformer Yard	-	20	-	-	-	-	-	3	24	-	-	24	-	-	-	-	-	-	172	-
5b.1.1.15	Turbine	-	2,596	-	-	-	-	-	389	2,985	-	-	2,985	-	-	-	-	-	-	40,503	-
5b.1.1.16	Turbine Pedestal	-	277	-	-	-	-	-	42	318	-	-	318	-	-	-	-	-	-	2,100	-
5b.1.1	Totals	-	7,418	-	-	-	-	-	1,113	8,531	-	-	8,531	-	-	-	-	-	-	88,040	-
Site Closeout Activities																					
5b.1.2	Remove Rubble	-	424	-	-	-	-	-	64	488	-	-	488	-	-	-	-	-	-	3,286	-
5b.1.3	Grade & landscape site	-	578	-	-	-	-	-	87	665	-	-	665	-	-	-	-	-	-	1,578	-
5b.1.4	Final report to NRC	-	-	-	-	-	-	156	23	179	179	-	-	-	-	-	-	-	-	-	1,560
5b.1	Subtotal Period 5b Activity Costs	-	8,421	-	-	-	-	156	1,286	9,863	179	-	9,684	-	-	-	-	-	-	92,904	1,560
Period 5b Additional Costs																					
5b.2.1	ISFSI Demolition	-	672	-	-	-	-	44	107	824	-	824	-	-	-	-	-	-	-	5,898	160
5b.2.2	Concrete Crushing	-	499	-	-	-	-	8	76	582	-	-	582	-	-	-	-	-	-	3,045	-
5b.2.3	Cofferdam	-	458	-	-	-	-	-	69	527	-	-	527	-	-	-	-	-	-	5,130	-
5b.2	Subtotal Period 5b Additional Costs	-	1,629	-	-	-	-	52	252	1,933	-	824	1,109	-	-	-	-	-	-	14,073	160
Period 5b Collateral Costs																					
5b.3.1	Small tool allowance	-	56	-	-	-	-	-	8	64	-	-	64	-	-	-	-	-	-	-	-
5b.3	Subtotal Period 5b Collateral Costs	-	56	-	-	-	-	-	8	64	-	-	64	-	-	-	-	-	-	-	-
Period 5b Period-Dependent Costs																					
5b.4.1	Insurance	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5b.4.2	Property taxes	-	-	-	-	-	-	7	1	8	-	-	8	-	-	-	-	-	-	-	-
5b.4.3	Heavy equipment rental	-	4,233	-	-	-	-	-	635	4,869	-	-	4,869	-	-	-	-	-	-	-	-
5b.4.4	Plant energy budget	-	-	-	-	-	-	167	25	192	-	-	192	-	-	-	-	-	-	-	-
5b.4.5	Security Staff Cost	-	-	-	-	-	-	2,419	363	2,782	-	-	2,782	-	-	-	-	-	-	-	45,051
5b.4.6	DOC Staff Cost	-	-	-	-	-	-	10,212	1,532	11,744	-	-	11,744	-	-	-	-	-	-	-	127,646
5b.4.7	Utility Staff Cost	-	-	-	-	-	-	4,507	676	5,183	-	-	5,183	-	-	-	-	-	-	-	73,209
5b.4	Subtotal Period 5b Period-Dependent Costs	-	4,233	-	-	-	-	17,312	3,232	24,777	-	-	24,777	-	-	-	-	-	-	-	245,906
5b.0	TOTAL PERIOD 5b COST	-	14,339	-	-	-	-	17,520	4,779	36,638	179	824	35,634	-	-	-	-	-	-	106,977	247,626
PERIOD 5 TOTALS		-	14,339	-	-	-	-	17,520	4,779	36,638	179	824	35,634	-	-	-	-	-	-	106,977	247,626
TOTAL COST TO DECOMMISSION		13,038	60,307	8,323	5,611	37,168	34,963	586,430	126,964	872,803	676,510	158,945	37,348	384,676	227,217	1,252	470	508	29,135,880	987,685	7,681,850

Table D-3
Cooper Nuclear Station
2034 SAFSTOR Decommissioning Cost Estimate
(thousands of 2008 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 17.02% CONTINGENCY:	$872,803	thousands of 2008 dollars
TOTAL NRC LICENSE TERMINATION COST IS 77.51% OR:	$676,510	thousands of 2008 dollars
SPENT FUEL MANAGEMENT COST IS 18.21% OR:	$158,945	thousands of 2008 dollars
NON-NUCLEAR DEMOLITION COST IS 4.28% OR:	$37,348	thousands of 2008 dollars
TOTAL LOW-LEVEL RADIOACTIVE WASTE VOLUME BURIED (EXCLUDING GTCC):	228,939	cubic feet
TOTAL GREATER THAN CLASS C RADWASTE VOLUME GENERATED:	508	cubic feet
TOTAL SCRAP METAL REMOVED:	30,276	tons
TOTAL CRAFT LABOR REQUIREMENTS:	987,685	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

WORK DIFFICULTY ADJUSTMENT FACTORS

APPENDIX E

WORK DIFFICULTY ADJUSTMENT FACTORS

TLG has historically applied work difficulty adjustment factors in determining Unit Cost Factors to account for working in a radiological controlled environment. In performing an area-by-area decommissioning cost/schedule estimate the work difficulty factors are to be applied on an "area" basis, based on the nominal area conditions. Where practical, areas are established based on similar working conditions. The intent of the use of these factors is to provide the estimator an appropriate means to achieve an additional element of consistency within the estimate.

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 areas 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).

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.

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 surface contamination levels are principally accounted for in protective clothing requirements and respiratory protection requirements)

0% Component is clean and is not located in a radiological controlled area.

10% Component is located in a radiological controlled area (General Area Radiation field < 2 .5 mrem/hr).

20% Component is located in a radiological controlled area (General Area Radiation field between 2. 5 to 15 mrem/hr).

40% Component is located in a radiological controlled area (General Area Radiation field between 16 and 99 mrem/hr).

100% Component is located in a radiological controlled area (General Area Radiation field > 100 mrem/hr).

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% Component is clean and is not located in a radiological controlled area.

30% 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 "PC's", or "PC's" with plastics.

50% 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 PC's for protective clothing.

100% 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 "PC's" and double "plastics" (extremely wet or humid working environment).

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 E-1
WORK DIFFICULTY ADJUSTMENT FACTORS

Area Identification	Area Description	Work Difficulty Factors			
		Access	Respirator	ALARA	Clothing
Reactor El 1001 Area 1	Refuel floor	14%	25%	14%	30%
Reactor El 859 Area 1	Torus	14%	25%	14%	30%
Reactor El 859 Area 2	HPCI Room, B&D RHR Room	14%	25%	14%	30%
Reactor El 859 Area 3	B Core Spray Pump Room	14%	25%	14%	30%
Reactor El 859 Area 4	RCIC Pump Room	14%	25%	14%	30%
Reactor El 859 Area 5	A&C RHR Pump Room	14%	25%	14%	30%
Reactor El 903 Area 1	CRD Hyd Control Units, TIP Room	14%	25%	14%	30%
Reactor El 903 Area 2	Steam Tunnel	14%	25%	14%	30%
Reactor El 903 Area 3	A RHR Room	22%	25%	40%	30%
Reactor El 903 Area 4	B RHR Room	22%	25%	40%	30%
Reactor El 931 Area 1	RBCCW pumps & heat exchangers	14%	25%	14%	30%
Reactor El 931 Area 2	RWCU Recirc pump room	10%	25%	100%	30%
Reactor El 931 Area 3	RWCU heat exchangers	10%	25%	100%	30%
Reactor El 931 Area 4	4 KV Switchgear	16%	0%	0%	0%
Reactor El 931 Area 5	Roof Area	16%	0%	0%	0%
Reactor El 958 Area 1	General Area	14%	25%	14%	30%
Reactor El 958 Area 2	Fuel Pool Cooling room	10%	25%	100%	30%
Reactor El 958 Area 3	RWCU piping	22%	25%	40%	30%
Reactor El 976 Area 1	Rx Recirc MG Sets	14%	25%	14%	30%

TABLE E-1 (continued)
WORK DIFFICULTY ADJUSTMENT FACTORS

Area Identification	Area Description	Work Difficulty Factors			
		Access	Respirator	ALARA	Clothing
Reactor El 976 Area 2	Standby Liquid Control	14%	25%	14%	30%
DRYWELL	Drywell	22%	25%	40%	30%
Control El 882 Area 1	Emergency CST's, RHR service water pumps	14%	25%	14%	30%
Control El 903 Area 1	Switchgear	16%	0%	0%	0%
Control El 918 Area 1	Battery Rooms	16%	0%	0%	0%
Control El 932 Area 1	Control Room, Computer Room	14%	0%	0%	0%
Turbine El 882 Area 1	Condenser	14%	25%	14%	30%
Turbine El 882 Area 2	Diesel / Boiler Room roof	14%	25%	14%	30%
Turbine El 882 Area 3	Condensate & FW Pumps SJAE Room	14%	25%	14%	30%
Turbine El 903 Area 1	FW heaters, condenser	14%	25%	14%	30%
Turbine El 903 Area 2	Generator Bus Duct	14%	25%	14%	30%
Turbine El 903 Area 3	Diesels/Boilers/Water Treatment	10%	0%	0%	0%
Turbine El 903 Area 4	Machine Shop	16%	0%	0%	0%
Turbine El 932 Area 1	Turbine operating floor	14%	25%	14%	30%
Turbine El 932 Area 2	Maintenance Office / Storage Area	10%	0%	0%	0%
Turbine El 932 Area 3	Switchgear room	10%	0%	0%	0%
Augmented Radwaste El 877 Area 1	Waste Concentrator	14%	25%	14%	30%
Augmented Radwaste El 903 Area 1	Cask Shipping	14%	25%	14%	30%
Augmented Radwaste El 918 Area 1	Concentrator heat exchangers	14%	25%	14%	30%
Augmented Radwaste El 929 Area 1	Roof above charcoal tanks	14%	25%	14%	30%

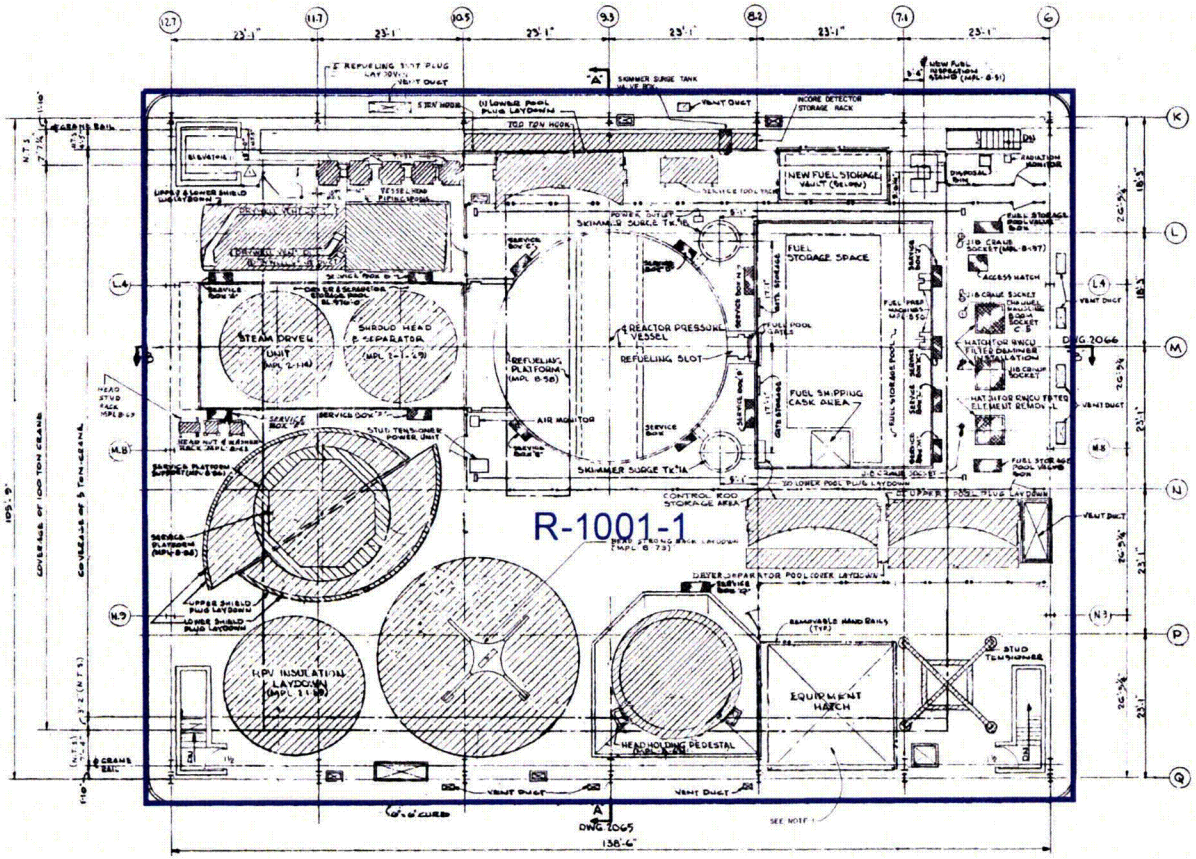
TABLE E-1 (continued)
WORK DIFFICULTY ADJUSTMENT FACTORS

Area Identification	Area Description	Work Difficulty Factors			
		Access	Respirator	ALARA	Clothing
Radwaste El 877 Area 1	General Basement area	14%	25%	14%	30%
Radwaste El 877 Area 2	Spent Resin & Backwash Separator Tanks	14%	25%	14%	30%
Radwaste El 877 Area 3	Sludge & Phase Separator Tanks	22%	25%	40%	30%
Radwaste El 903 Area 1	Drum Capping Handling Area	14%	25%	14%	30%
Radwaste El 903 Area 2	Resin Loading Station & Control Room	14%	25%	14%	30%
Radwaste El 903 Area 3	Corridor	14%	25%	14%	30%
Radwaste El 918 Area 1	Resin Hoppers	22%	25%	40%	30%
Radwaste El 918 Area 2	Condensate Filter Demineralizer	14%	25%	14%	30%
Radwaste El 918 Area 3	Offices, Rad Chem Lab, Drum loading area	14%	25%	14%	30%
Radwaste El 934 Area 1	Resin Centrifuges	14%	25%	14%	30%
Radwaste El 934 Area 2	Demin removal area, Laundry, filter units	14%	25%	14%	30%
Radwaste El 949 Area 1	Radwaste Roof	14%	25%	14%	30%
Multi-Purpose Facility	Multi-Purpose Facility	14%	25%	14%	30%
Intake	Intake	10%	0%	0%	0%
Yard Area 1	Elevated release point, tanks	10%	0%	0%	0%

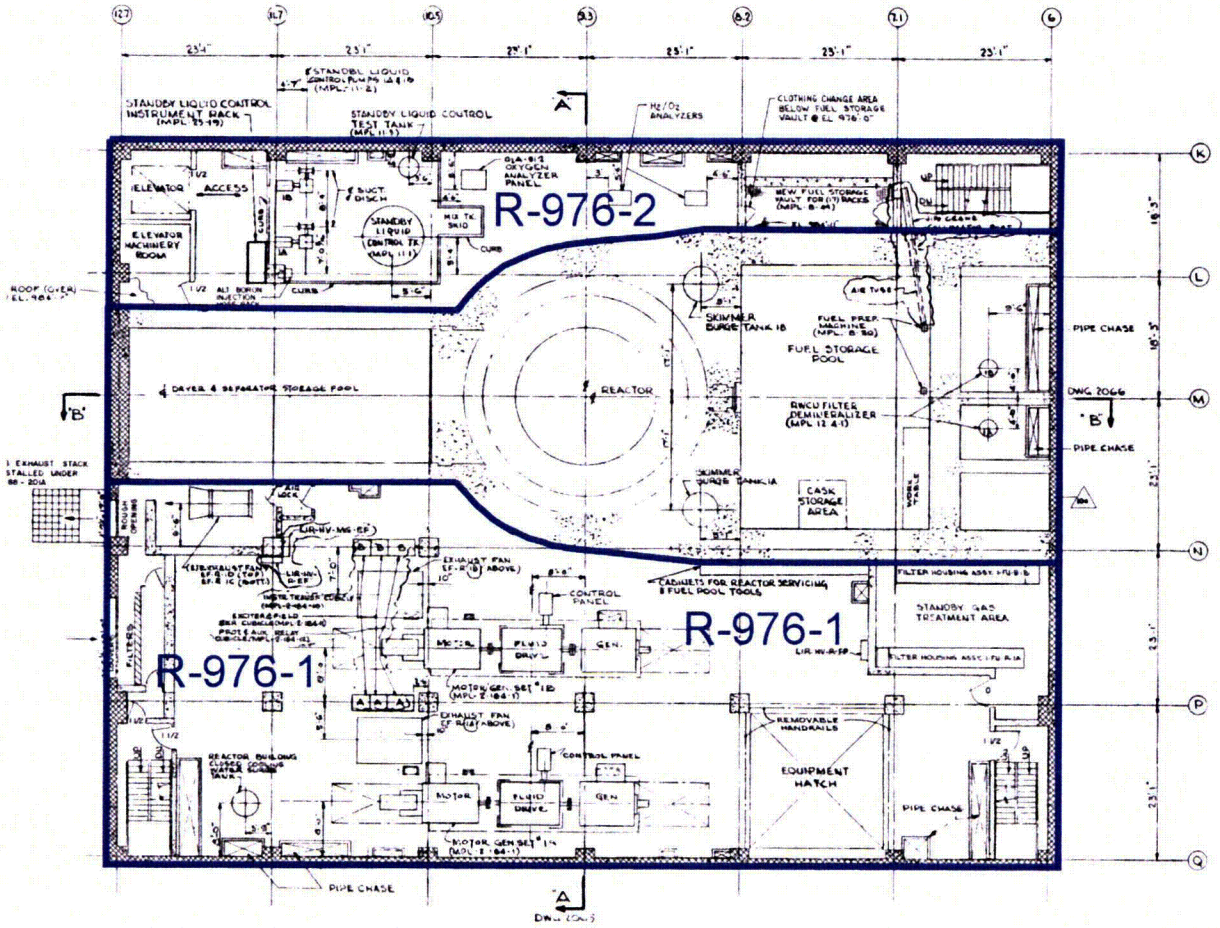
APPENDIX F

AREA MAPS

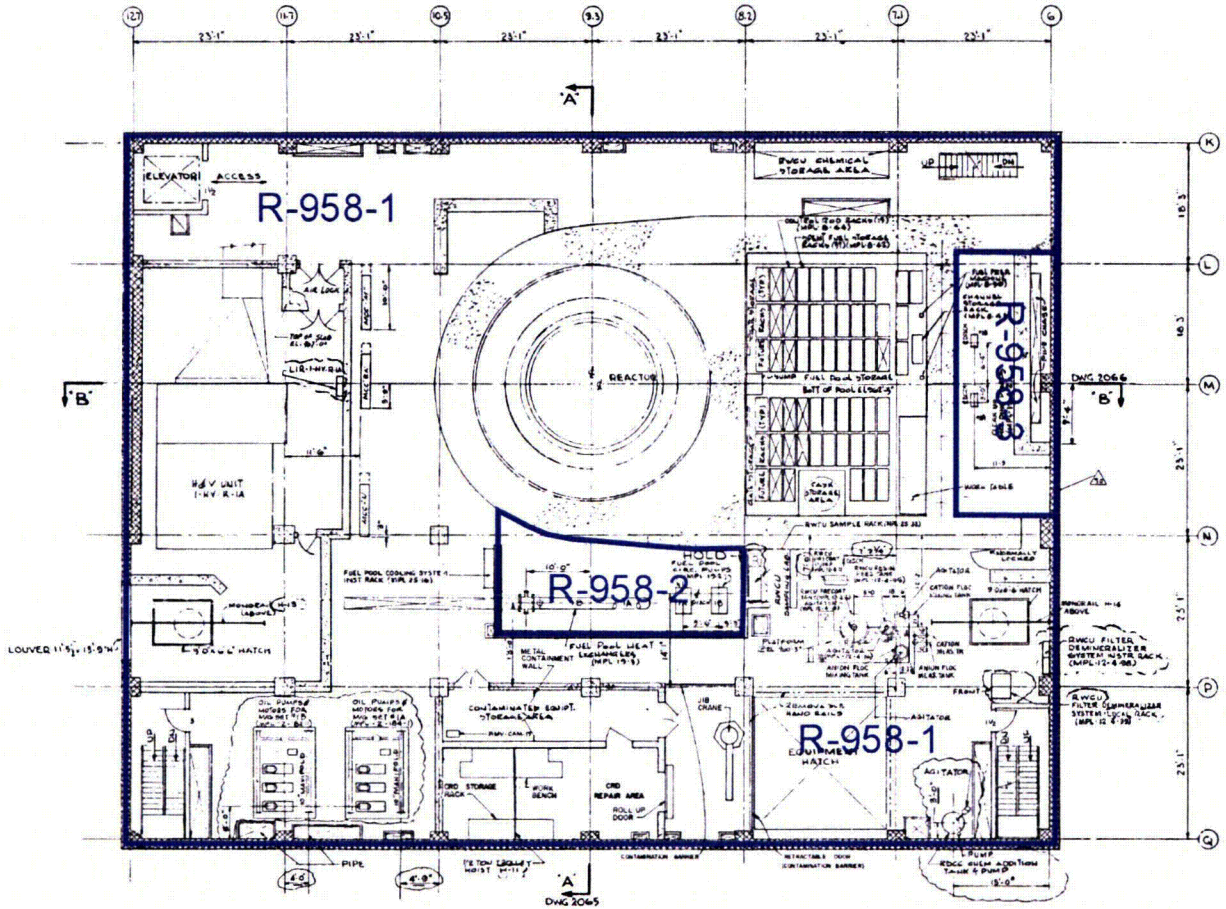
REACTOR BUILDING



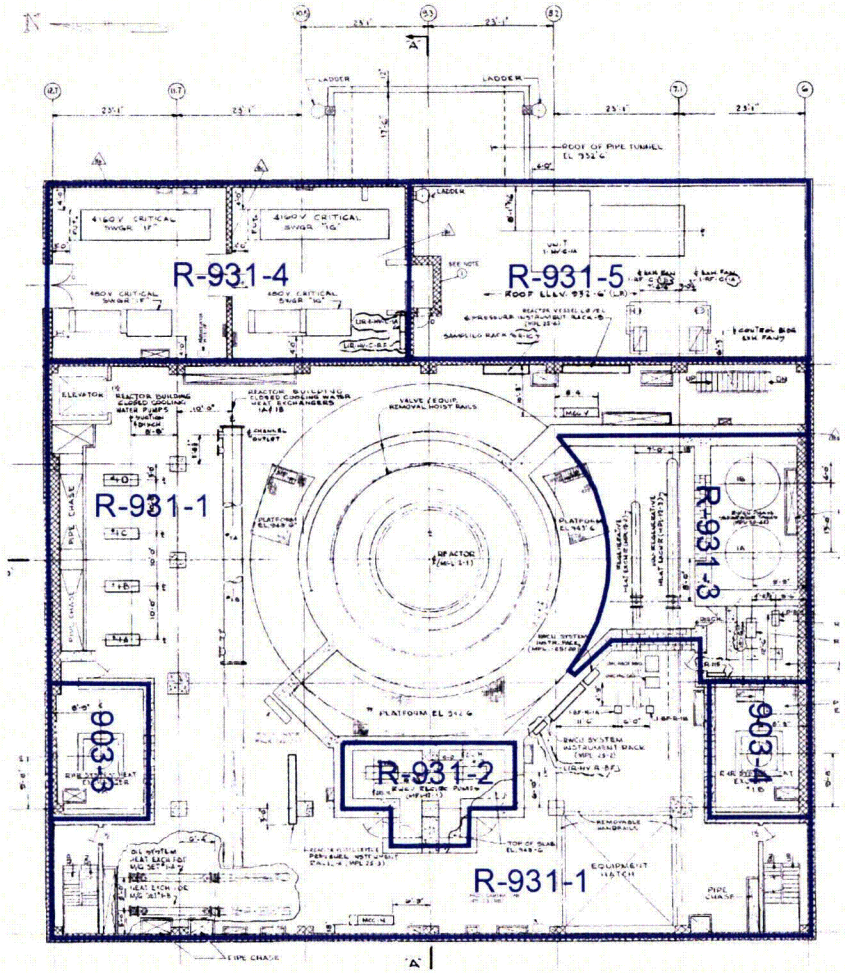
REACTOR BUILDING



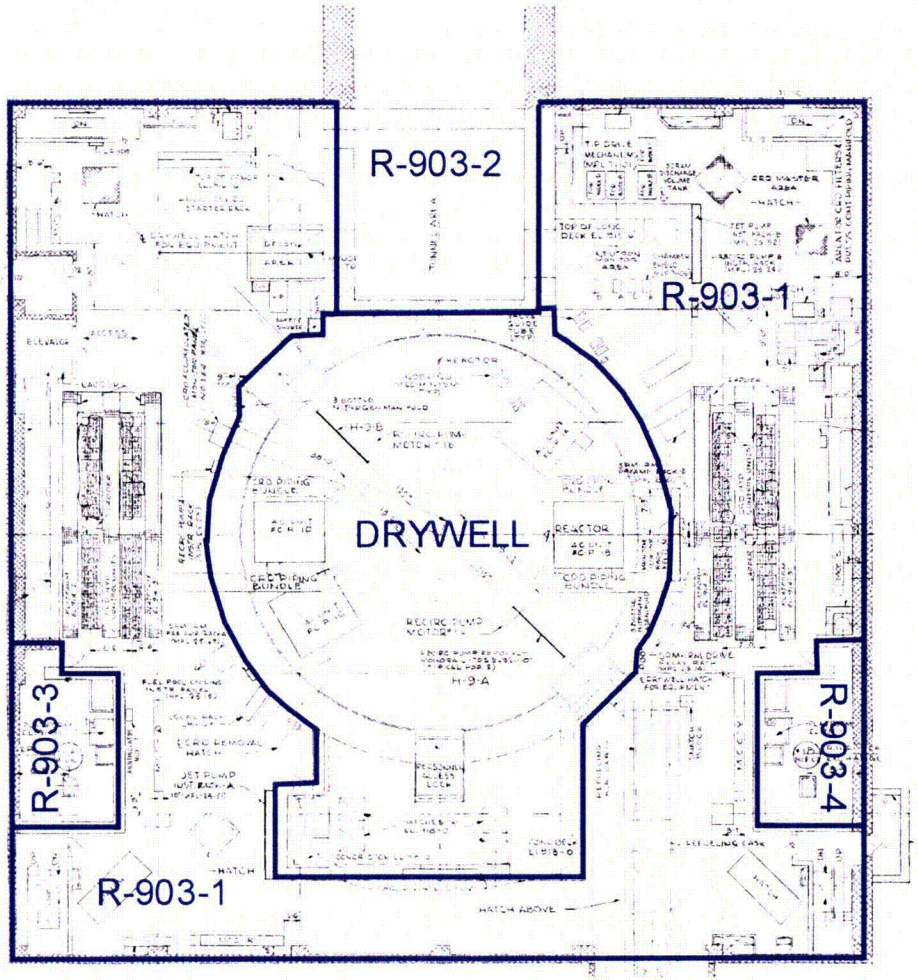
REACTOR BUILDING



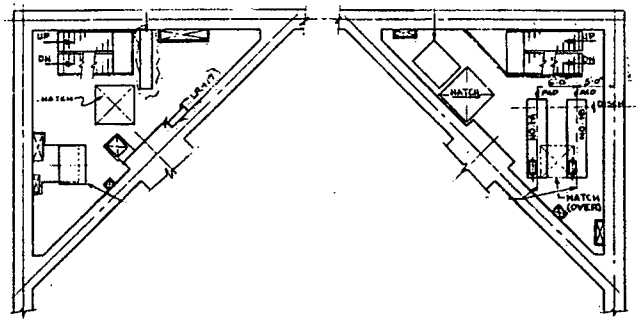
REACTOR BUILDING

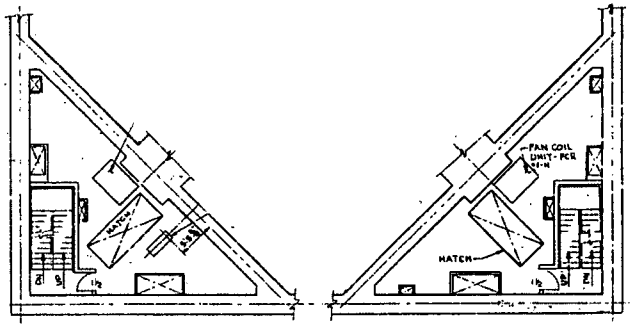


REACTOR BUILDING

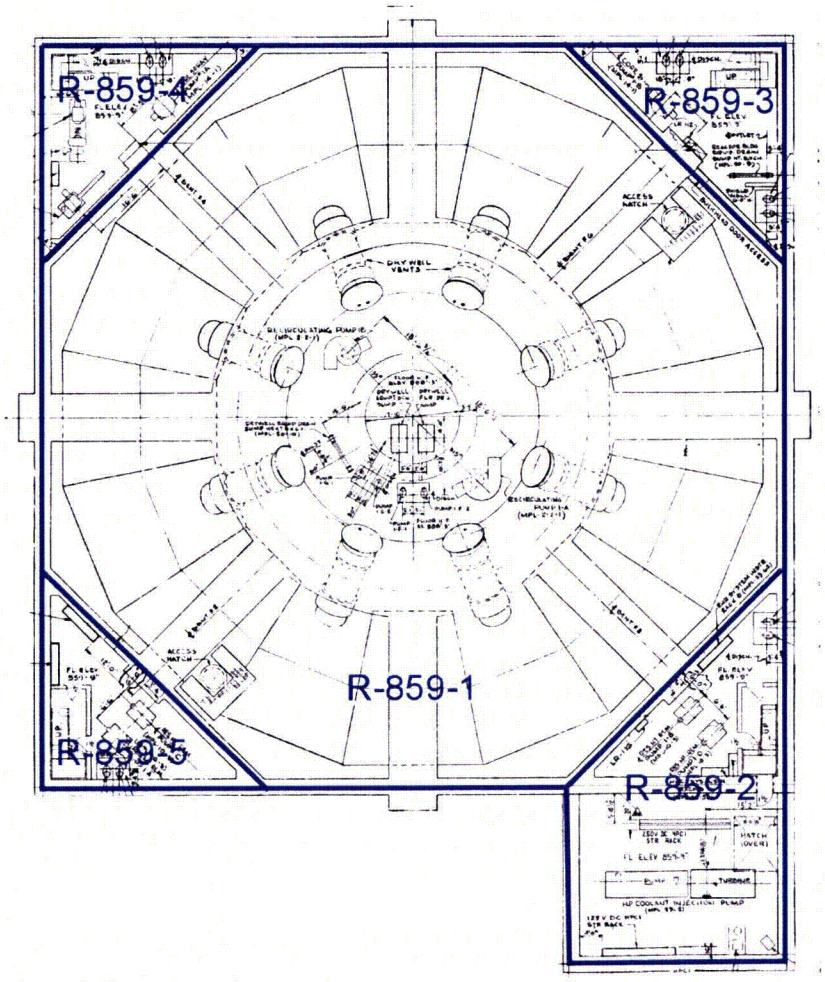


REACTOR BUILDING
(elevation 881)

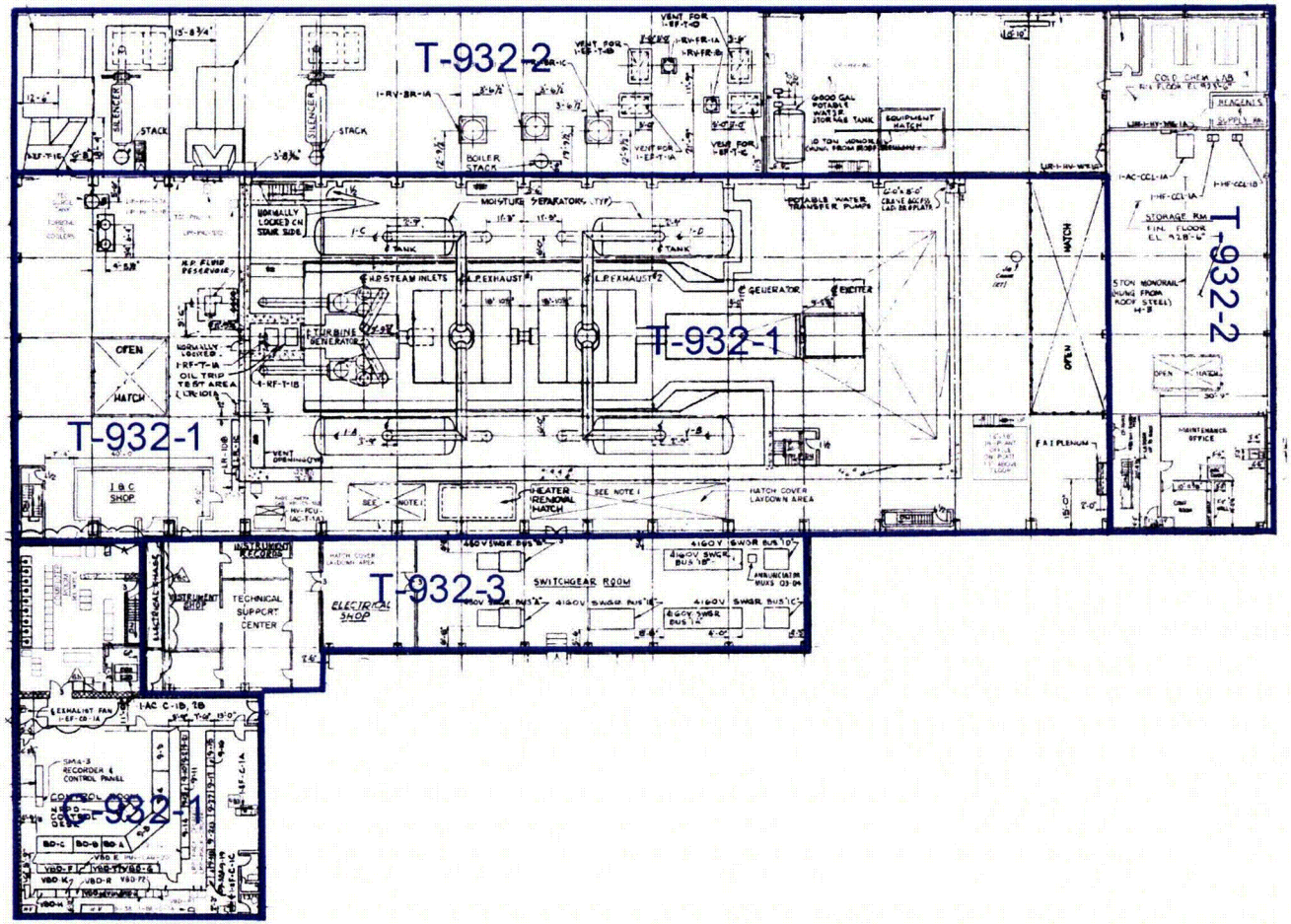




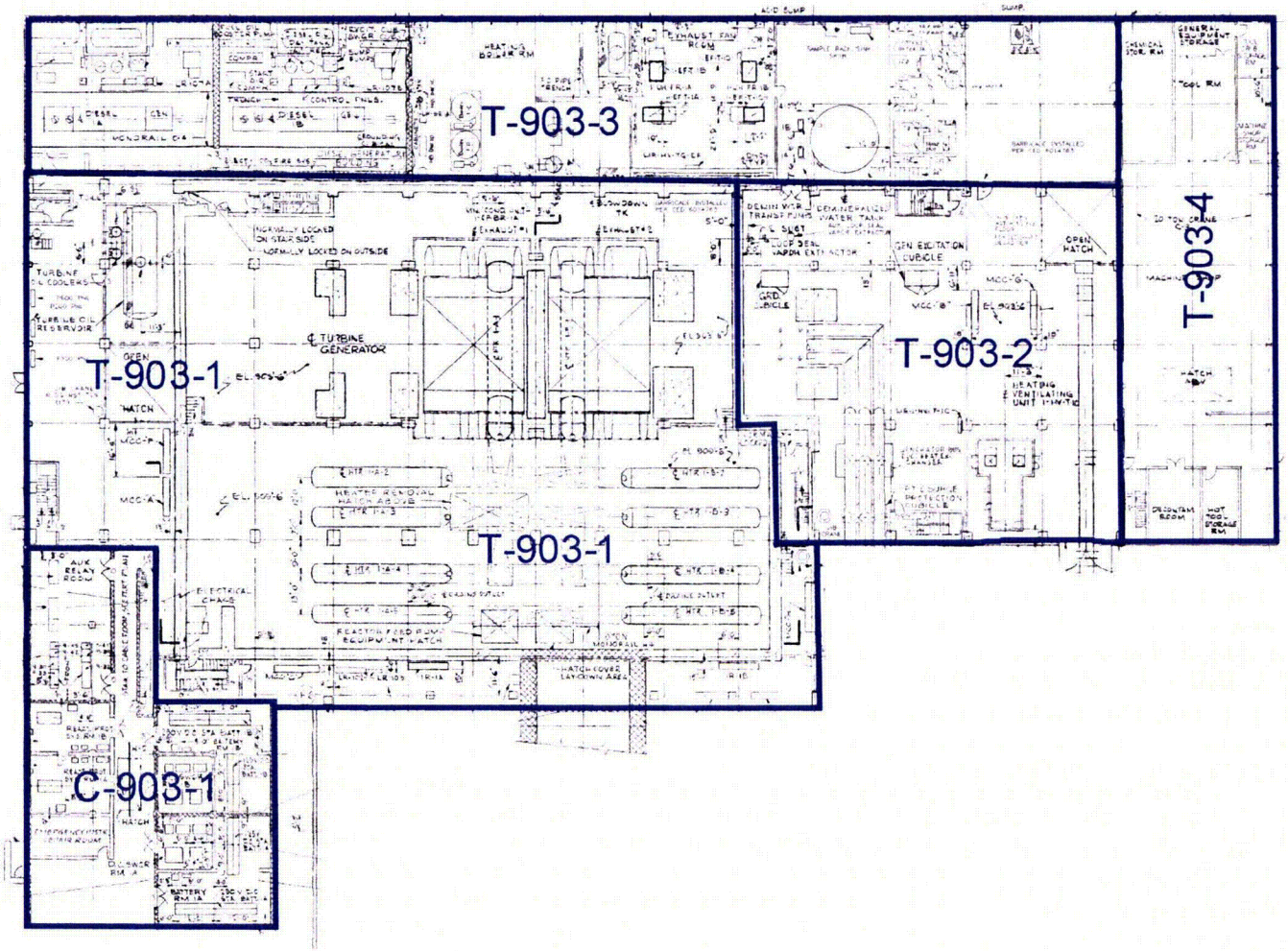
REACTOR BUILDING



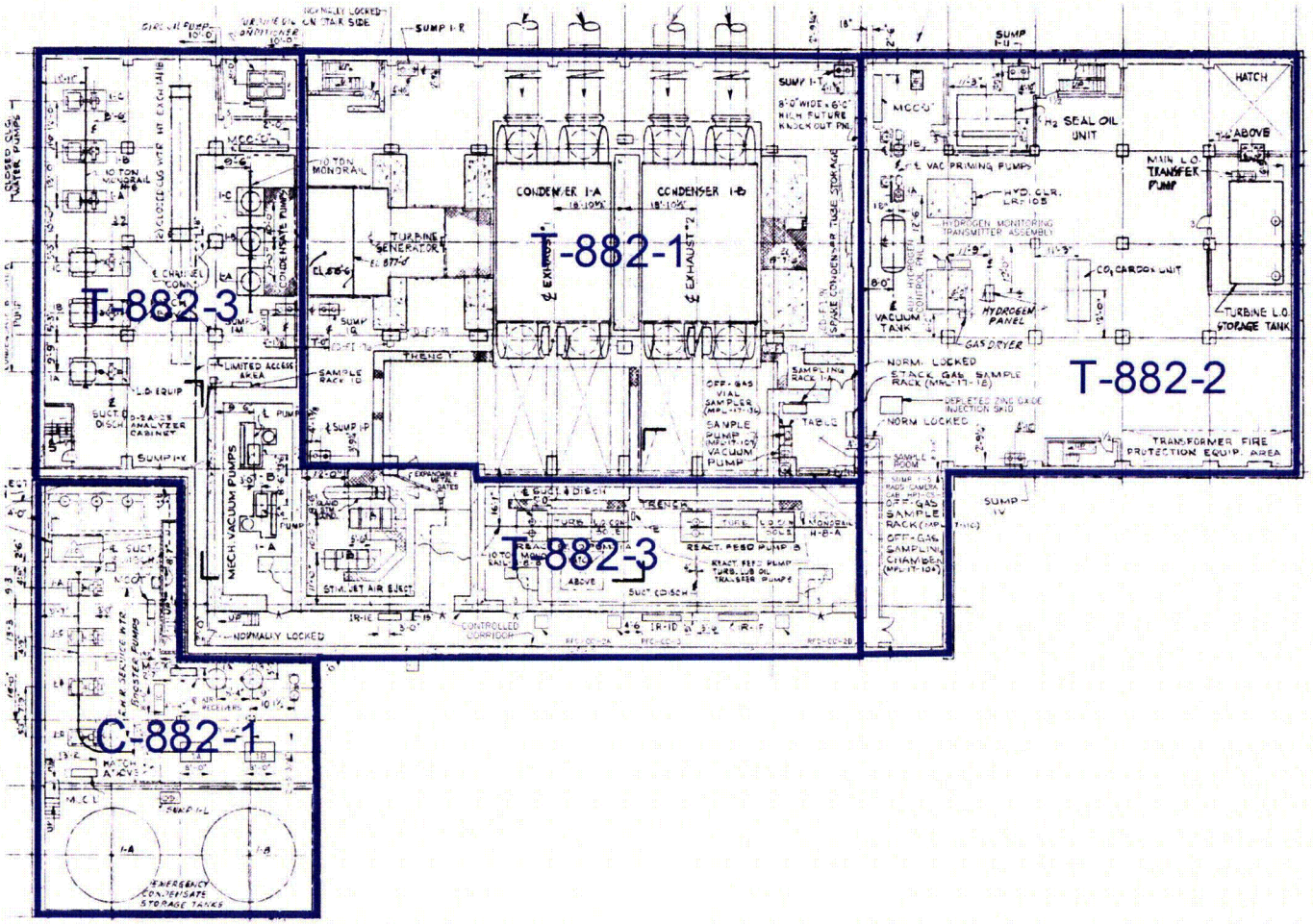
CONTROL AND TURBINE BUILDINGS



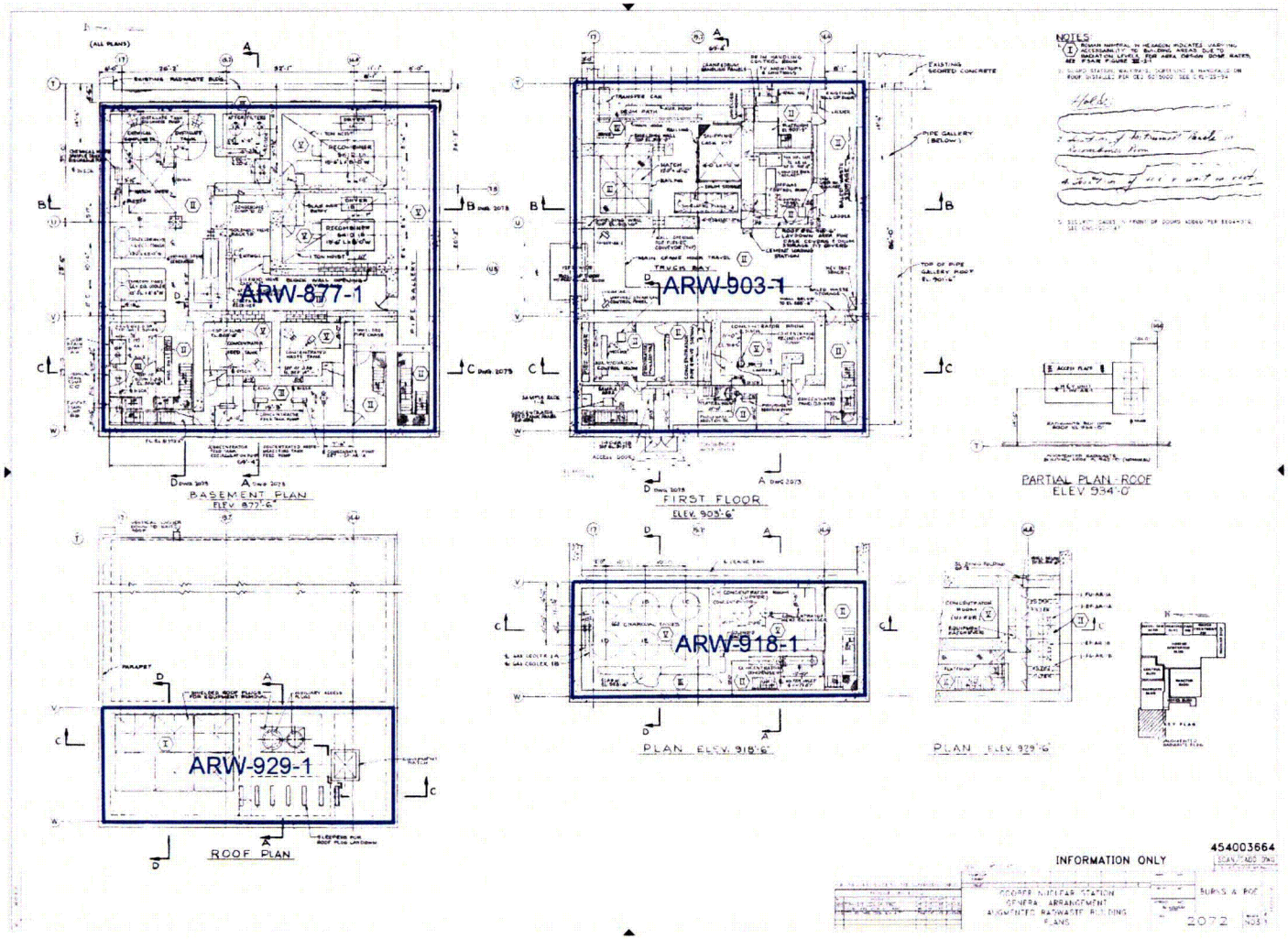
CONTROL AND TURBINE BUILDINGS



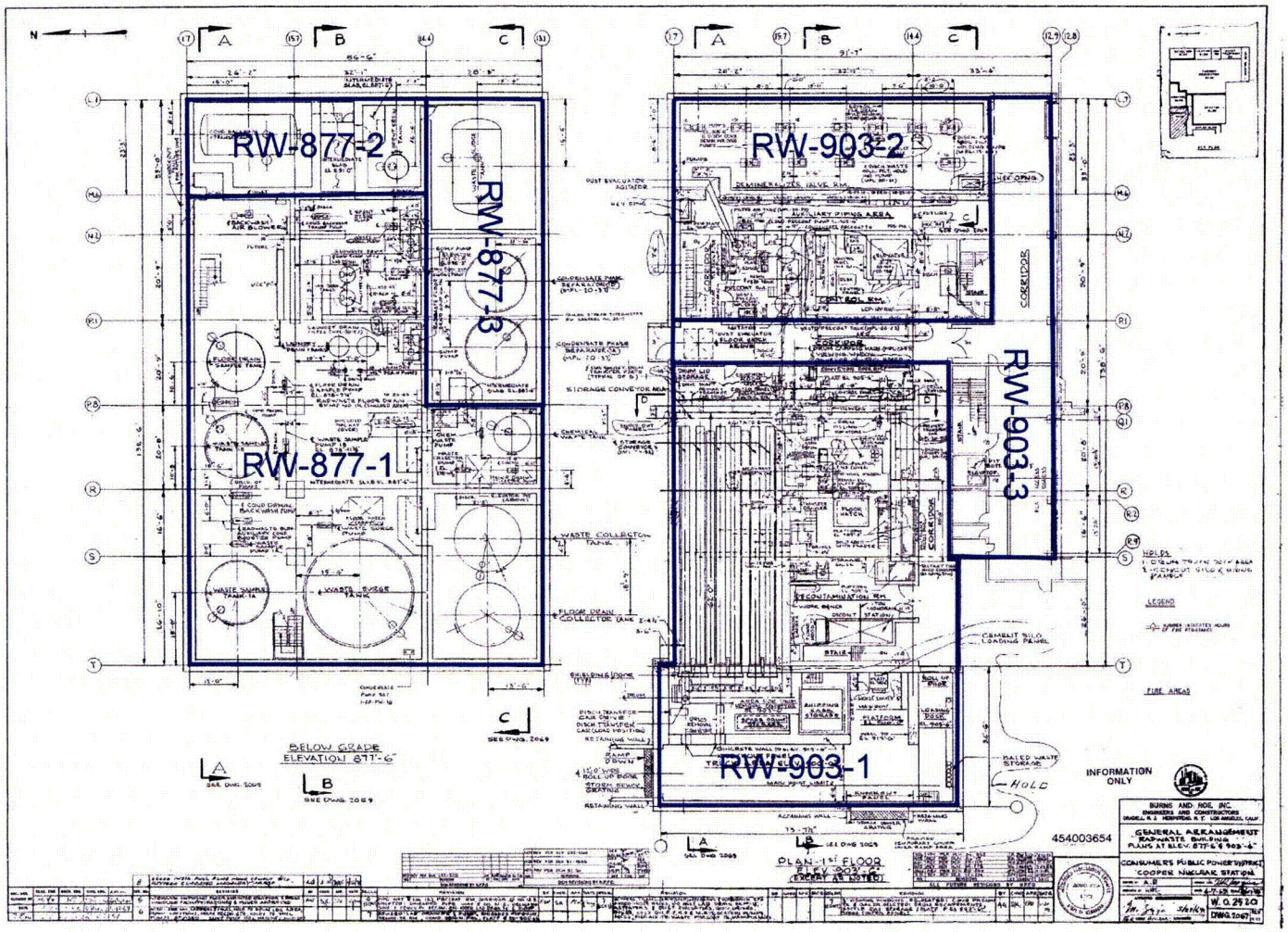
CONTROL AND TURBINE BUILDINGS



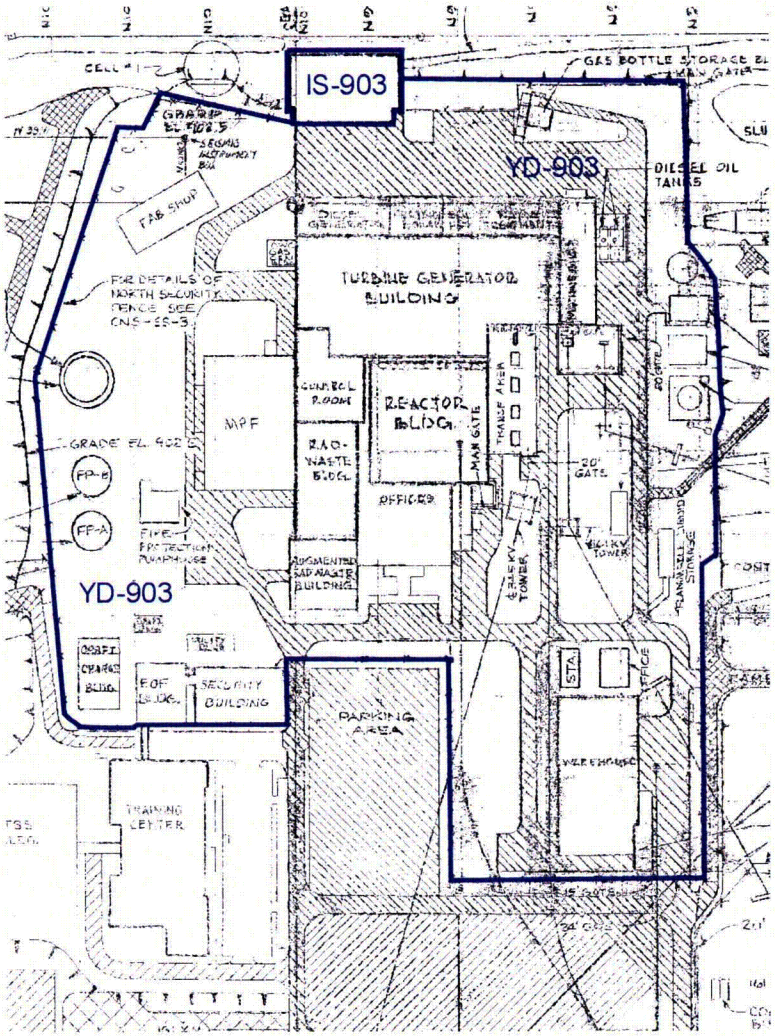
RADWASTE


ARW-877-1
ARW-903-1
ARW-918-1
ARW-929-1
BASEMENT PLAN
ELEV. 877'-6"
FIRST FLOOR
ELEV. 903'-6"
PARTIAL PLAN - ROOF
ELEV. 934'-0
ROOF PLAN
PLAN ELEV. 916'-6"
PLAN ELEV. 929'-6"
NOTES
INFORMATION ONLY
454003664
COOPER NUCLEAR STATION
GENERAL ARRANGEMENT
AUGMENTED RADWASTE BUILDING
PLANS
2072

RADWASTE


RW-877-2
RW-877-3
RW-877-1
RW-903-2
RW-903-3
RW-903-1
BELOW GRADE
ELEVATION 877'-6"
INFORMATION ONLY
454003654
GENERAL ARRANGEMENT
RADWASTE BUILDING
PLANS AT ELEV. 877'-6" & 903'-6"
COOPER NUCLEAR STATION

YARD


IS-903
YD-903
YD-903
TURBINE GENERATOR BUILDING
REACTOR BLDG.
CONTROL ROOM
RAD-WASTE BLDG.
MPF
OFFICES
AUGMENTED RAD MASTER BUILDING
SECURITY BUILDING
PARKING AREA
TRAINING CENTER
FIRE PROTECTION PUMPHOUSE
FP-E
FP-A
FAB SHOP
DIESEL OIL TANKS
GAS BOTTLE STORAGE
MAIN GATE
20' GATE
15' GATE
GRADE EL. 902'-5"
FOR DETAILS OF NORTH SECURITY FENCE SEE CNS-SS-3
WAREHOUSE
STA.
OFFICE