

April 25, 2014

U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, DC 20555

Serial No. 14-116
LIC/CDS/R0
Docket No. 50-305
License No. DPR-43

DOMINION ENERGY KEWAUNEE, INC.
KEWAUNEE POWER STATION
REVISION TO POST-SHUTDOWN DECOMMISSIONING ACTIVITIES REPORT

In accordance with 10 CFR 50.82(a)(7), Dominion Energy Kewaunee, Inc. (DEK) is submitting Revision 1 to the site-specific Post-Shutdown Decommissioning Activities Report (PSDAR) for Kewaunee Power Station (KPS). This revision updates the original KPS PSDAR, which was submitted in accordance with 10 CFR 50.82(a)(4)(i) by letter dated February 26, 2013 (Reference 1).

The purpose of this revision is to notify NRC of a "schedule change from those actions and schedules described in the PSDAR" as required under 10 CFR 50.82 (a)(7). Revision 0 of the KPS PSDAR indicated that all irradiated fuel would be transferred to dry storage at the Independent Spent Fuel Storage Installation (ISFSI) by the end of 2020. DEK recently outsourced activities associated with the transfer of spent fuel from the spent fuel pool to the ISFSI to a single qualified vendor, and was able to improve the schedule for completing the transfer of all spent fuel to the ISFSI. Under the new schedule, DEK expects to have all spent fuel transferred to the ISFSI by the end of 2016. DEK expects that outsourcing and compressing the schedule for transferring spent fuel from the spent fuel pool to the ISFSI will result in cost savings.

Revision 1 to the KPS PSDAR is provided in Enclosure 1. This revision incorporates the revised schedule and costs associated with the changes to the management and cost of transferring spent fuel from the spent fuel pool to the ISFSI discussed above. This revision also incorporates other minor changes necessary to ensure that the PSDAR continues to accurately describe the current status of decommissioning. Attachment 1 of the enclosed PSDAR contains revised schedule and cost tables that incorporate the changes associated with outsourcing and compressing the schedule for transferring spent fuel from the spent fuel pool to the ISFSI. The revised schedule and cost tables replace tables from the decommissioning cost analysis that was submitted as Attachment 1 of the original PSDAR.

An update to the Irradiated Fuel Management Plan, as required by 10 CFR 50.54(bb), is being submitted separately. The cash flow analysis provided with the updated Irradiated Fuel Management Plan indicates that the existing decommissioning trust funds for KPS will continue to be adequate to fund estimated decommissioning, spent fuel management, and site restoration costs.

ADD
MLR

In accordance with 10 CFR 50.82(a)(4)(i), a copy of the revised KPS PSDAR is being provided to the State of Wisconsin by transmitting a copy of this letter and its attachment to the designated State Official.

Please contact Mr. Craig Sly at 804-273-2784 if you have any questions or require additional information.

Sincerely,

A handwritten signature in black ink, appearing to read "Mark D. Sartain", followed by a horizontal line.

Mark D. Sartain
Vice President – Nuclear Engineering
Dominion Energy Kewaunee, Inc.

Enclosures:

1. Kewaunee Power Station Post-Shutdown Decommissioning Activities Report, Revision 1

Reference:

1. Letter from D. G. Stoddard (DEK) to NRC Document Control Desk, "Post Shutdown Decommissioning Activities Report," dated February 26, 2013. [ADAMS Accession No. ML13063A248]

Commitments made in this letter: None.

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Enclosure 1

**Kewaunee Power Station
Post-Shutdown Decommissioning Activities Report**

Revision 1

Kewaunee Power Station

Post-Shutdown Decommissioning Activities Report

Revision 1

April 2014

Kewaunee Power Station Post-Shutdown Decommissioning Activities Report

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List of Acronyms and Abbreviations

AIF	Atomic Industrial Forum
ALARA	As Low As Reasonably Achievable
CFR	Code of Federal Regulations
DEK	Dominion Energy Kewaunee, Inc.
Decon Pd	Decommissioning Period
DOE	United States Department of Energy
DSC	Dry Storage Canister
GEIS	Generic Environmental Impact Statement (NUREG-0586)
Grn Pd	Site Restoration Period
GTCC	Greater than Class C
ISFSI	Independent Spent Fuel Storage Installation
KPS	Kewaunee Power Station
LLRW	Low-Level Radioactive Waste
MWt	Megawatt-thermal
NEI	Nuclear Energy Institute
NRC	United States Nuclear Regulatory Commission
PSDAR	Post-Shutdown Decommissioning Activities Report
PWR	Pressurized Water Reactor
RCS	Reactor Coolant System
REMP	Radiological Environmental Monitoring Program
SEIS	Site-specific Environmental Impact Statement (NUREG-1437, Supp. 40)
SFP	Spent Fuel Pool
SNF Pd	Spent Fuel Management Period
SSC	Structures, Systems, and Components
USAR	Updated Safety Analysis Report
WDNR	Wisconsin Department of Natural Resources
WPDES	Wisconsin Pollution Discharge Elimination System

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I. INTRODUCTION AND SUMMARY

A. Introduction

In accordance with the requirements of 10 CFR 50.82, "Termination of license," paragraph (a)(4)(i), this report constitutes the Dominion Energy Kewaunee, Inc. (DEK) Post-Shutdown Decommissioning Activities Report (PSDAR) for Kewaunee Power Station (KPS). This PSDAR contains the following:

1. A description of the planned decommissioning activities along with a schedule for their accomplishment.
2. A site-specific decommissioning cost analysis¹ including the projected cost of managing spent fuel and site restoration.
3. A discussion that provides the reasons for concluding that the environmental impacts associated with site-specific decommissioning activities will be bounded by the appropriately previously issued environmental impact statements.

The PSDAR has been developed consistent with Regulatory Guide 1.185, "Standard Format and Content for Post-Shutdown Decommissioning Activities Report" (Reference 1), and has taken into consideration the proposed revision thereof in Draft Regulatory Guide DG-1272. This report is based on currently available information and the plans discussed may be modified as additional information becomes available or conditions change. As required by 10 CFR 50.82(a)(7), DEK will notify the NRC in writing before performing any decommissioning activity inconsistent with, or making any significant schedule change from, those actions and schedules described in the PSDAR, including changes that significantly increase the decommissioning cost.

B. Background

Kewaunee Power Station is located in Town of Carlton in the southeast corner of Kewaunee County, Wisconsin, on the west shore of Lake Michigan. The city of Green Bay, Wisconsin is about 27 miles west-northwest of the site. The city of Milwaukee, Wisconsin is about 90 miles to the south-southwest of the site. The KPS site is located at longitude 87° 32.1'W and latitude 44° 20.6'N. The closest distance to the international boundary between Canada and the United States is approximately 200 miles northeast of the site. The plant site is approximately 908 acres.

¹ As used in this report, the terms "site-specific decommissioning cost estimate" and "site-specific decommissioning cost analysis" are equivalent. While the term "site-specific decommissioning cost estimate" is used in 10 CFR 50.82, DEK is submitting a document called a "site-specific decommissioning cost analysis" to meet these regulations.

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Kewaunee Power Station is a single unit site with supporting facilities. The reactor coolant system is a two-loop pressurized water reactor design supplied by Westinghouse Electric Corporation housed in a steel primary containment vessel surrounded by a concrete secondary containment building. The reactor was originally licensed to operate to a maximum power output of 1650 megawatts-thermal (MWt). In 2003, a measurement uncertainty recapture power uprate was approved, and in 2004 a stretch power uprate was approved. These two power uprates increased the licensed power output of the plant to its current maximum of 1772 MWt. Kewaunee Power Station has an on-site Independent Spent Fuel Storage Installation (ISFSI). Construction of ten ISFSI horizontal storage modules was completed in 2009. The initial loading campaign was conducted in 2009.

A brief history of the major milestones related to plant construction and operational history is as follows:

- Construction Permit Issued: August 6, 1968
- Operating License Issued: December 21, 1973
- Commercial Operation: June 16, 1974
- Renewed License Issued: February 24, 2011
- Initial Operating License Expiration: December 21, 2013
- Renewed Operating License Expiration: December 21, 2033
- Permanent Cessation of Reactor Operation: May 7, 2013
- Reactor Defueled: May 14, 2013

On October 22, 2012, Dominion Energy Kewaunee, Inc. (DEK) publically announced its intention to permanently cease power operations and decommission KPS. By letters dated November 2, 2012 and February 25, 2013 (References 2 and 3), DEK notified the NRC of its intention to permanently cease power operations at KPS as required by 10 CFR 50.82(a)(1)(i). As discussed in Reference 3, KPS was permanently shut down on May 7, 2013. By letter dated May 14, 2013 (Reference 13), DEK submitted a certification of permanent removal of fuel from the reactor vessel, as required by 10 CFR 50.82(a)(1)(ii).

Upon docketing of the certification for permanent cessation of operations and certification of permanent removal of fuel from the reactor vessel, 10 CFR 50.82(a)(2) states that the 10 CFR Part 50 license for the unit no longer authorizes operation of the reactor or emplacement or retention of fuel in the reactor vessel. Pursuant to 10 CFR 50.51(b), "Continuation of license," the license for a facility that has permanently ceased operations (the KPS license is scheduled to expire on December 21, 2033), continues in effect beyond the expiration date to authorize ownership and possession of the facility

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until the NRC notifies the licensee in writing that the license has been terminated. During the period that the modified license remains in effect, 10 CFR 50.51(b) requires that DEK:

1. Take actions necessary to decommission and decontaminate the facility and continue to maintain the facility including storage, control, and maintenance of the spent fuel.
2. Conduct activities in accordance with requirements applicable to the facility in accordance with NRC regulations and the 10 CFR 50 facility license.

10 CFR 50.82(a)(9) states that power reactor licensees must submit an application for termination of the license at least two years prior to the license termination date and that the application must be accompanied or preceded by a license termination plan to be submitted for NRC approval.

C. Summary of Decommissioning Alternatives

The NRC has evaluated the environmental impacts of three general methods for decommissioning power reactor facilities in NUREG-0586, "Final Generic Environmental Impact Statement on Decommissioning of Nuclear Facilities" Supplement 1 (GEIS) (Reference 4). The three general methods evaluated are summarized as follows:

- **DECON:** The equipment, structures and portions of the facility and site that contain radioactive contaminants are removed and decontaminated to a level that permits termination of the license shortly after cessation of operations.
- **SAFSTOR:** After the plant is shutdown and defueled, the facility is placed in a safe, stable condition and maintained in that state (safe storage). The facility is decontaminated and dismantled at the end of the storage period to levels that permit license termination. During SAFSTOR, a facility is left intact or may be partially dismantled, but the fuel is removed from the reactor vessel and radioactive liquids are drained from systems and components. Radioactive decay occurs during the SAFSTOR period, thereby reducing the quantity of contamination and radioactivity that must be disposed of during decontamination and dismantlement.
- **ENTOMB:** Radioactive structures, systems, and components are encased in a structurally long-lived substance, such as concrete. The entombed structure is appropriately maintained, and continued surveillance is carried out until the radioactivity decays to a level that permits termination of the license.

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The decommissioning approach that has been selected by DEK for KPS is the SAFSTOR method. The primary objectives of the KPS decommissioning project are to remove the facility from service, reduce residual radioactivity to levels permitting unrestricted release, restore the site, perform this work safely, and complete the work in a cost effective manner. The selection of a preferred decommissioning alternative is influenced by a number of factors at the time of plant shutdown. These factors include the cost of each decommissioning alternative, minimization of occupational radiation exposure, availability of low-level waste disposal facilities, availability of a high-level waste (spent fuel) repository or DOE interim storage facility, regulatory requirements, and public concerns. In addition, 10 CFR 50.82(a)(3) requires decommissioning to be completed within 60 years of cessation of operations.

Under the SAFSTOR methodology, the facility is placed in a safe and stable condition and maintained in that state allowing levels of radioactivity to decrease through radioactive decay, followed by decontamination and dismantlement. After the safe storage period, the facility will be decontaminated and dismantled to levels that permit license termination. In accordance with 10 CFR 50.82(a)(9) a license termination plan will be developed and submitted for NRC approval at least two years prior to termination of the license.

The decommissioning approach for KPS is described in the following sections.

- Section II describes the planned decommissioning activities and the general timing of their implementation.
- Section III describes the overall decommissioning schedule, including the schedule for transfer of fuel from the spent fuel pool (SFP) to the KPS ISFSI.
- Section IV provides an analysis of expected decommissioning costs, including the costs associated with spent fuel management and site restoration.
- Section V describes the basis for concluding that the environmental impacts associated with decommissioning KPS are bounded by the most recent site-specific environmental impact statement and the NRC generic environmental impact statement related to decommissioning.

II. DESCRIPTION OF PLANNED DECOMMISSIONING ACTIVITIES

Dominion Energy Kewaunee, Inc. is decommissioning KPS using a SAFSTOR method. SAFSTOR is broadly defined in Section I.C of this report.

Use of the SAFSTOR approach is consistent with the need to effectively manage spent fuel after the facility is permanently shut down. Since DEK will likely be required to manage spent fuel at the site for an extended period of time, a discussion of the Irradiated Fuel Management Plan for the site is included in this section. After the plant is shutdown and the reactor is defueled, the plant will be configured to ensure continued safe storage of spent fuel while it remains in the SFP. Then the spent fuel in the SFP will be transferred, after appropriate cooling, to the onsite ISFSI. The spent fuel will then be stored in the ISFSI until possession is transferred to DOE.

Table 2-1 provides a summary of the current decommissioning plan for KPS. The major decommissioning periods and the general sequencing of activities that will occur during each period identified in Table 2-1 are discussed in more detail in the sections that follow. The decommissioning plan consists of nine Decommissioning periods (associated with 10 CFR 50.75(c) requirements), four Spent Fuel Management periods (associated with 10 CFR 50.54(bb) requirements), and two Site Restoration periods (representing post-license termination activities). Some Decommissioning periods and Spent Fuel Management periods occur simultaneously. The Site Restoration periods follow the Decommissioning periods sequentially. Each of the periods is listed in Table 2-1 below along with the start and end date for the period, the number of years for the period, and the cost of performing the activities associated with the period (in 2012 dollars).

The planning required for each decommissioning activity, including the selection of the process to perform the work, will be performed in accordance with applicable site procedures. No decommissioning activities unique to the site have been identified as necessary, and no activities outside the bounds considered in the GEIS have been identified or are anticipated.

Radiological and environmental programs will be maintained throughout the decommissioning process to ensure radiological safety and environmental compliance is maintained. Radiological programs will be conducted in accordance with the facility Technical Specifications, Operating License, USAR, Radiological Environmental Monitoring Program, and Offsite Dose Calculation Manual. Environmental programs will be conducted in accordance with applicable requirements and permits.

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Table 2-1

**Kewaunee Power Station
Schedule and Costs of Decommissioning
(2012 dollars in thousands)**

Period No.	Period Description	Start	End	Years	Total Cost
License Termination (50.75(c))					
Decon Pd 1	SAFSTOR Planning, Preparations and Deactivation	7/1/2013	11/30/2014	1.41	\$99,274
Decon Pd 2	SAFSTOR Preparation Delay During Wet Fuel Storage	11/30/2014	11/15/2016	1.96	\$8,811
Decon Pd 3	Completion of SAFSTOR Preparations	11/15/2016	5/15/2017	0.49	\$15,946
Decon Pd 4	Dormancy With Dry Storage	5/15/2017	10/19/2048	31.43	\$54,694
Decon Pd 5	Dormancy Only	10/19/2048	4/17/2067	18.49	\$32,011
Decon Pd 6	Decommissioning Planning During Dormancy	4/17/2067	6/22/2069	2.18	\$42,755
Decon Pd 7	Dismantlement Site Modifications and Preparations	6/22/2069	5/24/2070	0.91	\$64,972
Decon Pd 8	Systems Removal	5/24/2070	10/26/2071	1.42	\$153,318
Decon Pd 9	Site Decontamination	10/26/2071	8/29/2072	0.84	\$61,058
Account Total				59.13	\$532,839
Spent Fuel (50.54(bb))					
SNF Pd 1	Spent Fuel Planning, Cooling and Transfer to Dry Storage	7/1/2013	11/15/2016	3.37	\$103,224
SNF Pd 2	Dry Storage During Completion SAFSTOR Preparations	11/15/2016	5/15/2017	0.49	\$2,680
SNF Pd 3	Dry Storage During Dormancy	5/15/2017	10/19/2048	31.43	\$170,440
SNF Pd 4	ISFSI Demolition	3/30/2073	7/31/2073	0.33	\$2,072
Account Total				35.62	\$278,416
Greenfield					
Grn Pd 1	Clean Building Demolition	8/29/2072	7/31/2073	0.91	\$30,827
Grn Pd 2	Site Restoration	7/31/2073	12/4/2073	0.34	\$3,976
Account Total				1.25	\$34,803
Scenario Total					\$846,058

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A. Discussion of Decommissioning Periods

1. SAFSTOR Planning, Preparations, and Deactivation (Decon Period 1)

The SAFSTOR Planning, Preparation and Deactivation period is the time when detailed preparations and activities are undertaken prior to and following plant shutdown. These activities are focused on ensuring a smooth transition from plant operations to SAFSTOR dormancy. The activities that occur during this period include:

- Prepare a SAFSTOR schedule and decommissioning cost analysis.
- Develop an organizational structure to support the decommissioning plan.
- Prepare and submit required documents to the NRC, including a letter certifying cessation of power operations, the PSDAR, an updated Irradiated Fuel Management Plan, and a letter certifying permanent removal of fuel from the reactor vessel.
- Defuel the reactor vessel and re-set the head with the internals in place.
- Review, revise, and maintain plant licensing basis documents consistent with cessation of power operations and removal of fuel from the reactor. These documents include, but are not limited to, the Facility Operating License, Technical Specifications and Bases, Updated Final Safety Analysis Report, and the Technical Requirements Manual.
- Review and revise plant programs and procedures, as necessary, to reflect cessation of power operations and removal of fuel from the reactor.
- Review and re-classify plant structures, systems and components (SSCs) consistent with cessation of power operations and removal of fuel from the reactor.
- Sequentially remove from service systems no longer required based on processing of radioactive fluids and waste, and removal of hazards; while ensuring systems required for SFP cooling and makeup remain available.
- Prepare integrated work schedules.
- Procure non-engineered standard equipment needed for SAFSTOR preparations.
- Perform a general area cleanup.
- Perform radiation surveys of the plant, post caution signs, and control access as appropriate.

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2. SAFSTOR Preparations Delay during Wet Fuel Storage (Decon Period 2)

This period represents a delay in SAFSTOR preparations until all spent fuel has been removed from the SFP. This period ends concurrent with completion of SNF Period 1.

3. Completion of SAFSTOR Preparations (Decon Period 3)

After the spent fuel has been transferred to the ISFSI, final preparations will be made for placing the plant in SAFSTOR Dormancy. The activities that will occur during this period include:

- Drain the SFP and process liquid wastes for disposal.
- Flush and drain systems rendered non-essential following closure of SFP.
- Remove and dispose of spent resins and filter media.
- Secure site for dormancy period.

4. SAFSTOR Dormancy with Dry Fuel Storage (Decon Period 4)

SAFSTOR Dormancy with Dry Fuel Storage is the period of time during which the facility will be in safe storage while spent fuel is stored in the ISFSI. SAFSTOR dormancy with dry fuel storage will occur after SAFSTOR Planning, Preparations, and Deactivation activities are complete, and after spent fuel has been transferred to the ISFSI. The SAFSTOR dormancy with dry fuel storage period ends after the spent fuel in the ISFSI has been transferred to DOE.

During this period, sufficient personnel will be retained to maintain required SSCs, site security, fire protection, environmental compliance, and to provide radiological surveillance to ensure radioactive material is not spread from the plant site to the environment. Systems that have been removed from service will be monitored, as necessary, to control radioactive materials. Other systems needed to complete future decommissioning activities and maintain dose ALARA will be maintained. In addition, the structural integrity of buildings will be monitored and maintained.

Areas that do not require routine access will be locked and secured, as appropriate. Areas containing radioactive materials or other contamination will be posted and secured as needed to prevent accidental intrusion. Shielding will be added, where necessary, to maintain radiation exposure to plant personnel ALARA. Periodic radiological inspections of contaminated buildings will be conducted. Decontamination activities will generally be limited to those necessary to maintain exposures ALARA.

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5. SAFSTOR Dormancy (Decon Period 5)

SAFSTOR Dormancy is the period of time when the facility is in safe storage. SAFSTOR dormancy occurs after SAFSTOR planning, preparations, and deactivation activities are complete and spent fuel has been removed from the site.

During this period, sufficient personnel will be retained to maintain required SSCs, site security, fire protection, and to provide radiological surveillance to ensure radioactive material is not spread from the plant site to the environment. Systems that have been removed from service will be monitored, as needed, to control radioactive materials. Systems and equipment no longer needed may be removed from the site for asset recovery. In addition, the structural integrity of buildings will be monitored and maintained.

Areas that do not require routine access will be locked and secured as appropriate. Areas containing radioactive materials or other contamination will be posted and secured as needed to prevent accidental intrusion. Shielding will be added, where necessary, to maintain radiation exposure to plant personnel ALARA. Periodic radiological inspections of contaminated buildings will be conducted. Decontamination activities will generally be limited to those necessary to maintain exposures ALARA.

6. Decommissioning Planning During Dormancy (Decon Period 6)

Decommissioning Planning During Dormancy is the time period before major decommissioning activities are conducted during which detailed preparations are made to provide a smooth transition from SAFSTOR dormancy to decontamination and dismantlement activities. The required organizational structure will be established using available plant staff and outside resources, as needed.

During this period, and at least two years prior to the anticipated date of license termination, a license termination plan will be prepared and submitted in accordance with 10 CFR 50.82(a)(9). The license termination plan will define the details of the final radiological survey to be performed once decontamination activities are completed. The license termination plan will conform to the format defined in Regulatory Guide 1.179 (Reference 5) and will address the limits of 10 CFR 20, Subpart E, "Radiological Criteria for License Termination," using the pathways analysis defined in NUREG-1575 (Reference 6). Use of this guidance ensures that survey design and implementation are conducted in a manner that

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provides a high degree of confidence that applicable regulatory criteria are satisfied.

The activities that will occur during this period include:

- Decommissioning planning and design.
- Design containment access modifications, as required.
- Determine and procure staffing required to accomplish the required work.
- Prepare site support and storage facilities, as required.
- Plan and design the post-SAFSTOR site characterization. Begin site characterization so that radiological, regulated, and hazardous wastes will be identified, categorized, and quantified as decommissioning progresses.
- Prepare integrated work sequences and schedules for decontamination and dismantlement activities.
- Determine transportation and disposal container requirements (including shielding and stabilization) for activated materials and/or hazardous materials.
- Develop activity specifications and task-specific work procedures for occupational exposure control, control and release of liquid and gaseous effluents, processing of radioactive waste generated during decontamination and dismantlement, site security, and industrial safety.
- Prepare license termination plan and other decommissioning licensing documents.
- Submit license termination plan for NRC review and approval.

7. Dismantlement Site Modification and Preparations (Decon Period 7)

During the Dismantlement and Site Modifications period final planning and preparations will be made for the major decommissioning activities that will occur in the Systems Removal period (Period 8). The activities that will occur during this period include:

- Complete decommissioning planning and design activities, as needed.
- Perform post-SAFSTOR baseline radiation survey.
- Conduct post-SAFSTOR radiation surveys of work areas, major components, and sampling of internal piping contamination levels.
- Select shipping casks and obtain shipping permits.
- Design, specify, and procure special items and materials.
- Procure non-engineered standard equipment.
- Revitalize plant infrastructure and repower site, as needed.
- Test special cutting and handling equipment and train operators.

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- Modify the containment structure as needed to permit removal of large components.
- Finalize residual radiation inventory.

8. Systems Removal (Decon Period 8)

During the Systems Removal period, plant systems are decontaminated to minimize worker exposure, removed, appropriately packaged, and disposed. During this period the major radioactive components (as defined in 10 CFR 50.2) are segmented, removed and packaged for permanent disposal. "Major decommissioning activities" (as defined in 10 CFR 50.2) are planned to occur during this period. (See Section II.D for a detailed discussion of major decommissioning activities). Activities that will occur during this period include:

- Decontaminate components and piping systems, as required to control (i.e., minimize) worker exposure.
- Remove and dispose of low-level wastes (liquid and solid), mixed wastes, and other hazardous wastes.
- Remove, package, and dispose of piping and components that are no longer essential to support decommissioning operations.
- Remove additional systems and associated components as they become nonessential to the reactor vessel removal operations, related decommissioning activities, or worker health and safety (e.g., waste collection and processing systems, electrical and ventilation systems, etc.).
- Package GTCC components in appropriate containers for handling, storage, and disposal.
- Segment and dispose of fuel pool bridge crane.
- Remove control rod drive housings and the head service structure from the reactor vessel head and package for controlled disposal.
- Finalize reactor internals and vessel segmentation details.
- Remove steam generators and pressurizer for shipment and controlled disposal.
- Remove and dispose of reactor vessel insulation.
- Disassemble/segment the reactor internals and package in shielded casks.
- Segment/section the reactor vessel and closure head; placing segments into shielded containers. These operations are performed using a contamination control envelope. (DEK may also choose to not segment the reactor vessel and dispose of it as a whole component).
- Remove and dispose of the reactor coolant piping and pumps.

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9. Site Decontamination (Decon Period 9)

During the Site Decontamination period site buildings, structures, soils and land areas are decontaminated and remaining low-level radioactive waste hazardous materials are identified, packaged, and sent for disposal.

The activities that will occur during this period include:

- Decontaminate remaining site buildings and facilities having residual contaminants. Segment, package and dispose of remaining low-level radioactive waste along with any remaining hazardous materials.
- Remove remaining components, equipment, and plant services in support of the area release survey(s).
- Remediate any contaminated soil and perform final status survey for structures and land areas demonstrating compliance with standards for unrestricted release.
- Prepare final survey status report.

The site decontamination period is considered complete after NRC has approved the license termination plan and terminated the facility license. After the NRC has approved the license termination plan, the final remediation of site facilities may commence as discussed below in Section B, "Discussion of Site Restoration Periods."

B. Discussion of Spent Fuel Management Periods

10 CFR 50.82(a)(4)(i) requires that the PSDAR contain a site-specific decommissioning cost estimate, including the projected cost of managing spent fuel. The projected costs of managing spent fuel are summarized in Table 2-1 with a corresponding detailed discussion included in the site specific decommissioning cost analysis provided in Attachment 1 of this report. In addition, an update to the Irradiated Fuel Management Plan pursuant to 10 CFR 50.54(bb) is being submitted separately.

The KPS ISFSI was designed and installed under a general license in accordance with 10 CFR Part 72, "Licensing Requirements for the Independent Storage of Spent Nuclear Fuel, High Level Radioactive Waste, and Reactor-Related Greater than Class C Waste." The spent fuel storage systems are licensed by the NRC and used in accordance with an NRC Certificate of Compliance.

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Following core off-load, spent fuel will be stored in the spent fuel pool until it is transferred to the KPS ISFSI. While spent fuel is stored in the spent fuel pool, spent fuel storage and handling systems will be maintained in operation. Following transfer of all spent fuel from the spent fuel pool to the KPS ISFSI, spent fuel storage and handling systems will be removed from operation. All spent fuel will be stored at the KPS ISFSI until transferred to DOE.

The Spent Fuel Management Periods are discussed in detail below.

1. Spent Fuel Planning, Cooling, and Transfer to Dry Storage (SNF Period 1)

This period begins when all spent fuel is off-loaded from the reactor vessel into the spent fuel pool and the certification of permanent defueling letter is submitted to the NRC in accordance with 10 CFR 50.82(a)(1)(ii). During this period, measures will be planned, designed and implemented to ensure spent fuel storage and handling systems are capable of functioning to support fuel storage in the spent fuel pool, and to facilitate transfer of the spent fuel to the ISFSI.

Systems and structures needed to support the safe storage and transfer of spent fuel such as security, fire protection, and environmental and radiological monitoring, will be maintained in accordance with applicable requirements. Equipment maintenance, inspection, and operations will be performed on these systems and structures as appropriate.

During this period, the ISFSI capacity will be expanded to accommodate transfer of all spent fuel in the SFP to dry storage.

All spent fuel will be transferred to the ISFSI by the end of this period.

2. Dry Storage during Completion of SAFSTOR Preparations (SNF Period 2)

During this period, spent fuel will have been transferred to the ISFSI while SAFSTOR preparations are completed as discussed in Decon Period 3. Programs and procedures needed to support safe operation of the ISFSI will be maintained in accordance with applicable requirements. Equipment maintenance, monitoring, inspection, and operations will be performed as necessary.

3. Dry Storage during Dormancy (SNF Period 3)

This period begins concurrent with Decon Period 4, when the plant is in SAFSTOR status. The spent fuel remains in the ISFSI while the plant is in a dormant

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SAFSTOR condition. Programs and procedures required to support safe operation of the ISFSI will be maintained in accordance with applicable requirements. Equipment maintenance, monitoring, inspection, and operations will be performed as necessary.

As outlined in the site-specific decommissioning cost analysis (Attachment 1 to PSDAR Revision 0), DEK assumes that the DOE will begin accepting spent fuel during this period. Shipments of fuel to DOE will be from the ISFSI. Upon completion of this period, all spent fuel will have been transferred to DOE.

4. ISFSI Decommissioning (SNF Period 4)

After DOE acceptance of the spent fuel, any radiological decommissioning associated with the ISFSI would be accomplished as part of site decommissioning under the Part 50 license. As a generally licensed installation, the ISFSI will be included in the license termination plan as discussed above in Section II.A.9, "Site Decontamination."

C. Discussion of Site Restoration Periods

The restoration of the KPS site will be undertaken after the 10 CFR Part 50 facility license for KPS is terminated. After the NRC has terminated the facility license, non-radioactive structures and equipment will remain on the site. Demolition of the remaining portions of the containment structure and interior portions of the reactor building will be accomplished using commercial demolition techniques. Removal of remaining buildings and other site structures will also use commercial demolition techniques and will be conducted in accordance with State, Local, and Federal requirements. There are two Site Restoration periods as follows:

1. Clean Building Demolition (Grn Period 1)

Buildings, structures, and other facilities which are not radiologically contaminated, such as the intake structure, the discharge structure, turbine building, auxiliary building, containment, and office buildings will be dismantled, or will have been dismantled, as part of the building demolition effort after the final license termination survey. These buildings can be removed late in the building demolition phase since there is no decommissioning operational need to remove them earlier.

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2. Site Restoration (Grn Period 2)

Site restoration is the period beginning after license termination, when the demolition of non-radioactive structures and back-filling of any excavations remaining after decommissioning operations will occur. Restored areas on the site will be back-filled, graded, and landscaped as needed. Some onsite structures may remain and continue to be available for alternative use.

D. General Decommissioning Considerations

1. Major Decommissioning Activities

As defined in 10 CFR 50.2, "Definitions," a "major decommissioning activity" is "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 greater than Class C waste in accordance with 10 CFR 61.55." The following discussion provides a summary of the major decommissioning activities currently planned for KPS. These activities may be modified as conditions dictate.

Prior to starting a major decommissioning activity, the affected components will be surveyed and decontaminated, as required, in order to minimize worker exposure, and a plan will be developed for the activity. Shipping casks and other equipment necessary to conduct major decommissioning activities will be designed and procured.

The initial major decommissioning activities will focus on removal, packaging and disposal of piping and components that are no longer essential to support decommissioning operations. Then additional systems and associated components would be removed as they become nonessential to the reactor vessel removal operations, related decommissioning activities, or worker health and safety.

The initial major decommissioning activity inside containment will be removal, packaging, and disposal of the control rod drive housings from the reactor vessel head. Then the reactor vessel insulation will be removed, followed by removal and disposal of the reactor coolant piping and pumps.

Following reactor vessel and cavity reflood the reactor vessel internals will be removed from the reactor vessel and segmented as needed to separate the GTCC

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waste. The internals comprising the core shroud, core support structure, fuel guide plate, and upper portions of the in-core thimble guide tubes may be GTCC waste which will be segmented, packaged into fuel bundle sized containers, and transferred to the ISFSI for storage and eventual disposal. Using this approach, the internals will be packaged and disposed of independent of the reactor vessel. When the internals segmentation effort is completed, the reactor vessel and cavity will be drained and any remaining debris removed.

Removal of the reactor vessel and vessel closure head follows the removal of the reactor internals. Without the internals present, several options are available for removal and disposal of the reactor vessel: segmentation, sectioning into larger pieces, or disposal as an intact package. It is likely that the components would be removed by sectioning or segmenting performed remotely in air using a contamination control envelope. Vessel sectioning or segmenting will permit a substantial portion of the waste to be sent to a waste re-processor instead of a near surface disposal site. The segments that are GTCC will be placed into shielded canisters and stored in the ISFSI until transferred to DOE.

Additional major decommissioning activities that would be conducted include removal and disposal of the steam generators, pressurizer, spent fuel storage racks and spent fuel bridge crane. The dismantling of the containment structure would be undertaken as part of the reactor building demolition.

2. Other Decommissioning Activities

In addition to the major decommissioning activities discussed above, plant components will be removed from the Turbine Building including the Turbine Generator, Condenser, Feedwater Heaters, Moisture Separator/Reheaters, and miscellaneous system and support equipment.

3. Decontamination and Dismantlement Activities

The objectives of the decontamination effort are two-fold. The first objective is to reduce radiation levels throughout the facility in order to minimize personnel exposure during dismantlement. This objective will be achieved by allowing radioactive decay during the SAFSTOR period, thereby reducing the quantity of contamination and radioactivity that must be disposed of during decontamination and dismantlement.

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The second objective is to clean as much material as possible to unrestricted use levels, thereby permitting non-radiological demolition and disposal and minimizing the quantities of material that must be disposed of by burial as radioactive waste. The second objective will be achieved by decontaminating structural components including steel framing and concrete surfaces. The methods to accomplish this are typically mechanical, requiring the removal of the surface or surface coating, and are used regularly in industrial and contaminated sites. The need to decontaminate SSCs will be determined by the schedule to dismantle them and by plant conditions.

The decontamination and/or dismantlement of contaminated SSCs may be accomplished by decontamination in place, decontamination and dismantlement, or dismantlement and disposal. A combination of these methods may be utilized to reduce contamination levels, worker radiation exposures, and project costs. The methods chosen will be those deemed most appropriate for the particular circumstances. Material below the applicable radiological limits will be released for unrestricted disposition (e.g., scrap, recycle, or general disposal). Radioactively contaminated or activated materials will be removed from the site as necessary to allow the site to be released for unrestricted use.

Low-level radioactive waste will be processed in accordance with plant procedures and existing commercial options. Contaminated material will be characterized and segregated for additional onsite decontamination or processing, offsite processing (e.g., disassembly, chemical cleaning, volume reduction, waste treatment, etc.), and/or packaged for controlled disposal at a low-level radioactive waste disposal facility.

Contaminated concrete and structural steel components will be decontaminated and removed as required to gain access to contaminated and uncontaminated systems and components. After the systems and components are removed and processed as described above, the remaining contaminated concrete and structural steel components will be decontaminated and/or removed. Contaminated concrete will be packaged and shipped to a low-level waste disposal facility. Contaminated structural steel components may be removed to a processing area for decontamination, volume reduction, and packaging for shipment to a processing facility or to a low-level radioactive waste disposal facility, as necessary.

Buried and imbedded contaminated components (e.g., piping, drains, etc.) will be decontaminated in place or excavated and decontaminated. Appropriate

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contamination controls will be employed to minimize the spread of contamination and protect personnel.

4. Radioactive Waste Management

A major component of the total cost of decommissioning KPS is the cost of packaging and disposing of SSCs, contaminated soil, resins, water, and other plant process liquids. A waste management plan will be developed to incorporate the most cost effective disposal strategy, consistent with regulatory requirements for each waste type. Currently, Class B and C waste may be disposed of at the waste disposal site in Andrews County, Texas. The waste management plan will be based on the evaluation of available methods and strategies for processing, packaging, and transporting radioactive waste in conjunction with the available disposal facility options and associated waste acceptance criteria.

Class A low level radioactive waste (LLRW) will be disposed of at a licensed disposal site (DEK currently uses the *EnergySolutions* facility located in Clive, Utah). If other licensed Class B and C LLRW facilities become available in the future, DEK may choose to use them as well.

5. Removal of Mixed Wastes

Mixed wastes and mixed wastes generated during decommissioning, if any, will be managed in accordance with applicable Federal and State regulations.

Mixed wastes from KPS will be transported by authorized and licensed transporters and shipped to authorized and licensed facilities. If technology, resources, and approved processes are available, the processes will be evaluated to render the mixed waste non-hazardous.

6. Site Characterization

During the decommissioning process, a site characterization will be performed in which radiological, regulated, and hazardous wastes will be identified, categorized, and quantified. Surveys will be conducted to establish the contamination and radiation levels throughout the plant. This information will be used in developing procedures to ensure that hazardous, regulated, and radiologically contaminated areas are removed and ensure that worker exposure is controlled. Surveys of selected outdoor areas will also be performed including surveys of soil and groundwater near the site. As decontamination and dismantlement work proceeds,

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surveys will be conducted to maintain the site characterization current and ensure that decommissioning activities are adjusted accordingly.

An activity level calculation of the reactor internals, the reactor vessel, and the biological shield wall will be performed as part of the site characterization. Using the results of this analysis, these components will be classified in accordance with 10 CFR 61. The results of the analysis will form the basis for the detailed plans for their packaging and disposal. The material which is found to be Greater than Class C (GTCC) will be removed and stored at the KPS ISFSI until transferred to DOE.

7. Groundwater Protection and Radiological Decommissioning Records Program

A groundwater protection program was initiated at KPS in accordance with NEI Technical Report 07-07, "Industry Groundwater Protection Initiative, Final Guidance Document," in August 2007. A site hydrology study was completed as part of this initiative. Fourteen monitoring wells were installed around the plant to identify any leakage and transport of any radiological contaminants from the plant. No contamination attributed to plant operations has been found through the sampling program implemented as part of this initiative. The program is directed by procedures and will be maintained during decommissioning.

KPS will also continue to maintain the existing radiological decommissioning records program required by 10 CFR 50.75(g). The program is directed by procedures. The events noted in the 10 CFR 50.75(g) file were remediated to the free release criteria in place at the time of the events.

8. Changes to Management and Staffing

As the plant progresses through the various decommissioning periods, plant management and staffing levels will be adjusted to ensure adequate resources are provided.

III. SCHEDULE OF PLANNED DECOMMISSIONING ACTIVITIES

DEK is utilizing a SAFSTOR methodology. The SAFSTOR method involves removal of radioactive or activated material from the site following a period of dormancy. Planning for decommissioning of the site is underway. Work activities associated with the planning and preparation period commenced after the plant was permanently shut down and fuel removed from the reactor vessel. The schedule of decommissioning activities is provided in Table 2-1.

The schedule provided in Table 2-1 recognizes that spent fuel will be retained in the SFP for a period of time until it can be transferred to the ISFSI and ultimately transferred to DOE.

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IV. ESTIMATE OF EXPECTED DECOMMISSIONING AND SPENT FUEL MANAGEMENT COSTS

10 CFR 50.82(a)(8)(iii) requires that a site-specific decommissioning cost estimate be prepared and submitted within two years following permanent cessation of operations. 10 CFR 50.82(a)(4)(i) requires that the PSDAR contain a site-specific decommissioning cost estimate including the projected costs of managing irradiated fuel.

A site-specific decommissioning cost analysis was prepared for KPS, which also provides projected costs for managing spent fuel, as well as non-radiological decommissioning and site restoration costs, accounted for separately. The site-specific decommissioning cost analysis was provided as Attachment 1 to PSDAR Revision 0 fulfilling the requirements of 10 CFR 50.82(a)(4)(i) and 10 CFR 50.82(a)(8)(iii) and is incorporated herein by reference. Certain replacement tables have been prepared reflecting the accelerated schedule for transfer of spent fuel to dry storage and the resulting changes in cost. These replacement tables are provided in Attachment 1. A summary of the site-specific decommissioning cost analysis and projected cost of managing spent fuel is provided in Table 2-1. A summary of the annual costs, earnings, and trust balances associated with decommissioning, spent fuel management, and site restoration are provided in an update to the Irradiated Fuel Management Plan being submitted as a separate document in accordance with 10 CFR 50.54(bb) (Reference 7).

The methodology used to develop the site-specific decommissioning cost analysis follows the basic approach originally advanced by the Atomic Industrial Forum (now Nuclear Energy Institute) in their program to develop a standardized model for decommissioning cost estimates. The results of this program were published as AIF/NESP-036, "A Guideline for Producing Commercial Nuclear Power Plant Decommissioning Cost Estimates," (Reference 8). This document presents a unit cost factor method for estimating direct activity costs, simplifying the estimating process. The unit cost factors used in the study reflect the latest available data at the time of the study concerning worker productivity during decommissioning.

10 CFR 50.82(c) states that for a facility that has permanently ceased operation before the expiration of its license, the collection period for any shortfall of funds will be determined, upon application by the licensee, on a case-by-case basis taking into account the specific financial situation of each licensee. At the time that operations ceased at KPS, sufficient funds were available in the plant decommissioning fund to complete the planned decommissioning activities.

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10 CFR 50.82(a)(6)(ii) states that licensees shall not perform any decommissioning activities, as defined in 10 CFR 50.2, that would result in there no longer being reasonable assurance that adequate funds will be available for decommissioning. Because adequate funding exists based on the site-specific decommissioning cost analysis in Attachment 1, no such activities have been identified.

V. ENVIRONMENTAL IMPACTS

10 CFR 50.82(a)(4)(i) requires that the PSDAR include "a discussion that provides the reasons for concluding that the environmental impacts associated with the site-specific decommissioning activities will be bounded by appropriate, previously issued environmental impact statements." The following discussion provides the reasons for reaching this conclusion and is based on three previously issued environmental impact statements:

1. NUREG-0586, Supplement 1, "Final Generic Environmental Impact Statement on Decommissioning Nuclear Facilities," (Reference 4) (Referred to as the GEIS).
2. NUREG-1437, "Generic Environmental Impact Statement for License Renewal of Nuclear Plants, Supplement 40, Regarding Kewaunee Power Station," published August 2010 (Reference 9) (Referred to as the SEIS).
3. NUREG-1496, "Generic Environmental Impact Statement in Support of Rulemaking on Radiological Criteria for License Termination of NRC-Licensed Nuclear Facilities," dated July 1997 (Reference 10).

A. Environmental Impacts of Decommissioning KPS

The following is a summary of the reasons for reaching the conclusion that the environmental impacts of decommissioning KPS are bounded by the GEIS and SEIS. Each environmental impact standard in the GEIS is listed along with a summary as to why DEK concludes the GEIS analysis bounds the impacts of KPS decommissioning on that standard. As a general matter, KPS is smaller than the reference PWR used in NUREG-0586 to evaluate the environmental impacts of decommissioning, and is likewise smaller than a number of PWRs that were evaluated in NUREG-0586, Supplement 1 and is therefore bounded by those assessments. Further, there are no unique site-specific features or unique aspects of planned decommissioning that have been identified.

1. Onsite/Offsite Land Use

The GEIS concluded that the impacts on land use are not detectable or small for facilities having only onsite land-use changes as a result of large component removal, structure dismantlement, and low level waste packaging and storage. Construction activities that would disturb greater than one acre of soil require application and approval from WDNR prior to disturbing the soil. All construction projects must control sediment and erosion effect on water course and wetlands. DEK does not anticipate any changes in land use beyond the site boundary during

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decommissioning. Therefore DEK concludes that the impacts on land use are bounded by the GEIS.

2. Water Use

After the plant was shutdown the operational demand for cooling water and makeup water dramatically decreased. After the plant was shutdown and defueled, the amount of water used by the service water system is much less than during normal operation of the plant. The need for cooling water will continue to decrease as the heat load of spent fuel in the SFP declines due to radioactive decay and as spent fuel is relocated from the SFP to the ISFSI. After the plant is shutdown, the use of potable water will also decrease commensurate with the expected decrease in plant staffing levels. The demand for water needed to conduct plant decommissioning activities (flushing piping, hydro-lasing, dust abatement, etc.) will be an insignificant portion of overall potable water use. Therefore, the impacts of KPS decommissioning on water use is bounded by the previously issued GEIS.

3. Water Quality – Non-Radiological

DEK has chosen to decommission the plant using the SAFSTOR method. During the SAFSTOR planning and actual storage periods, storm water runoff and drainage paths will be maintained in their current configuration. The schedule for this decommissioning method includes a 20-year roofing replacement that will ensure runoff is directed to designed drainage paths and not through the structures themselves. The WPDES permit, which regulates water discharges from the site, will remain in place. Programs and processes designed to minimize, detect, and contain spills will be maintained throughout the decommissioning process. Federal, state and local regulations and permits pertaining to water quality will remain in effect and no significant changes to water supply reliability are expected. Therefore, the impact of KPS decommissioning on water quality is bounded by the GEIS.

4. Air Quality

KPS holds an operating permit issued by the WDNR which regulates air emission sources at the power station. This permit will remain in place during decommissioning. If new sources of air emissions are added or changed at the facility to support this process, then the permit will be modified as required. As new regulations are issued that impact these sources then these requirements will

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be addressed at the station. In addition, there are various other regulations that apply to air quality including hazardous air pollutants and indoor air quality. There are many types of decommissioning activities that have the potential to affect air quality. These activities are listed in the GEIS. DEK does not anticipate any activities beyond those listed in the GEIS that could potentially affect air quality.

Therefore, the impacts of KPS decommissioning on air quality is bounded by the previously issued GEIS and SEIS.

5. Aquatic Ecology

Aquatic Ecology encompasses the plants and animals in Lake Michigan and wetlands near KPS. Aquatic ecology also includes the interaction of those organisms with each other and the environment. After the plant was shutdown the amount of water withdrawn from Lake Michigan significantly decreased thus reducing the potential impacts from impingement and entrainment of aquatic species. DEK does not anticipate disturbance of lands beyond the current operational areas of the plant. All activities within the current operational areas of the plant will be conducted in accordance with required permits. Therefore, the impacts of decommissioning KPS on aquatic ecology are bounded by the GEIS.

6. Terrestrial Ecology

Terrestrial ecology considers the plants and animals in the vicinity of KPS as well as the interaction of those organisms with each other and the environment. Evaluations of impacts to terrestrial ecology are usually directed at important habitats and species, including plant and animals that are important to industry, recreational activities, the area ecosystems, and those protected by endangered species regulations and legislation. DEK does not anticipate activities to be conducted, including ISFSI expansion that would disturb habitat beyond the operational areas of the plant. In addition, the WDNR controls significant impacts to the environment through regulation of construction activities. Therefore, the impacts of decommissioning KPS on terrestrial ecology are bounded by the GEIS.

7. Threatened and Endangered Species

It is anticipated that the potential impacts of decommissioning on threatened or endangered aquatic species will be less than during plant operations because the normal cooling system for the plant (i.e. circulating water system) will no longer be in use. Eliminating use of normal cooling water systems reduces the effects of

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impingement, entrainment, thermal discharges, and effluent discharges on aquatic species.

The effects of decommissioning on threatened or endangered terrestrial species is expected to be no greater than during normal power operations.

The only example of an endangered or threatened species known to be present at the KPS site is a state-listed endangered peregrine falcon nest currently on the top of the KPS containment structure.

At some point during decommissioning, any active peregrine falcon nest on the property that will be impacted during decommissioning will be removed. Appropriate permits will be obtained, and any such action will be coordinated with, and approved by, US Fish and Wildlife and WDNR Wildlife Biologists.

Based on the above, the planned decommissioning of KPS will not result in direct mortality or major behavior changes or otherwise jeopardize the local population of any endangered or threatened species. Therefore, the impacts of decommissioning KPS on threatened and endangered species are bounded by the GEIS.

8. Radiological

Occupational Dose

The occupational radiation exposure to KPS plant personnel will be maintained ALARA and below the occupational dose limits in 10 CFR 20 during decommissioning. The need for plant personnel to routinely enter radiological areas to conduct maintenance, calibration, inspection, and other activities associated with an operating plant has been reduced, thus occupational dose to plant personnel commensurately decreased after the plant was shutdown and defueled.

DEK has elected to decommission KPS using the SAFSTOR alternative. It is expected that the occupational dose required to complete the decommissioning activities at KPS will be within the range of dose estimates (308 – 664 person rem) provided for the reference PWR using the SAFSTOR alternative (Table 4-1 of the GEIS). This is based on the fact that KPS is a relatively small, two loop PWR, and because the ALARA program will be maintained to ensure that occupational dose is maintained ALARA.

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Public Dose

Radiation dose to the public will be maintained within regulatory limits and below comparable levels when the plant was operating through the continued application of radiation protection and contamination controls combined with the reduced source term available in the facility.

9. Radiological Accidents

The likelihood of a large offsite radiological release that impacts public health and safety with KPS shutdown and defueled is considerably lower than the likelihood of a release from the plant during power operation. This is because the majority of the potential releases associated with power operation are not relevant after the fuel has been removed from the reactor. Furthermore, handling of spent fuel assemblies will continue to be controlled under work procedures designed to minimize the likelihood and consequences of a fuel handling accident. In addition, emergency plans and procedures will remain in place to protect the health and safety of the public while the possibility of significant radiological releases exists.

NUREG-0586, Supplement 1 also considers the possibility of a zircalloy fire. It references the NRC's 2001 Technical Study of Spent Fuel Pool Accident Risk at Decommissioning Nuclear Power Plants (NUREG-1738), as providing both the frequency of beyond design basis spent fuel pool accidents and bounding consequence analyses. Additional measures required after the terrorist attacks on September 11, 2001 have been shown to be effective in maintaining spent fuel pool cooling even if a spent fuel pool is entirely drained, further reducing risk of a zircalloy fire (Reference 11). Moreover, this remote risk diminishes as spent fuel radioactivity levels decay.

The potential for decommissioning activities to result in radiological releases not involving spent fuel (i.e. releases related to decontamination and dismantlement activities) will be minimized by use of procedures designed to minimize the likelihood and consequences of such releases.

Therefore, DEK concludes that the impacts of decommissioning on radiological accidents are small and bounded by the GEIS.

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10. Occupational Issues

DEK will continue to maintain appropriate administrative controls and requirements to ensure occupational hazards are minimized and that applicable federal, state and local occupational safety standards and requirements continue to be met. DEK has reviewed the occupational hazards and injuries in the GEIS and concluded that they are not destabilizing to future decommissioning projects. Therefore, the impacts of decommissioning KPS on occupational issues are bounded by the GEIS.

11. Cost

Decommissioning costs for KPS are discussed in Section IV of this report and in Attachment 1 to this report. The GEIS recognizes that an evaluation of decommissioning cost is not a National Environmental Policy Act requirement. Therefore a bounding analysis is not applicable.

12. Socioeconomics

Decommissioning of KPS is expected to result in negative socioeconomic impacts. As KPS transitioned from an operating plant to a shutdown plant and continues to transition into the different phases of decommissioning, an overall decrease in plant staff will occur. The lost wages of these plant staff will result in decreases in revenues available to support the local economy and local tax authorities. Some laid-off workers may relocate, thus potentially impacting the local cost of housing and availability of public services. The GEIS recognizes that these impacts are likely and concluded that the impacts are not destabilizing. DEK has reviewed the GEIS and has determined that the decommissioning of KPS is bounded by the GEIS analysis of socioeconomic effects.

13. Environmental Justice

Executive Order 12898, dated February 16, 1994, directs Federal executive agencies to consider environmental justice under the National Environmental Policy Act. It is designed to ensure that low-income and minority populations do not experience disproportionately high and adverse human health or environmental effects because of Federal actions.

The SEIS sections 4.9.7.1 and 4.9.7.2 each analyzed the census data within 50 miles of the plant for minority and low income populations, respectively. The

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conclusion was that there are no blocks of minority populations or low income populations within 20 miles of the plant. Both types of populations were located in Green Bay, WI or beyond. Based on this data, there would be little, if any, minority or low income group impacts as a result of decommissioning KPS.

Because the activities of the decommissioning plan are similar to activities performed during plant refueling outages, DEK believes that the impact of decommissioning is similar to the impact of a normal refuel outage with respect to environmental justice. Therefore, it has been concluded that the impacts of decommissioning KPS on environmental justice are bounded by the SEIS and GEIS. The GEIS states that, subsequent to the submittal of the PSDAR, the NRC staff will consider the impacts related to environmental justice from decommissioning activities.

14. Cultural, Historic, and Archeological Resources

Based on walkdowns conducted at the site in 2007 in support of the SEIS for license renewal, no known historic and archaeological resources are known to exist on the KPS site. DEK expects that most decommissioning activities will be conducted within the protected areas. DEK has a cultural resources plan in place for land disturbing activities performed outside of the protected area. Contractors who perform work activities outside the protected area are briefed to contact the site environmental coordinator if they discover archeological or cultural resources while performing their work activities.

DEK has concluded impact of decommissioning on cultural, historic, and archeological resources is bounded by the GEIS.

15. Aesthetic Issues

The impact of decommissioning activities on aesthetic resources will be temporary and remain consistent with the aesthetics of an industrial plant. After the decommissioning process is complete, site restoration activities will result in structures being removed from the site and the site being backfilled, graded and landscaped as needed. The removal of structures is generally considered beneficial to the aesthetic impact of the site.

Therefore, DEK has concluded that the impact of decommissioning on aesthetic issues is bounded by the GEIS.

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16. Noise

General noise levels during the decommissioning process are not expected to any more severe than during refueling outages and are not expected to present an audible intrusion on the surrounding community. Some decommissioning activities may result in higher than normal noise levels (i.e. some types of demolition activities). However, these noise levels would be temporary and are not expected to present an audible intrusion on the surrounding community.

Therefore, DEK has concluded that the impact of decommissioning on noise is bounded by the GEIS.

17. Transportation

The transportation impacts of decommissioning are dependent on the number of shipments to and from the plant, the types of shipments, the distance the material is shipped, and the radiological waste/fixed waste quantities and disposal plans. The estimated number and volume of shipments from the plant will be much smaller than shipments to the plant during decommissioning. The shipments from the plant would be primarily radioactive wastes and non-radioactive wastes associated with dismantlement and disposal of structures, systems and components.

The estimated cubic feet of radioactive waste associated with decommissioning KPS is summarized as follows:

Class A	133,498 cubic feet
Class B	2,207 cubic feet
Class C	341 cubic feet
GTCC	58 cubic feet

The GEIS estimate for low-level waste disposal from a referenced PWR is 600 - 45,000 cubic meters (21,000 – 1.5 million cubic feet) for a PWR using the SAFSTOR alternative. DEK estimates the low-level waste burial volume (Class A, B, and C) for KPS will be 3,853 cubic meters (136,046 cubic feet) using the SAFSTOR alternative.

DEK must comply with applicable regulations when shipping radioactive waste from decommissioning and NRC has concluded in the GEIS that these regulations

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are adequate to protect the public against unreasonable risk from transportation of radioactive materials.

The number of GTCC waste shipments expected to occur during decommissioning are expected to be below the number referenced in the GEIS Table 4-6. These shipments will occur over an extended period of time and will not result in significant changes to local traffic density or patterns, the need for construction of new methods of transportation, or significant dose to workers or the public.

In addition, shipments of non-radioactive wastes from the site are not expected to result in measurable deterioration of affected roads or a destabilizing increase in traffic density.

Therefore, DEK has concluded that the impact of decommissioning on transportation is bounded by the GEIS.

18. Irreversible and Irretrievable Commitment of Resources

Irreversible commitments are commitments of resources that cannot be recovered, and irretrievable commitments of resources are those that are lost for only a period of time.

Uranium is a natural resource that is irretrievably consumed during power operation. After the plant is shutdown uranium is no longer consumed. The use of the environment (air, water, land) is not considered to represent a significant irreversible or irretrievable resource commitment but rather a relatively short-term investment. Since the decommissioning plan is to release the site for unrestricted use after license termination, land is not considered an irreversible resource. The only irretrievable resources that would occur during decommissioning would be materials used to decontaminate the facility (e.g. rags, solvents, gases, and tools) and the fuel used for Decommissioning activities and transportation of materials to and from the site. However, the use of these resources is minor.

Therefore, DEK has concluded that the impact of decommissioning on irreversible and irretrievable commitment of resources is bounded by the GEIS.

B. Environmental Impacts of License Termination – NUREG-1496

According to the schedule provided in Section III of this report, a license termination plan for KPS will not be developed until approximately two years prior to final site

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decontamination (approximately the year 2070). At that time, a supplemental environmental report will be submitted as required by 10 CFR 50.82(a)(9). While detailed planning for license termination activities will not be performed until after the SAFSTOR period, the absence of any unique site-specific factors, significant groundwater contamination, unusual demographics, or impediments to achieving unrestricted release suggest that impacts resulting from license termination will be similar to those evaluated in NUREG-1496.

C. Discussion of Decommissioning in the SEIS

NUREG-1437, Supplement 40, dated August 2010 was issued in conjunction with the NRC approval of a renewed facility operating license for KPS in accordance with 10 CFR 54, "Requirements for the Renewal of Operating Licenses for Nuclear Power Plants." Although KPS was issued a renewed facility operating license under 10 CFR 54 on February 24, 2011, the original license term, which ended on December 21, 2013, was not completed at the time KPS was permanently shutdown.

Postulated impacts associated with decommissioning are discussed in the SEIS (NUREG-1437, Supplement 40), Section 7.0, which identified six issues related to decommissioning as follows:

- Radiation Doses
- Waste Management
- Air Quality
- Water Quality
- Ecological Resources
- Socioeconomic Impacts

The NRC staff did not identify any new and significant information during their review of the most recent DEK environmental report at that time (Reference 12), the site audit, or the scoping process for license renewal. Therefore, the NRC concluded that there are no impacts related to these issues beyond those discussed in the NRC GEIS issued in 1996 and 1999 for license renewal or the NRC GEIS issued in 2002 for decommissioning. For the issues above, the GEISs concluded the impacts are small. The NRC found no site-specific issues related to decommissioning.

Kewaunee Power Station Post-Shutdown Decommissioning Activities Report

D. Additional Considerations

While not quantitative, the following considerations are relevant to concluding that decommissioning activities will not result in significant environmental impacts not previously reviewed:

- The release of effluents will continue to be controlled by plant license requirements and plant procedures.
- KPS will continue to comply with the Offsite Dose Calculation Manual, Radiological Environmental Monitoring Program, and Groundwater Protection Initiative Program during decommissioning.
- Releases of non-radiological effluents will continue to be controlled per the requirements of the WPDES permit and applicable State of Wisconsin permits.
- Systems used to treat or control effluents during power operation will either be maintained or replaced by temporary or mobile systems for the decommissioning activities.
- Radiation protection principles used during plant operations will remain in effect during decommissioning.
- Sufficient decontamination and source term reduction prior to dismantlement will be performed to ensure that occupational dose and public exposure will be maintained below applicable limits.
- Transport of radioactive waste will be in accordance with plant procedures, applicable Federal regulations, and the requirements of the receiving facility.
- Site access control during decommissioning will ensure that residual contamination is minimized or eliminated as a radiation release pathway to the public.

E. Conclusion

Based on the above discussions, DEK concludes that the environmental impacts associated with ongoing and planned KPS site-specific decommissioning activities will be bounded by appropriate, previously issued environmental impact statements. Specifically, the environmental impacts are bounded by the GEIS (Reference 4) and the most recent SEIS for KPS (Reference 9).

1. The postulated impacts associated with the decommissioning method chosen, SAFSTOR, have already been considered in the most recent SEIS and GEIS.
2. There are no unique aspects of KPS or of the decommissioning techniques to be utilized that would invalidate the conclusions reached in the most recent SEIS and GEIS.

Kewaunee Power Station Post-Shutdown Decommissioning Activities Report

3. The methods to be employed to dismantle and decontaminate KPS are standard construction-based techniques fully considered in the most recent SEIS and GEIS.

Therefore, it can be concluded that the environmental impacts associated with the site-specific decommissioning activities for KPS will be bounded by appropriate previously issued environmental impact statements

10 CFR 50.82(a)(6)(ii) states that licensees shall not perform any decommissioning activities, as defined in 10 CFR 50.2, that result in significant environmental impacts not previously reviewed. No such impacts have been identified.

Kewaunee Power Station Post-Shutdown Decommissioning Activities Report

VI. REFERENCES

1. Regulatory Guide 1.185, "Standard Format and Content for Post-Shutdown Decommissioning Activities Report," July 2000.
2. Letter from David A. Heacock (DEK) to NRC Document Control Desk, "Certification of Permanent Cessation of Power Operations," dated November 2, 2012.
3. Letter from D. G. Stoddard (DEK) to NRC Document Control Desk, "Certification of Permanent Cessation of Power Operations," dated February 25, 2013.
4. NUREG-0586, "Final Generic Environmental Impact Statement on Decommissioning of Nuclear Facilities: Supplement 1, Regarding the Decommissioning of Nuclear Power Reactors," October 2002.
5. Regulatory Guide 1.179, "Standard Format and Content of License Termination Plans for Nuclear Power Reactors."
6. NUREG-1575, "Multi Agency Radiation Survey and Site Investigation Manual (MARSSIM)," Revision 1, dated August 2000.
7. Letter from M. D. Sartain (DEK) to NRC Document Control Desk, "Update to Irradiated Fuel Management Plan Pursuant to 10 CFR 50.54(bb)," dated April 25, 2014.
8. AIF/NESP-036, "A Guideline for Producing Commercial Nuclear Power Plant Decommissioning Cost Estimates"
9. NUREG-1437, "Generic Environmental Impact Statement for License Renewal of Nuclear Plants, Supplement 40, Regarding Kewaunee Power Station," published August 2010.
10. NUREG-1496, "Generic Environmental Impact Statement in Support of Rulemaking on Radiological Criteria for License Termination of NRC-Licensed Nuclear Facilities," dated July 1997.
11. The Attorney General of Commonwealth of Massachusetts; the Attorney General of California; Denial of Petitions for Rulemaking, 73 Fed. Reg. 46,204, 46,209 (Aug. 8, 2008).
12. Dominion Energy Kewaunee, Inc. (DEK) 2008, "Kewaunee Power Station, Applicant's Environmental Report, Operating License Renewal Stage," Glen Allen, VA. [ADAMS Accession Nos. ML082341020, ML082341038, and ML082341039].
13. Letter from D. G. Stoddard (DEK) to Document Control Desk, "Certification of Permanent Removal of Fuel from the Reactor Vessel," dated May 14, 2013.

Kewaunee Power Station Post-Shutdown Decommissioning Activities Report

Attachment 1

Revised Cost and Schedule Tables

**Supplement to Cost and Schedule Tables Contained in “2012
Decommissioning Cost Analysis for Kewaunee Nuclear Power Plant
SAFSTOR Methodology,” dated February 7, 2013**

Table 6-1
Scenario 1 Cost and Schedule Summary
Page 31 of 36

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Table 6-1
Revised Cost and Schedule Summary

Table 6-1
Cost and Schedule Summary
(2012 Dollars in Thousands)

Period No.	Period Description	Start	End	Years	Cost
License Termination					
Decon Pd 1	SAFSTOR Planning, Preparations and Deactivation	7/1/2013	11/30/2014	1.41	\$99,274
Decon Pd 2	SAFSTOR Preparation Delay During Wet Fuel Storage	11/30/2014	11/15/2016	1.96	\$8,811
Decon Pd 3	Completion of SAFSTOR Preparations	11/15/2016	5/15/2017	0.49	\$15,946
Decon Pd 4	Dormancy With Dry Storage	5/15/2017	10/19/2048	31.43	\$54,694
Decon Pd 5	Dormancy Only	10/19/2048	4/17/2067	18.49	\$32,011
Decon Pd 6	Decommissioning Planning During Dormancy	4/17/2067	6/22/2069	2.18	\$42,755
Decon Pd 7	Dismantlement Site Modifications and Preparations	6/22/2069	5/24/2070	0.91	\$64,972
Decon Pd 8	Systems Removal	5/24/2070	10/26/2071	1.42	\$153,318
Decon Pd 9	Site Decontamination	10/26/2071	8/29/2072	0.84	\$61,058
Account Total				59.13	\$532,839
Spent Fuel					
SNF Pd 1	Spent Fuel Planning, Cooling and Transfer to Dry Storage	7/1/2013	11/15/2016	3.37	\$103,224
SNF Pd 2	Dry Storage During Completion SAFSTOR Preparations	11/15/2016	5/15/2017	0.49	\$2,680
SNF Pd 3	Dry Storage During Dormancy	5/15/2017	10/19/2048	31.43	\$170,440
SNF Pd 4	ISFSI Demolition	3/30/2073	7/31/2073	0.33	\$2,072
				35.62	\$278,416
Greenfield					
Grn Pd 1	Clean Building Demolition	8/29/2072	7/31/2073	0.91	\$30,827
Grn Pd 2	Site Restoration	7/31/2073	12/4/2073	0.34	\$3,976
Account Total				1.25	\$34,803
Grand Total					\$846,058

Appendix B
Spent Fuel Shipping Schedule

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Appendix B
Revised Spent Fuel Shipping Schedule

Kewaunee Power Station
Spent Fuel Shipping Schedule
2021 DOE Acceptance, Dry Storage

Year	On-Site Transfers			On-Site Inventory			Off-Site Transfers		
	Fuel Assemblies Discharged	No Dry Modules	Assemblies Transferred from Pool to Dry Storage	Assemblies in Fuel Pool Storage	Assemblies in Dry Storage	Total Assemblies in On Site Storage	Total Assemblies to DOE	Assemblies Shipped to DOE From Pool	Assemblies Shipped to DOE from Dry Storage
2008	45	0	0	1,081	0	1,081	0	0	0
2009	44	2	64	1,061	64	1,125	0	0	0
2010	0	2	64	997	128	1,125	0	0	0
2011	45	4	128	914	256	1,170	0	0	0
2012	44	0	0	958	256	1,214	0	0	0
2013	121	0	0	1,079	256	1,335	0	0	0
2014	0	6	192	887	448	1,335	0	0	0
2015	0	0	0	887	448	1,335	0	0	0
2016	0	24	887	0	1335	1,335	0	0	0
2017	0	0	0	0	1335	1,335	0	0	0
2018	0	0	0	0	1335	1,335	0	0	0
2019	0	0	0	0	1335	1,335	0	0	0
2020	0	0	0	0	1335	1,335	0	0	0
2021	0	0	0	0	1271	1,271	64	0	64
2022	0	0	0	0	1271	1,271	0	0	0
2023	0	0	0	0	1239	1,239	32	0	32
2024	0	0	0	0	1207	1,207	32	0	32
2025	0	0	0	0	1143	1,143	64	0	64
2026	0	0	0	0	1047	1,047	96	0	96
2027	0	0	0	0	983	983	64	0	64
2028	0	0	0	0	951	951	32	0	32
2029	0	0	0	0	887	887	64	0	64
2030	0	0	0	0	813	813	74	0	74
2031	0	0	0	0	739	739	74	0	74
2032	0	0	0	0	702	702	37	0	37
2033	0	0	0	0	665	665	37	0	37
2034	0	0	0	0	628	628	37	0	37
2035	0	0	0	0	591	591	37	0	37
2036	0	0	0	0	554	554	37	0	37
2037	0	0	0	0	517	517	37	0	37
2038	0	0	0	0	443	443	74	0	74
2039	0	0	0	0	406	406	37	0	37
2040	0	0	0	0	369	369	37	0	37
2041	0	0	0	0	369	369	0	0	0
2042	0	0	0	0	332	332	37	0	37
2043	0	0	0	0	258	258	74	0	74
2044	0	0	0	0	221	221	37	0	37
2045	0	0	0	0	184	184	37	0	37
2046	0	0	0	0	184	184	0	0	0
2047	0	0	0	0	147	147	37	0	37
2048	0	0	0	0	0	0	147	0	147
2049	0	0	0	0	0	0	0	0	0
2050	0	0	0	0	0	0	0	0	0
2051	0	0	0	0	0	0	0	0	0

No. Post S/D MPCs for fuel 30
No. Post S/D MPCs for GTCC 0

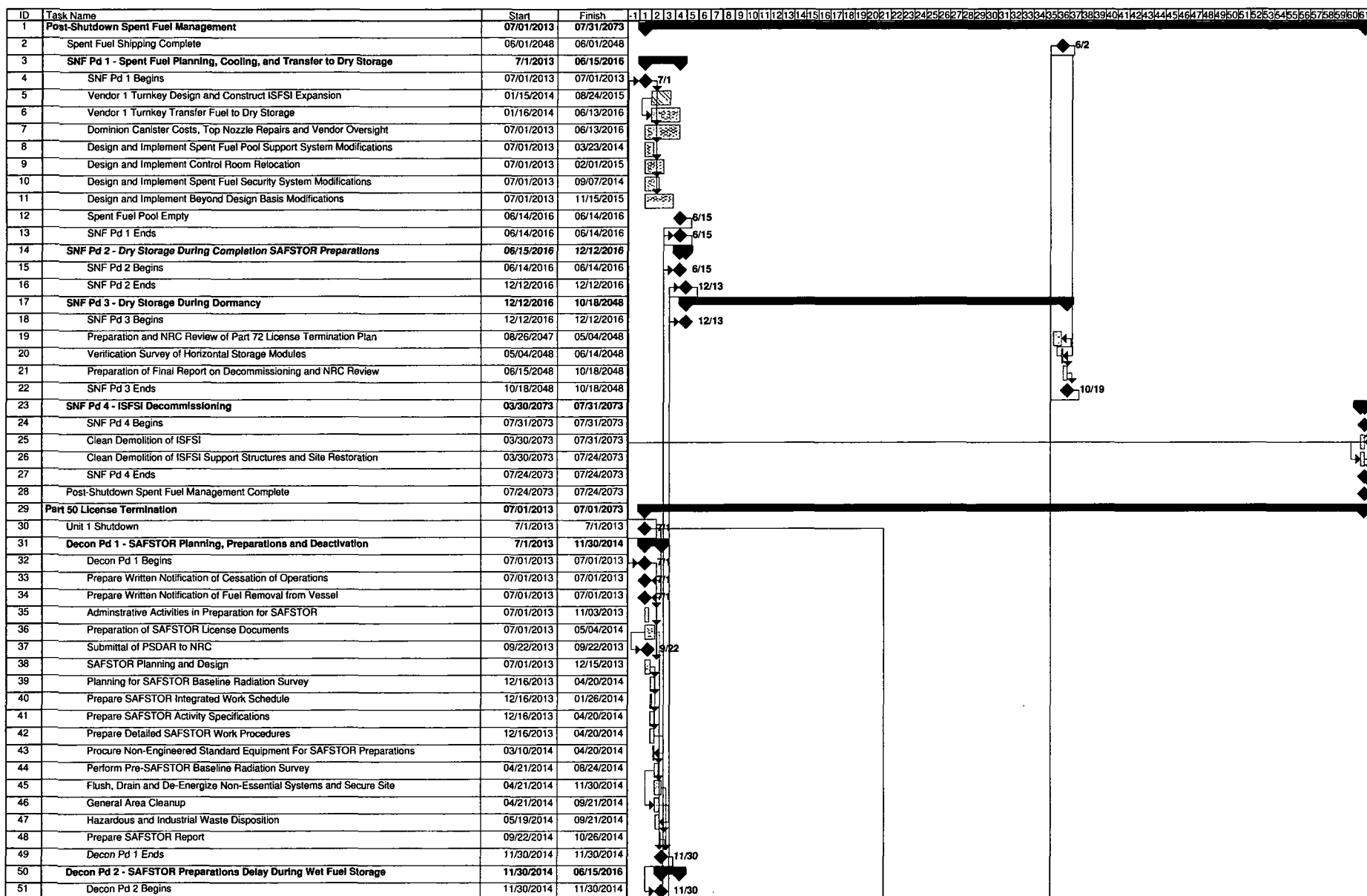
Note: The assumption and information in this appendix should not be construed as any sort of admission or concession regarding the legal obligations of DOE.

Appendix C
Detailed Project Schedule

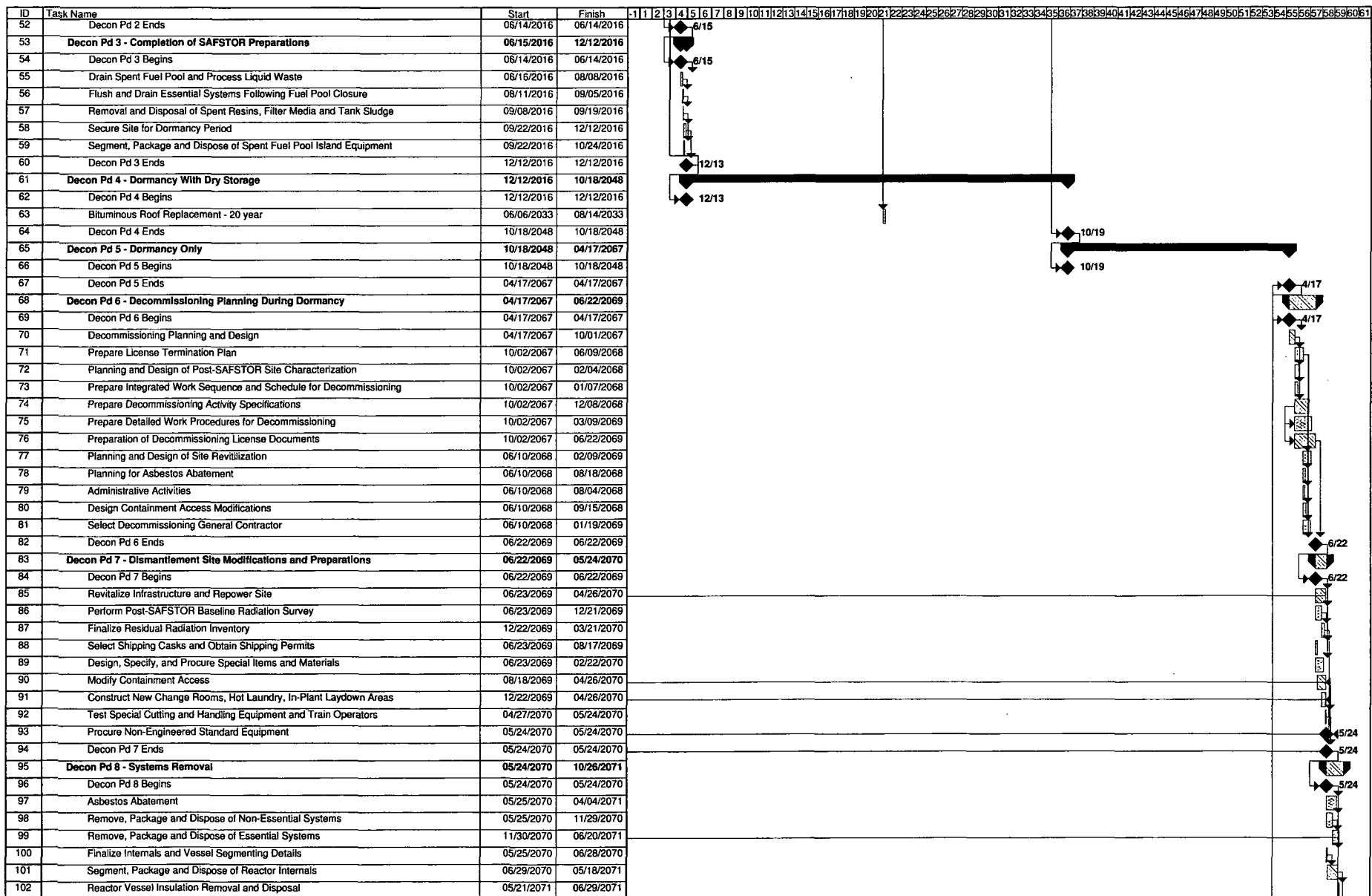
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Appendix C
Revised Detailed Project Schedule

Kewaunee Power Station
Scenario 2 Detailed Project Schedule
SAFSTOR with Dry Storage, 2013 Shutdown and DOE Acceptance in 2021



Kewaunee Power Station
Scenario 2 Detailed Project Schedule
SAFSTOR with Dry Storage, 2013 Shutdown and DOE Acceptance in 2021



SAFSTOR with Dry Storage, 2013 Shutdown and DOE Acceptance in 2021

ID	Task Name	Start	Finish
103	Segment, Package and Dispose of Reactor Pressure Vessel	05/21/2071	10/26/2071
104	Remove and Dispose of Steam Generators	10/12/2070	06/20/2071
105	Remove and Dispose of Pressurizer	04/12/2071	06/20/2071
106	Removal and Disposal of Spent Fuel Racks	05/25/2070	07/05/2070
107	Segment, Package and Dispose of Refueling Bridge	07/06/2070	07/26/2070
108	Decon Pd 8 Ends	10/26/2071	10/26/2071
109	Decon Pd 9 - Site Decontamination	10/26/2071	08/29/2072
110	Decon Pd 9 Begins	10/26/2071	10/26/2071
111	Decon Containment Building	10/29/2071	04/11/2072
112	Decon Auxiliary Building	10/29/2071	01/18/2072
113	Decon Technical Support Center	10/29/2071	11/30/2071
114	Decon Decontamination Building	12/03/2071	12/14/2071
115	Decon Fuel Handling Building	12/17/2071	04/04/2072
116	Remediate Soil Contamination	04/07/2072	05/16/2072
117	Contaminated Roof Disposal	05/19/2072	05/23/2072
118	Segment, Package and Dispose of Contaminated Decon Equipment	05/26/2072	07/04/2072
119	Perform Final Status Survey for Structures	10/29/2071	08/29/2072
120	Perform Final Status Survey for Land Areas	04/28/2072	08/29/2072
121	Decon Pd 9 Ends	08/29/2072	08/29/2072
122	ORISE Verification and NRC Approval	09/01/2072	02/13/2073
123	Prepare Final Report of Dismantling Program	02/16/2073	03/27/2073
124	Decon Complete - License terminated	03/27/2073	03/27/2073
125	60 Year SAFSTOR Limit	07/01/2073	07/01/2073
126	Grn Pd 1 Clean Building Demolition	08/29/2072	07/31/2073
127	Grn Pd 1 Begins	08/29/2072	08/29/2072
128	Procure Clean Building Demolition Equipment	08/29/2072	08/29/2072
129	Demolish Non-Essential Structures	09/01/2072	03/27/2073
130	Demolish Remaining Structures	02/16/2073	03/27/2073
131	Demolish Turbine Building	09/01/2072	11/21/2072
132	Demolish Fuel Handling Building	02/16/2073	03/20/2073
133	Demolish Auxiliary Building	02/16/2073	04/17/2073
134	Demolish Decontamination Building	04/20/2073	05/01/2073
135	Demolish Steam Generator Storage Building	05/04/2073	05/22/2073
136	Demolish Containment Building	02/16/2073	07/31/2073
137	Grn Pd 1 Ends	07/31/2073	07/31/2073
138	Grn Pd 2 Site Restoration	07/31/2073	12/04/2073
139	Grn Pd 2 Begins	07/31/2073	07/31/2073
140	Procure Site Restoration Equipment	07/31/2073	07/31/2073
141	Remove Temporary Structures	08/03/2073	08/07/2073
142	Finish Grading and Re-Vegetate Site	08/10/2073	12/04/2073
143	Grn Pd 2 Ends	12/04/2073	12/04/2073
144	Site Restored	12/04/2073	12/04/2073

Appendix D
Detailed Cost Table

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Appendix D
Revised Detailed Cost Table

Kewaunee SAFSTOR with Expedited Transfer to Dry Storage, 2013 Shutdown and DOE Acceptance Starting in 2021

Decommissioning Alternative SAFSTOR
Spent Fuel Alternative Dry

License Status Extension Unit 1 Shut Down Date 7/1/2013
Fuel Pool Systems Modified
DOE Acceptance Date: 1/1/2021

2012 Dollars in Thousands

No.	Item Description	Labor	Equipment	Disposal	Other	Contingency	Total
<u>A. License Termination</u>							
Decon Pd 1	SAFSTOR Planning, Preparations and Deactivation						
Distributed							
	1.03 Administrative Activities in Preparation for SAFSTOR	\$1,027	\$4	\$0	\$0	\$134	\$1,165
	1.04 Preparation of SAFSTOR License Documents	\$2,251	\$7	\$0	\$0	\$294	\$2,552
	1.05 SAFSTOR Planning and Design	\$328	\$0	\$0	\$0	\$43	\$370
	1.06 Planning for SAFSTOR Baseline Radiation Survey	\$421	\$3	\$0	\$0	\$55	\$480
	1.07 Prepare SAFSTOR Integrated Work Schedule	\$107	\$4	\$0	\$0	\$14	\$125
	1.08 Prepare SAFSTOR Activity Specifications	\$718	\$5	\$0	\$0	\$94	\$817
	1.09 Prepare Detailed SAFSTOR Work Procedures	\$1,547	\$8	\$0	\$0	\$202	\$1,758
	1.10 Procure Non-Engineered Standard Equipment For SAFSTOR Preparations	\$0	\$1,512	\$0	\$0	\$227	\$1,739
	1.11 Perform Pre-SAFSTOR Baseline Radiation Survey	\$411	\$72	\$0	\$0	\$64	\$548
	1.12 Flush, Drain and De-Energize Non-Essential Systems	\$11	\$1,339	\$947	\$0	\$528	\$2,826
	1.13 General Area Cleanup	\$673	\$226	\$166	\$0	\$245	\$1,310
	1.14 Hazardous and Industrial Waste Disposition	\$243	\$46	\$60	\$163	\$105	\$616
	1.15 Prepare SAFSTOR Report	\$63	\$0	\$0	\$0	\$8	\$72
Distributed	Subtotal	\$7,800	\$3,226	\$1,173	\$163	\$2,013	\$14,378
Undistributed							
	1.01 Utility Staff	\$36,926	\$0	\$0	\$0	\$4,800	\$41,726
	1.02 Utility Staff HP Supplies	\$0	\$2,114	\$0	\$0	\$317	\$2,431
	1.03 Security Guard Force	\$1,234	\$0	\$0	\$0	\$185	\$1,419
	1.04 Insurance	\$0	\$0	\$0	\$202	\$30	\$232
	1.05 NRC Decommissioning Fees	\$0	\$0	\$0	\$1,072	\$161	\$1,232
	1.06 Materials and Services	\$0	\$2,272	\$0	\$0	\$341	\$2,613
	1.07 DAW Disposal	\$0	\$0	\$10	\$0	\$1	\$11
	1.08 Energy	\$0	\$0	\$0	\$7,432	\$1,115	\$8,546
	1.11 Severance	\$16,094	\$0	\$0	\$0	\$2,414	\$18,508
	1.12 Gross Receipt Taxes	\$0	\$0	\$0	\$7,111	\$1,067	\$8,178
Undistributed	Subtotal	\$54,254	\$4,386	\$10	\$15,817	\$10,431	\$84,896
Decon Pd 1	Subtotal	\$62,054	\$7,612	\$1,183	\$15,980	\$12,444	\$99,274

Kewaunee SAFSTOR with Expedited Transfer to Dry Storage, 2013 Shutdown and DOE Acceptance Starting in 2021

Decommissioning Alternative SAFSTOR
Spent Fuel Alternative Dry

License Status Extension Unit 1 Shut Down Date 7/1/2013
Fuel Pool Systems Modified
DOE Acceptance Date: 1/1/2021

2012 Dollars in Thousands

No.	Item Description	Labor	Equipment	Disposal	Other	Contingency	Total
Decon Pd 2	SAFSTOR Preparation Delay During Wet Fuel Storage						
Undistributed							
	1.01 Utility Staff	\$3,689	\$0	\$0	\$0	\$480	\$4,169
	1.02 Utility Staff HP Supplies	\$0	\$342	\$0	\$0	\$51	\$393
	1.03 Security Guard Force	\$1,708	\$0	\$0	\$0	\$256	\$1,965
	1.04 Insurance	\$0	\$0	\$0	\$201	\$30	\$231
	1.05 NRC Decommissioning Fees	\$0	\$0	\$0	\$574	\$86	\$660
	1.06 Materials and Services	\$0	\$400	\$0	\$0	\$60	\$460
	1.08 Energy	\$0	\$0	\$0	\$812	\$122	\$933
Undistributed	Subtotal	\$5,397	\$742	\$0	\$1,587	\$1,085	\$8,811
Decon Pd 2	Subtotal	\$5,397	\$742	\$0	\$1,587	\$1,085	\$8,811

Kewaunee SAFSTOR with Expedited Transfer to Dry Storage, 2013 Shutdown and DOE Acceptance Starting in 2021

Decommissioning Alternative SAFSTOR
Spent Fuel Alternative Dry

License Status Extension Unit 1 Shut Down Date 7/1/2013
Fuel Pool Systems Modified
DOE Acceptance Date: 1/1/2021

2012 Dollars in Thousands

No.	Item Description	Labor	Equipment	Disposal	Other	Contingency	Total
Decon Pd 3	Completion of SAFSTOR Preparations						
Distributed							
	3.02 Flush and Drain Essential Systems Following Fuel Pool Closure	\$58	\$1,352	\$947	\$0	\$542	\$2,899
	3.03 Removal and Disposal of Spent Resins, Filter Media and Tank Sludge	\$24	\$27	\$2,368	\$0	\$557	\$2,976
	3.04 Secure Site for Dormancy Period	\$0	\$0	\$0	\$1,500	\$225	\$1,725
	3.05 Segment, Package and Dispose of Spent Fuel Pool Island Equipment	\$6	\$1	\$106	\$0	\$26	\$140
Distributed	Subtotal	\$88	\$1,380	\$3,421	\$1,500	\$1,350	\$7,740
Undistributed							
	1.01 Utility Staff	\$1,739	\$0	\$0	\$0	\$226	\$1,965
	1.02 Utility Staff HP Supplies	\$0	\$170	\$0	\$0	\$26	\$196
	1.03 Security Guard Force	\$108	\$0	\$0	\$0	\$16	\$124
	1.04 Insurance	\$0	\$0	\$0	\$51	\$8	\$58
	1.05 NRC Decommissioning Fees	\$0	\$0	\$0	\$240	\$36	\$276
	1.06 Materials and Services	\$0	\$114	\$0	\$0	\$17	\$131
	1.07 DAW Disposal	\$0	\$0	\$1	\$0	\$0	\$1
	1.08 Energy	\$0	\$0	\$0	\$251	\$38	\$289
	1.09 Decommissioning General Contractor Staff	\$4,427	\$0	\$0	\$0	\$576	\$5,003
	1.10 DGC HP Supplies	\$0	\$142	\$0	\$0	\$21	\$163
Undistributed	Subtotal	\$6,274	\$426	\$1	\$542	\$964	\$8,206
Decon Pd 3	Subtotal	\$6,362	\$1,806	\$3,422	\$2,042	\$2,314	\$15,946

Kewaunee SAFSTOR with Expedited Transfer to Dry Storage, 2013 Shutdown and DOE Acceptance Starting in 2021

Decommissioning Alternative SAFSTOR
Spent Fuel Alternative Dry

License Status Extension Unit 1 Shut Down Date 7/1/2013
Fuel Pool Systems Modified
DOE Acceptance Date: 1/1/2021

2012 Dollars in Thousands							
No.	Item Description	Labor	Equipment	Disposal	Other	Contingency	Total
Decon Pd 4	Dormancy With Dry Storage						
Distributed							
	4.01 Bituminous Roof Replacement - 20 year	\$524	\$150	\$25	\$0	\$105	\$803
Distributed	Subtotal	\$524	\$150	\$25	\$0	\$105	\$803
Undistributed							
	1.01 Utility Staff	\$14,706	\$0	\$0	\$0	\$1,912	\$16,618
	1.02 Utility Staff HP Supplies	\$0	\$2,611	\$0	\$0	\$392	\$3,002
	1.03 Security Guard Force	\$6,848	\$0	\$0	\$0	\$1,027	\$7,875
	1.04 Insurance	\$0	\$0	\$0	\$3,217	\$483	\$3,700
	1.05 NRC Decommissioning Fees	\$0	\$0	\$0	\$9,206	\$1,381	\$10,587
	1.06 Materials and Services	\$0	\$1,845	\$0	\$0	\$277	\$2,122
	1.08 Energy	\$0	\$0	\$0	\$92	\$14	\$105
	1.14 SAFSTOR Surveillance and Maintenance	\$0	\$0	\$0	\$8,593	\$1,289	\$9,882
Undistributed	Subtotal	\$21,554	\$4,456	\$0	\$21,108	\$6,775	\$53,891
Decon Pd 4	Subtotal	\$22,078	\$4,606	\$25	\$21,108	\$6,880	\$54,694

Kewaunee SAFSTOR with Expedited Transfer to Dry Storage, 2013 Shutdown and DOE Acceptance Starting in 2021

Decommissioning Alternative SAFSTOR
Spent Fuel Alternative Dry

License Status Extension Unit 1 Shut Down Date 7/1/2013
Fuel Pool Systems Modified
DOE Acceptance Date: 1/1/2021

2012 Dollars in Thousands

No.	Item Description	Labor	Equipment	Disposal	Other	Contingency	Total
Decon Pd 5	Dormancy Only						
Undistributed							
	1.01 Utility Staff	\$8,652	\$0	\$0	\$0	\$1,125	\$9,777
	1.02 Utility Staff HP Supplies	\$0	\$1,536	\$0	\$0	\$230	\$1,766
	1.03 Security Guard Force	\$4,029	\$0	\$0	\$0	\$604	\$4,633
	1.04 Insurance	\$0	\$0	\$0	\$1,893	\$284	\$2,177
	1.05 NRC Decommissioning Fees	\$0	\$0	\$0	\$5,416	\$812	\$6,229
	1.06 Materials and Services	\$0	\$1,085	\$0	\$0	\$163	\$1,248
	1.08 Energy	\$0	\$0	\$0	\$319	\$48	\$367
	1.14 SAFSTOR Surveillance and Maintenance	\$0	\$0	\$0	\$5,055	\$758	\$5,814
Undistributed	Subtotal	\$12,681	\$2,621	\$0	\$12,683	\$4,024	\$32,011
Decon Pd 5	Subtotal	\$12,681	\$2,621	\$0	\$12,683	\$4,024	\$32,011

Kewaunee SAFSTOR with Expedited Transfer to Dry Storage, 2013 Shutdown and DOE Acceptance Starting in 2021

Decommissioning Alternative SAFSTOR
Spent Fuel Alternative Dry

License Status Extension
Fuel Pool Systems Modified
DOE Acceptance Date: 1/1/2021

Unit 1 Shut Down Date 7/1/2013

2012 Dollars in Thousands

No.	Item Description	Labor	Equipment	Disposal	Other	Contingency	Total
Decon Pd 6	Decommissioning Planning During Dormancy						
Distributed							
	6.01 Decommissioning Planning and Design	\$328	\$0	\$0	\$0	\$43	\$370
	6.02 Prepare License Termination Plan	\$437	\$10	\$0	\$0	\$58	\$506
	6.03 Planning and Design of Post-SAFSTOR Site Characterization	\$421	\$3	\$0	\$0	\$55	\$480
	6.04 Prepare Integrated Work Sequence and Schedule for Decommissioning	\$189	\$0	\$0	\$0	\$25	\$213
	6.05 Prepare Decommissioning Activity Specifications	\$3,059	\$21	\$0	\$0	\$401	\$3,481
	6.06 Prepare Detailed Work Procedures for Decommissioning	\$3,010	\$8	\$0	\$0	\$393	\$3,411
	6.07 Preparation of Decommissioning License Documents	\$2,251	\$7	\$0	\$0	\$294	\$2,552
	6.08 Planning and Design of Site Revitalization	\$1,396	\$15	\$0	\$0	\$184	\$1,594
	6.09 Planning for Asbestos Abatement	\$181	\$2	\$0	\$0	\$24	\$206
	6.10 Administrative Activities	\$210	\$0	\$0	\$0	\$27	\$237
	6.11 Design Containment Access Modifications	\$297	\$4	\$0	\$0	\$39	\$340
	6.12 Select Decommissioning General Contractor	\$344	\$4	\$0	\$0	\$45	\$393
Distributed	Subtotal	\$12,123	\$74	\$0	\$0	\$1,588	\$13,783
Undistributed							
	1.01 Utility Staff	\$6,139	\$0	\$0	\$0	\$798	\$6,937
	1.02 Utility Staff HP Supplies	\$0	\$308	\$0	\$0	\$46	\$355
	1.03 Security Guard Force	\$475	\$0	\$0	\$0	\$71	\$547
	1.04 Insurance	\$0	\$0	\$0	\$223	\$34	\$257
	1.05 NRC Decommissioning Fees	\$0	\$0	\$0	\$639	\$96	\$735
	1.06 Materials and Services	\$0	\$417	\$0	\$0	\$63	\$480
	1.08 Energy	\$0	\$0	\$0	\$392	\$59	\$451
	1.09 Decommissioning General Contractor Staff	\$16,133	\$0	\$0	\$0	\$2,097	\$18,231
	1.10 DGC HP Supplies	\$0	\$255	\$0	\$0	\$38	\$293
	1.14 SAFSTOR Surveillance and Maintenance	\$0	\$0	\$0	\$597	\$89	\$686
Undistributed	Subtotal	\$22,747	\$980	\$0	\$1,851	\$3,391	\$28,972
Decon Pd 6	Subtotal	\$34,870	\$1,054	\$0	\$1,851	\$4,979	\$42,755

Kewaunee SAFSTOR with Expedited Transfer to Dry Storage, 2013 Shutdown and DOE Acceptance Starting in 2021

Decommissioning Alternative SAFSTOR
Spent Fuel Alternative Dry

License Status Extension Unit 1 Shut Down Date 7/1/2013
Fuel Pool Systems Modified
DOE Acceptance Date: 1/1/2021

2012 Dollars in Thousands

No.	Item Description	Labor	Equipment	Disposal	Other	Contingency	Total
Decon Pd 7	Dismantlement Site Modifications and Preparations						
Distributed							
	7.01 Revitalize Infrastructure and Repower Site	\$0	\$0	\$0	\$18,993	\$2,469	\$21,462
	7.02 Perform Post-SAFSTOR Baseline Radiation Survey	\$411	\$72	\$0	\$0	\$64	\$548
	7.03 Finalize Residual Radiation Inventory	\$86	\$6	\$0	\$0	\$12	\$104
	7.04 Select Shipping Casks and Obtain Shipping Permits	\$39	\$0	\$0	\$0	\$5	\$44
	7.05 Design, Specify, and Procure Special Items and Materials	\$1,068	\$4,857	\$0	\$0	\$867	\$6,792
	7.06 Modify Containment Access	\$351	\$526	\$0	\$0	\$125	\$1,002
	7.07 Construct New Change Rooms, Hot Laundry, In-Plant Laydown Areas	\$0	\$1,088	\$0	\$0	\$163	\$1,251
	7.08 Test Special Cutting and Handling Equipment and Train Operators	\$891	\$0	\$0	\$0	\$116	\$1,007
	7.09 Procure Non-Engineered Standard Equipment	\$0	\$3,209	\$0	\$0	\$481	\$3,690
Distributed	Subtotal	\$2,846	\$9,758	\$0	\$18,993	\$4,302	\$35,900
Undistributed							
	1.01 Utility Staff	\$8,938	\$0	\$0	\$0	\$1,162	\$10,100
	1.02 Utility Staff HP Supplies	\$0	\$633	\$0	\$0	\$95	\$728
	1.03 Security Guard Force	\$334	\$0	\$0	\$0	\$50	\$384
	1.04 Insurance	\$0	\$0	\$0	\$131	\$20	\$151
	1.05 NRC Decommissioning Fees	\$0	\$0	\$0	\$445	\$67	\$512
	1.06 Materials and Services	\$0	\$573	\$0	\$0	\$86	\$659
	1.07 DAW Disposal	\$0	\$0	\$5	\$0	\$1	\$5
	1.08 Energy	\$0	\$0	\$0	\$294	\$44	\$338
	1.09 Decommissioning General Contractor Staff	\$13,905	\$0	\$0	\$0	\$1,808	\$15,713
	1.10 DGC HP Supplies	\$0	\$419	\$0	\$0	\$63	\$482
Undistributed	Subtotal	\$23,177	\$1,625	\$5	\$870	\$3,396	\$29,072
Decon Pd 7	Subtotal	\$26,023	\$11,383	\$5	\$19,863	\$7,698	\$64,972

Kewaunee SAFSTOR with Expedited Transfer to Dry Storage, 2013 Shutdown and DOE Acceptance Starting in 2021

Decommissioning Alternative SAFSTOR
Spent Fuel Alternative Dry

License Status Extension
Fuel Pool Systems Modified
DOE Acceptance Date: 1/1/2021

Unit 1 Shut Down Date 7/1/2013

2012 Dollars in Thousands

No.	Item Description	Labor	Equipment	Disposal	Other	Contingency	Total
Decon Pd 8	Systems Removal						
Distributed							
	8.01 Asbestos Abatement	\$0	\$0	\$0	\$14,088	\$2,113	\$16,201
	8.02 Remove, Package and Dispose of Non-Essential Systems	\$3,727	\$400	\$2,386	\$0	\$1,498	\$8,011
	8.03 Remove, Package and Dispose of Essential Systems	\$4,897	\$1,205	\$2,420	\$0	\$1,960	\$10,481
	8.04 Finalize Internals and Vessel Segmenting Details	\$24	\$0	\$0	\$0	\$5	\$29
	8.05 Segment, Package and Ship Reactor Internals	\$3,228	\$1,487	\$18,421	\$0	\$6,561	\$29,698
	8.06 Reactor Vessel Insulation Removal and Disposal	\$35	\$8	\$119	\$0	\$49	\$213
	8.07 Package and Ship Reactor Pressure Vessel	\$2,229	\$1,569	\$4,301	\$0	\$2,551	\$10,650
	8.08 Remove and Dispose of Steam Generators	\$1,476	\$420	\$3,756	\$0	\$1,300	\$6,952
	8.09 Remove and Dispose of Pressurizer	\$249	\$118	\$696	\$0	\$244	\$1,306
	8.10 Remove and Dispose of Spent Fuel Storage Racks	\$45	\$96	\$3,619	\$0	\$865	\$4,624
	8.11 Segment and Dispose of Fuel Pool Bridge Crane	\$46	\$11	\$166	\$0	\$51	\$273
Distributed	Subtotal	\$15,956	\$5,314	\$35,884	\$14,088	\$17,197	\$88,438
Undistributed							
	1.01 Utility Staff	\$18,273	\$0	\$0	\$0	\$2,376	\$20,649
	1.02 Utility Staff HP Supplies	\$0	\$1,569	\$0	\$0	\$235	\$1,804
	1.03 Security Guard Force	\$1,241	\$0	\$0	\$0	\$186	\$1,427
	1.04 Insurance	\$0	\$0	\$0	\$203	\$30	\$233
	1.05 NRC Decommissioning Fees	\$0	\$0	\$0	\$689	\$103	\$792
	1.06 Materials and Services	\$0	\$1,265	\$0	\$0	\$190	\$1,455
	1.07 DAW Disposal	\$0	\$0	\$151	\$0	\$23	\$174
	1.08 Energy	\$0	\$0	\$0	\$690	\$104	\$794
	1.09 Decommissioning General Contractor Staff	\$32,156	\$0	\$0	\$0	\$4,180	\$36,337
	1.10 DGC HP Supplies	\$0	\$1,056	\$0	\$0	\$158	\$1,215
Undistributed	Subtotal	\$51,670	\$3,890	\$151	\$1,582	\$7,585	\$64,880
Decon Pd 8	Subtotal	\$67,626	\$9,204	\$36,035	\$15,670	\$24,782	\$153,318

Kewaunee SAFSTOR with Expedited Transfer to Dry Storage, 2013 Shutdown and DOE Acceptance Starting in 2021

Decommissioning Alternative SAFSTOR
Spent Fuel Alternative Dry

License Status Extension
Fuel Pool Systems Modified
DOE Acceptance Date: 1/1/2021

Unit 1 Shut Down Date 7/1/2013

2012 Dollars in Thousands

No.	Item Description	Labor	Equipment	Disposal	Other	Contingency	Total
Decon Pd 9	Site Decontamination						
Distributed							
	9.01 Decon Containment Building	\$1,600	\$733	\$2,432	\$0	\$1,096	\$5,860
	9.02 Decon Auxiliary Building	\$128	\$155	\$217	\$0	\$115	\$615
	9.03 Decon Technical Support Building	\$19	\$23	\$18	\$0	\$14	\$74
	9.04 Decon Decontamination Building	\$9	\$4	\$20	\$0	\$7	\$40
	9.05 Decon Fuel Handling Building	\$811	\$495	\$806	\$0	\$486	\$2,598
	9.06 Remediate Contaminated Soil	\$34	\$376	\$2,421	\$0	\$651	\$3,483
	9.07 Contaminated Roof Disposal	\$43	\$6	\$160	\$0	\$48	\$257
	9.08 Segment, Package and Dispose of Contaminated Decon Equipment and Tooling	\$21	\$0	\$91	\$0	\$26	\$138
	9.09 Final Status Survey for Structures	\$3,785	\$700	\$0	\$1,265	\$1,221	\$6,971
	9.10 Final Status Survey for Land Areas	\$5,458	\$403	\$0	\$0	\$1,348	\$7,209
	9.11 Prepare Final Report of Dismantling Program	\$87	\$2	\$0	\$0	\$20	\$109
Distributed	Subtotal	\$11,995	\$2,897	\$6,165	\$1,265	\$5,032	\$27,354
Undistributed							
	1.01 Utility Staff	\$8,910	\$0	\$0	\$0	\$1,158	\$10,068
	1.02 Utility Staff HP Supplies	\$0	\$733	\$0	\$0	\$110	\$843
	1.03 Security Guard Force	\$735	\$0	\$0	\$0	\$110	\$845
	1.04 Insurance	\$0	\$0	\$0	\$120	\$18	\$138
	1.05 NRC Decommissioning Fees	\$0	\$0	\$0	\$408	\$61	\$469
	1.06 Materials and Services	\$0	\$622	\$0	\$0	\$93	\$716
	1.07 DAW Disposal	\$0	\$0	\$104	\$0	\$16	\$120
	1.08 Energy	\$0	\$0	\$0	\$336	\$50	\$386
	1.09 Decommissioning General Contractor Staff	\$17,168	\$0	\$0	\$0	\$2,232	\$19,400
	1.10 DGC HP Supplies	\$0	\$626	\$0	\$0	\$94	\$719
Undistributed	Subtotal	\$26,813	\$1,981	\$104	\$864	\$3,942	\$33,704
Decon Pd 9	Subtotal	\$38,808	\$4,878	\$6,269	\$2,129	\$8,974	\$61,058
A. License Termination	Subtotal	\$275,899	\$43,906	\$46,939	\$92,913	\$73,180	\$532,839

Kewaunee SAFSTOR with Expedited Transfer to Dry Storage, 2013 Shutdown and DOE Acceptance Starting in 2021

Decommissioning Alternative SAFSTOR
Spent Fuel Alternative Dry

License Status Extension Unit 1 Shut Down Date 7/1/2013
Fuel Pool Systems Modified
DOE Acceptance Date: 1/1/2021

2012 Dollars in Thousands

No.	Item Description	Labor	Equipment	Disposal	Other	Contingency	Total
<u>B. Spent Fuel</u>							
SNF Pd 1	Spent Fuel Planning, Cooling and Transfer to Dry Storage						
Distributed	Design & Construct ISFSI Expansion, Transfer Fuel to Dry Storage, Canister Costs, Top Nozzle Repairs, Vendor Oversight, Spent Fuel Pool Support System Mods, SF Security Sys Mods, Beyond Design Basis Mods						
Distributed	Subtotal	\$4,887	\$5,040	\$0	\$47,330	\$2,043	\$59,299
Undistributed							
	2.01 Utility Spent Fuel Staff	\$3,737	\$0	\$0	\$0	\$486	\$4,223
	2.02 Utility Staff HP Supplies	\$0	\$680	\$0	\$0	\$102	\$782
	2.03 Fuel Pool Maintenance and Operation Staff	\$6,090	\$0	\$0	\$0	\$792	\$6,882
	2.05 Security Guard Force	\$12,259	\$0	\$0	\$0	\$1,839	\$14,097
	2.06 Insurance	\$0	\$0	\$0	\$1,383	\$207	\$1,591
	2.07 Spent Fuel Fees and Permits	\$0	\$0	\$0	\$5,630	\$845	\$6,475
	2.08 Energy	\$0	\$0	\$0	\$2,885	\$433	\$3,317
	2.09 Materials and Services	\$0	\$1,838	\$0	\$0	\$276	\$2,114
	2.10 Spent Fuel Maintenance	\$0	\$0	\$0	\$826	\$124	\$950
	2.12 Severance	\$3,038	\$0	\$0	\$0	\$456	\$3,494
Undistributed	Subtotal	\$25,124	\$2,518	\$0	\$10,724	\$5,560	\$43,925
SNF Pd 1	Subtotal	\$30,011	\$7,558	\$0	\$58,054	\$7,603	\$103,224

Kewaunee SAFSTOR with Expedited Transfer to Dry Storage, 2013 Shutdown and DOE Acceptance Starting in 2021

Decommissioning Alternative SAFSTOR
Spent Fuel Alternative Dry

License Status Extension Unit 1 Shut Down Date 7/1/2013
Fuel Pool Systems Modified
DOE Acceptance Date: 1/1/2021

2012 Dollars in Thousands

No.	Item Description	Labor	Equipment	Disposal	Other	Contingency	Total
SNF Pd 2	Dry Storage During Completion SAFSTOR Preparations						
Undistributed							
	2.01 Utility Spent Fuel Staff	\$846	\$0	\$0	\$0	\$110	\$956
	2.02 Utility Staff HP Supplies	\$0	\$59	\$0	\$0	\$9	\$68
	2.04 Additional Staff for Spent Fuel Shipping	\$5	\$0	\$0	\$0	\$1	\$6
	2.05 Security Guard Force	\$900	\$0	\$0	\$0	\$135	\$1,035
	2.06 Insurance	\$0	\$0	\$0	\$118	\$18	\$136
	2.07 Spent Fuel Fees and Permits	\$0	\$0	\$0	\$219	\$33	\$251
	2.08 Energy	\$0	\$0	\$0	\$14	\$2	\$16
	2.09 Materials and Services	\$0	\$139	\$0	\$0	\$21	\$160
	2.10 Spent Fuel Maintenance	\$0	\$0	\$0	\$45	\$7	\$52
Undistributed	Subtotal	\$1,751	\$198	\$0	\$396	\$336	\$2,680
SNF Pd 2	Subtotal	\$1,751	\$198	\$0	\$396	\$336	\$2,680

Kewaunee SAFSTOR with Expedited Transfer to Dry Storage, 2013 Shutdown and DOE Acceptance Starting in 2021

Decommissioning Alternative SAFSTOR
Spent Fuel Alternative Dry

License Status Extension Unit 1 Shut Down Date 7/1/2013
Fuel Pool Systems Modified
DOE Acceptance Date: 1/1/2021

2012 Dollars in Thousands

No.	Item Description	Labor	Equipment	Disposal	Other	Contingency	Total
SNF Pd 3	Dry Storage During Dormancy						
Distributed							
	12.01 Preparation and NRC Review of License Termination Plan	\$87	\$0	\$0	\$141	\$30	\$258
	12.02 Verification Survey of Horizontal Storage Modules	\$25	\$18	\$0	\$0	\$6	\$49
	12.03 Preparation of Final Report on Decommissioning and NRC Review	\$87	\$0	\$0	\$141	\$30	\$258
Distributed	Subtotal	\$199	\$18	\$0	\$282	\$66	\$565
Undistributed							
	2.01 Utility Spent Fuel Staff	\$46,322	\$0	\$0	\$0	\$6,022	\$52,344
	2.02 Utility Staff HP Supplies	\$0	\$3,723	\$0	\$0	\$558	\$4,281
	2.04 Additional Staff for Spent Fuel Shipping	\$336	\$0	\$0	\$0	\$44	\$380
	2.05 Security Guard Force	\$57,068	\$0	\$0	\$0	\$8,560	\$65,628
	2.06 Insurance	\$0	\$0	\$0	\$7,490	\$1,123	\$8,613
	2.07 Spent Fuel Fees and Permits	\$0	\$0	\$0	\$13,868	\$2,080	\$15,949
	2.08 Energy	\$0	\$0	\$0	\$8,487	\$1,273	\$9,760
	2.09 Materials and Services	\$0	\$8,350	\$0	\$0	\$1,252	\$9,602
	2.10 Spent Fuel Maintenance	\$0	\$0	\$0	\$2,885	\$433	\$3,318
Undistributed	Subtotal	\$103,726	\$12,073	\$0	\$32,730	\$21,345	\$169,875
SNF Pd 3	Subtotal	\$103,925	\$12,091	\$0	\$33,012	\$21,411	\$170,440

Kewaunee SAFSTOR with Expedited Transfer to Dry Storage, 2013 Shutdown and DOE Acceptance Starting in 2021

Decommissioning Alternative SAFSTOR
Spent Fuel Alternative Dry

License Status Extension Unit 1 Shut Down Date 7/1/2013
Fuel Pool Systems Modified
DOE Acceptance Date: 1/1/2021

2012 Dollars in Thousands							
No.	Item Description	Labor	Equipment	Disposal	Other	Contingency	Total
SNF Pd 4	ISFSI Demolition						
Distributed							
	13.01 Clean Demolition of ISFSI	\$835	\$465	\$316	\$0	\$263	\$1,879
Distributed	Subtotal	\$835	\$465	\$316	\$0	\$263	\$1,879
Undistributed							
	2.01 Utility Spent Fuel Staff	\$155	\$0	\$0	\$0	\$20	\$175
	2.08 Energy	\$0	\$0	\$0	\$7	\$1	\$8
	2.09 Materials and Services	\$0	\$9	\$0	\$0	\$1	\$10
Undistributed	Subtotal	\$155	\$9	\$0	\$7	\$22	\$193
SNF Pd 4	Subtotal	\$990	\$474	\$316	\$7	\$285	\$2,072
B. Spent Fuel	Subtotal	\$136,677	\$20,321	\$316	\$91,469	\$29,635	\$278,416

Kewaunee SAFSTOR with Expedited Transfer to Dry Storage, 2013 Shutdown and DOE Acceptance Starting in 2021

Decommissioning Alternative SAFSTOR
Spent Fuel Alternative Dry

License Status Extension Unit 1 Shut Down Date 7/1/2013
Fuel Pool Systems Modified
DOE Acceptance Date: 1/1/2021

2012 Dollars in Thousands							
No.	Item Description	Labor	Equipment	Disposal	Other	Contingency	Total
<u>C. Greenfield</u>							
Grn Pd 1	Clean Building Demolition						
Distributed							
	14.01 Procure Demolition Equipment	\$0	\$1,287	\$0	\$0	\$296	\$1,583
	14.02 Demolish Non-Essential Structures	\$1,446	\$1,874	\$165	\$0	\$644	\$4,129
	14.03 Demolish Remaining Structures	\$1,109	\$1,511	\$152	\$0	\$514	\$3,286
	14.04 Demolish Turbine Building	\$1,015	\$331	\$118	\$0	\$226	\$1,690
	14.05 Demolish Fuel Handling Building	\$439	\$157	\$78	\$0	\$105	\$778
	14.06 Demolish Auxiliary Building	\$918	\$312	\$173	\$0	\$217	\$1,620
	14.07 Demolish Decontamination Building	\$22	\$7	\$2	\$0	\$5	\$35
	14.08 Demolish Steam Generator Storage Building	\$35	\$10	\$3	\$0	\$7	\$55
	14.09 Demolish Containment Building	\$1,922	\$416	\$206	\$0	\$376	\$2,921
Distributed	Subtotal	\$6,906	\$5,905	\$897	\$0	\$2,390	\$16,097
Undistributed							
	3.01 Utility Staff	\$2,737	\$0	\$0	\$0	\$356	\$3,093
	3.02 Security Guard Force	\$334	\$0	\$0	\$0	\$50	\$384
	3.03 Decommissioning General Contractor Staff	\$9,575	\$0	\$0	\$0	\$1,245	\$10,820
	3.04 Energy	\$0	\$0	\$0	\$339	\$51	\$390
	3.05 Insurance	\$0	\$0	\$0	\$37	\$6	\$43
Undistributed	Subtotal	\$12,646	\$0	\$0	\$376	\$1,708	\$14,730
Grn Pd 1	Subtotal	\$19,552	\$5,905	\$897	\$376	\$4,098	\$30,827

Kewaunee SAFSTOR with Expedited Transfer to Dry Storage, 2013 Shutdown and DOE Acceptance Starting in 2021

Decommissioning Alternative SAFSTOR
Spent Fuel Alternative Dry

License Status Extension
Fuel Pool Systems Modified
DOE Acceptance Date: 1/1/2021

Unit 1 Shut Down Date 7/1/2013

2012 Dollars in Thousands							
No.	Item Description	Labor	Equipment	Disposal	Other	Contingency	Total
Grn Pd 2	Site Restoration						
Distributed							
	15.01 Procure Site Restoration Equipment	\$0	\$115	\$0	\$0	\$27	\$142
	15.03 Finish Grading and Re-Vegetate Site	\$402	\$305	\$0	\$0	\$122	\$829
Distributed	Subtotal	\$402	\$420	\$0	\$0	\$149	\$971
Undistributed							
	3.01 Utility Staff	\$585	\$0	\$0	\$0	\$76	\$661
	3.02 Security Guard Force	\$125	\$0	\$0	\$0	\$19	\$144
	3.03 Decommissioning General Contractor Staff	\$1,804	\$0	\$0	\$0	\$234	\$2,038
	3.04 Energy	\$0	\$0	\$0	\$127	\$19	\$146
	3.05 Insurance	\$0	\$0	\$0	\$14	\$2	\$16
Undistributed	Subtotal	\$2,514	\$0	\$0	\$141	\$350	\$3,005
Grn Pd 2	Subtotal	\$2,916	\$420	\$0	\$141	\$499	\$3,976
C. Greenfield	Subtotal	\$22,468	\$6,325	\$897	\$517	\$4,597	\$34,803
Scenario No. 2	Total	\$435,044	\$70,552	\$48,152	\$184,899	\$107,412	\$846,058

Appendix E
Annual Cash Flow Table

Replaced with

Appendix E
Revised Annual Cash Flow Table

Kewaunee Annual Cost By Account

SAFSTOR - 2013 Shutdown, Expedited Dry Storage Transfer, DOE Acceptance in 2021

Unit No: Unit 1

2012 Dollars in Thousands

Year	License Termination	Spent Fuel	Greenfield	Total
2013	\$27,077	\$11,189	\$0	\$38,266
2014	\$72,590	\$33,122	\$0	\$105,712
2015	\$4,485	\$29,486	\$0	\$33,971
2016	\$6,052	\$28,392	\$0	\$34,444
2017	\$14,911	\$7,134	\$0	\$22,045
2018	\$1,714	\$5,404	\$0	\$7,118
2019	\$1,714	\$5,404	\$0	\$7,118
2020	\$1,714	\$5,404	\$0	\$7,118
2021	\$1,714	\$5,404	\$0	\$7,118
2022	\$1,714	\$5,404	\$0	\$7,118
2023	\$1,714	\$5,404	\$0	\$7,118
2024	\$1,714	\$5,404	\$0	\$7,118
2025	\$1,714	\$5,404	\$0	\$7,118
2026	\$1,714	\$5,404	\$0	\$7,118
2027	\$1,714	\$5,404	\$0	\$7,118
2028	\$1,714	\$5,404	\$0	\$7,118
2029	\$1,714	\$5,404	\$0	\$7,118
2030	\$1,714	\$5,404	\$0	\$7,118
2031	\$1,714	\$5,404	\$0	\$7,118
2032	\$1,714	\$5,404	\$0	\$7,118
2033	\$2,517	\$5,404	\$0	\$7,921
2034	\$1,714	\$5,404	\$0	\$7,118
2035	\$1,714	\$5,404	\$0	\$7,118
2036	\$1,714	\$5,404	\$0	\$7,118
2037	\$1,714	\$5,404	\$0	\$7,118
2038	\$1,714	\$5,404	\$0	\$7,118
2039	\$1,714	\$5,404	\$0	\$7,118
2040	\$1,714	\$5,404	\$0	\$7,118
2041	\$1,714	\$5,404	\$0	\$7,118
2042	\$1,714	\$5,404	\$0	\$7,118
2043	\$1,714	\$5,404	\$0	\$7,118
2044	\$1,714	\$5,404	\$0	\$7,118
2045	\$1,714	\$5,404	\$0	\$7,118
2046	\$1,714	\$5,404	\$0	\$7,118
2047	\$1,714	\$5,532	\$0	\$7,246
2048	\$1,726	\$4,773	\$0	\$6,499
2049	\$1,731	\$0	\$0	\$1,731

Kewaunee Annual Cost By Account

SAFSTOR - 2013 Shutdown, Expedited Dry Storage Transfer, DOE Acceptance in 2021

Unit No: Unit 1

2012 Dollars in Thousands

Year	License Termination	Spent Fuel	Greenfield	Total
2050	\$1,731	\$0	\$0	\$1,731
2051	\$1,731	\$0	\$0	\$1,731
2052	\$1,731	\$0	\$0	\$1,731
2053	\$1,731	\$0	\$0	\$1,731
2054	\$1,731	\$0	\$0	\$1,731
2055	\$1,731	\$0	\$0	\$1,731
2056	\$1,731	\$0	\$0	\$1,731
2057	\$1,731	\$0	\$0	\$1,731
2058	\$1,731	\$0	\$0	\$1,731
2059	\$1,731	\$0	\$0	\$1,731
2060	\$1,731	\$0	\$0	\$1,731
2061	\$1,731	\$0	\$0	\$1,731
2062	\$1,731	\$0	\$0	\$1,731
2063	\$1,731	\$0	\$0	\$1,731
2064	\$1,731	\$0	\$0	\$1,731
2065	\$1,731	\$0	\$0	\$1,731
2066	\$1,731	\$0	\$0	\$1,731
2067	\$12,697	\$0	\$0	\$12,697
2068	\$22,848	\$0	\$0	\$22,848
2069	\$44,312	\$0	\$0	\$44,312
2070	\$101,262	\$0	\$0	\$101,262
2071	\$92,407	\$0	\$0	\$92,407
2072	\$48,975	\$0	\$11,158	\$60,134
2073	\$109	\$2,072	\$23,645	\$25,826
	\$532,839	\$278,416	\$34,803	\$846,058