~~CONFIDENTIAL COMMERCIAL AND FINANCIAL INFORMATION TO BE WITHHELD FROM PUBLIC DISCLOSURE PURSUANT TO 10 CFR 2.390 & 10 CFR 9.17~~

ENERGY*SOLUTIONS*

May 13, 2021 ES-2021-002

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

Subject: Notification of Amended Post-Shutdown Decommissioning Activities Report (Revision 2) for Kewaunee Power Station

Kewaunee Power Station
NRC Docket No. 50-305
NRC License No. DPR-43

Reference: Letter from Stoddard, D.G. (Dominion Energy Kewaunee, Inc.), and Robuck, K. W. (Energy*Solutions* LLC), "Application for Order Approving Transfer of Control of KPS License and Conforming License Amendments," dated May 10, 2021.

Dominion Energy Kewaunee, Inc. (DEK) and Energy*Solutions*, LLC, (Energy*Solutions*) submitted an "Application for Order Approving Transfer of Control of KPS License and Conforming License Amendments" for Kewaunee Power Station (KPS) to the U. S. Nuclear Regulatory Commission (NRC) for review in a letter dated May 10, 2021 (Reference) (the "Application").

This letter is provided to notify the NRC of a schedule change in the Post-Shutdown Decommissioning Activities Report in accordance with 10 CFR 50.82, "Termination of license," paragraph (a)(7). The intended change is to accelerate the decommissioning schedule for KPS following approval of the Application and transfer of control of the KPS license pursuant to the terms set forth in the Application. The proposed amended Post-Shutdown Decommissioning Activities Report, Revision 2 (the "PSDAR"), provides financial and planning information to support the Application. The PSDAR is to be made effective upon implementation of the transfer of control of the License.

Attachment 1 provides PSDAR. The enclosures of Attachment 1 provide detailed cost and schedule information. Enclosure 1A of Attachment 1 contains confidential commercial and financial information. Energy*Solutions* requests that Enclosure 1A be withheld from public disclosure pursuant to 10 CFR 2.390, as described in the Affidavit provided in Attachment 2. Enclosure 1B of Attachment 1 is suitable for public disclosure.

A001

NRR

UPON SEPARATION OF ATTACHMENT 1, ENCLOSURE 1A,
THIS LETTER IS DECONTROLLED

In accordance with 10 CFR 50.91(b)(1), a copy of this submittal has been sent to the State of Wisconsin.

There are no regulatory commitments made in this submittal.

If the NRC has any questions, please contact Gerard P. van Noordennen, Senior Vice President Regulatory Affairs, Energy*Solutions*, LLC. at 860-462-9707. Please also include the following on the distribution list for all correspondence related to the PSDAR:

For DEK:

Daniel G. Stoddard
President and Chief Nuclear Officer
Dominion Energy Kewaunee, Inc.
5000 Dominion Blvd.
Glen Allen, VA 23060
Email: daniel.g.stoddard@dominionenergy.com

William S. Blair
General Counsel
Dominion Energy Kewaunee, Inc.
120 Tredegar St.
Richmond, VA 23219
Email: william.s.blair@dominionenergy.com

For Energy*Solutions*:

Kenneth W. Robuck
President and Chief Executive Officer
Energy*Solutions*, LLC
121 West Trade Street, Suite 2700
Charlotte, North Carolina 28202
Email: kwrobuck@energysolutions.com

Russell G. Workman
General Counsel and Secretary
Energy*Solutions*, LLC
299 South Main Street, Suite 1700
Salt Lake City, UT 84111
E-mail: rgworkman@energysolutions.com

Sincerely,

Gerard P. Van Noordennen

Gerard P. Van Noordennen
May 13 2021 2:45 PM

Gerard van Noordennen
Senior Vice President Regulatory Affairs
Energy*Solutions*, LLC

Attachments:

1. Kewaunee Power Station Post-Shutdown Decommissioning Activities Report, Revision 2 (Enclosure 1A contains CONFIDENTIAL COMMERCIAL INFORMATION)
2. 10 CFR 2.390 Affidavit

Cc: w/ Enclosures

Mr. Karl Sturzebecher
NRC Project Manager- Kewaunee Power Station
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

NRC Region III Administrator
U.S. Nuclear Regulatory Commission
2443 Warrenville Road, Suite 210
Lisle, Illinois 60532-4352

Cc: w/o Attachment 1, Enclosure 1A

Mr. Jeff Kitsembel
Division of Energy Regulation & Analysis
Public Service Commission of Wisconsin
P.O. Box 7854
Madison, WI 53707-7854

ATTACHMENT 2

10 CFR 2.390 AFFIDAVIT

KEWAUNEE POWER STATION

NRC POSSESSION ONLY LICENSE NO. DPR-43

10 CFR 2.390
AFFIDAVIT OF RUSSELL G. WORKMAN

I, Russell G. Workman, General Counsel of Energy*Solutions*, LLC, state that:

1. I am authorized to execute this affidavit on behalf of Energy*Solutions*, LLC (Energy*Solutions*).

2. Energy*Solutions* is providing information in support of the above-described "Post-Shutdown Decommissioning Activities Report" (PSDAR). Enclosure 1A of the PSDAR contains confidential commercial and financial information, including proprietary aspects to the decommissioning of Kewaunee Power Station ("KPS"), belonging to Energy*Solutions*, that should be held in confidence by the NRC pursuant to the policy reflected in 10 CFR 2.390(a)(4) and 10 CFR 9.17(a)(4), because:

a. This information is and has been held in confidence by Energy*Solutions*, its affiliates and contractors, and is the subject of confidentiality obligations owed by Dominion Energy Kewaunee, Inc., as well as their affiliates and contractors.

b. This information is of a type that is held in confidence by Energy*Solutions* and Dominion Energy Kewaunee, Inc., and their affiliates and contractors, and there is a rational basis for doing so because the information contains sensitive trade secret or financial information concerning the decommissioning of KPS.

c. This information is being transmitted to the NRC in confidence.

d. This information is not available in public sources and could not be gathered readily from other publicly available information.

e. Public disclosure of this information would create substantial harm to the competitive position of Energy*Solutions* and its affiliates by disclosing unique decommissioning analyses, including approaches to decommissioning developed by Energy*Solutions* at considerable time and expense, to other parties whose commercial interests may be adverse to those of Energy*Solutions*.

Accordingly, Energy*Solutions* requests that Enclosure 1A to the "Post-Shutdown Decommissioning Activities Report" be withheld from public disclosure pursuant to 10 CFR 2.390(a)(4) and 9.17(a)(4).

Energy*Solutions*, LLC

Russell G. Workman
General Counsel

STATE OF UTAH

COUNTY OF SALT LAKE

Subscribed and sworn to me, a Notary Public, in and for the County and State above named, this 12 day of May.

My Commission Expires: 9/5/21

Notary Public - State of Utah
JILL WADSWORTH
Commission #696798
My Commission Expires
September 5, 2021

ATTACHMENT 1

POST-SHUTDOWN DECOMMISSIONING ACTIVITIES REPORT

REVISION 2

KEWAUNEE POWER STATION

NRC LICENSE NO. DPR-73

Kewaunee Power Station

Post-Shutdown Decommissioning Activities Report

Revision 2

May 2021

Kewaunee Power Station Post-Shutdown Decommissioning Activities Report

Table of Contents

List of Tables and Figures

Enclosures

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
DSAR	Defueled Safety Analysis Report
DSC	Dry Storage Canister
GEIS	Generic Environmental Impact Statement (NUREG-0586)
Grn Pd	Site Restoration Period
GTCC	Greater than Class C
IFMP	Irradiated Fuel Management Plan
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
WDNR	Wisconsin Department of Natural Resources
WPDES	Wisconsin Pollution Discharge Elimination System

Kewaunee Power Station Post-Shutdown Decommissioning Activities Report

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 Kewaunee Solutions, Inc. ("Kewaunee Solutions") Post-Shutdown Decommissioning Activities Report (PSDAR) for Kewaunee Power Station ("KPS"). This revision of the PSDAR reflects an accelerated decommissioning schedule for KPS, consistent with the application requesting NRC consent to the transfer of control of Renewed Facility Operating License No. DPR-43 for KPS ("License") from DEK's current parent entity, Dominion Nuclear Projects, Inc. ("Dominion") to Energy*Solutions,* LLC. ("Energy*Solutions*") (the "Application") (Reference 2). The transfer of control is to occur pursuant to the May 6, 2021 Stock Purchase Agreement by and between Energy*Solutions* and Dominion ("Purchase Agreement"), which is enclosed with the Application. Following the closing of the transaction described in the Application (the "Closing"), Energy*Solutions* will acquire DEK and rename it to Kewaunee Solutions, Inc. Thus, the same corporate entity will remain the NRC licensee following the transfer of control, but it will operate under a new name, and it will be a direct, wholly owned subsidiary of Energy*Solutions*.

As this PSDAR reflects an accelerated decommissioning approach for KPS following the transfer of control of the KPS License to Energy*Solutions*, this PSDAR shall be made effective following issuance of the Order approving the license transfer. Until the implementation of the transfer of control, the current DEK PSDAR (Reference 3) will remain in effect.

This PSDAR contains the following:

1. A description of the planned decommissioning activities along with a schedule for their accomplishment, including certain related updates as to the plan for managing spent fuel.
2. A site-specific decommissioning cost analysis,[1] 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 appropriate previously issued environmental impact statements.

[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 has submitted a document called a "site-specific decommissioning cost analysis" to meet these regulations.

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), Kewaunee Solutions 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

KPS 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.

KPS is a single unit site with supporting facilities. The nuclear steam supply 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 at permanent cessation of operations was licensed to operate to a maximum power output of 1772 megawatts-thermal (MWt). KPS has an on-site Independent Spent Fuel Storage Installation ("ISFSI"). The transfer of all spent fuel to the ISFSI was completed in 2017.

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
- All Spent Fuel Transferred to the ISFSI June 15, 2017

On October 22, 2012, DEK publicly announced its intention to permanently cease power operations and decommission KPS. By letters dated November 2, 2012 and February 25, 2013 (References 4 and 5), 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 5, KPS was permanently shut down on May 7, 2013. By letter dated May 14, 2013 (Reference 14), DEK submitted a certification of permanent removal of fuel from the reactor vessel, as required by 10 CFR 50.82(a)(1)(ii). By letter dated June 22, 2017, DEK submitted a certification of permanent removal of all spent fuel assemblies from the spent fuel pool ("SFP") (Reference 15).

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 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 the licensee:

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 ("LTP") submitted for NRC approval.

C. Summary of Decommissioning Alternatives

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 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 6). 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.

In addition, 10 CFR 50.82(a)(3) requires decommissioning to be completed within 60 years of cessation of operations.

The decommissioning approach that is currently selected by DEK for KPS is the SAFSTOR method. 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.

However, upon approval of the Application to transfer control of the License, and following completion of all necessary engineering and licensing actions, Kewaunee Solutions will implement a DECON method with the goal of accelerating the decommissioning schedule for KPS.

Within DECON, two basic approaches for executing decontamination and decommissioning were considered: the surgical removal method and the modified bulk material removal method. The surgical removal method minimizes radioactive waste

volumes, but increases exposure to workers, who must spend more time on the decommissioning site working with the radioactive waste. The modified bulk material removal method has become more commonly accepted for decommissioning as it lowers exposure risks to workers and can also lower overall costs for decommissioning. However, this method does generate higher low-level radioactive waste ("LLRW") volumes and related disposal costs. The modified bulk material removal approach to plant decontamination and decommissioning was utilized for estimates, schedules, and waste volumes reported in this PSDAR.

After approval of the Application and transfer of control of the License, Kewaunee Solutions will prepare for accelerated decommissioning. After taking the necessary engineering and licensing actions, Kewaunee Solutions will commence decommissioning of KPS using a DECON method and will complete all activities necessary to terminate the license and release the KPS site. It is anticipated that Kewaunee Solutions will complete decommissioning of KPS and release the KPS site (except for any onsite waste storage facilities) approximately eight and one-half years after the license transfer. Refer to Enclosure 1A, Figure 1A-1 (Confidential), for a detailed Kewaunee Solutions decommissioning schedule.

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, including certain updates to the spent fuel management plan.
- Section III describes the overall decommissioning schedule.
- 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 statements related to decommissioning.

II. DESCRIPTION OF PLANNED DECOMMISSIONING ACTIVITIES

DEK chose the SAFSTOR method to decommission KPS. SAFSTOR is broadly defined in Section I.C of this report.

Following the Closing, Kewaunee Solutions will be the KPS licensee. It will hold title to and ownership of any real estate encompassing the KPS site; any KPS improvements at the site; easements for other portions of the site; and all spent fuel and Greater-Than-Class C ("GTCC") waste. Kewaunee Solutions will assume responsibility for all licensed activities at the KPS site, including responsibility under the license to complete radiological decommissioning pursuant to NRC regulations.

After taking the necessary engineering and licensing actions, Kewaunee Solutions will commence decommissioning of KPS and will complete all activities necessary to terminate the license and release the KPS site (except for any onsite waste storage facilities). It is expected that Kewaunee Solutions will substantially complete decommissioning of KPS and reduce the area covered by the License to the area set aside for storage of spent fuel (i.e., partial Part 50 License termination).

Kewaunee Solutions will, during a brief transition period, ensure continuity of the existing site procedures, currently implemented for the KPS site by DEK, while also establishing new KPS-specific procedures using Kewaunee Solutions project procedures, programs, personnel, and contractors.

The Kewaunee Solutions organization will include an experienced nuclear management team to assure compliance with the requirements of the License and NRC regulations. Kewaunee Solutions will implement a management approach which assures efficient and effective decommissioning and decontamination planning, preparation, and execution, including: a safety conscious work environment; day-to-day industrial safety; radiological protection; radioactive waste handling; an effective corrective action program; performance reporting, monitoring, and metrics; personnel performance; and financial controls.

Kewaunee Solutions will also prepare and execute a LTP and site restoration activities. The LTP will be prepared in accordance with the requirements of 10 CFR 50.82(a)(9) at least two years prior to the anticipated date of license termination. The LTP will include a site characterization, description of remaining dismantling activities, plans for site remediation, updated cost estimate to complete the decommissioning, any associated environmental concerns, designation of the end use of the site, and the procedures for the final radiation survey. The LTP will be developed following the guidance contained

in Regulatory Guide 1.179, "Standard Format and Content of License Termination Plans for Nuclear Power Reactors" (Reference 7). As described in Regulatory Guide 1.179, the LTP will use the guidance contained in NUREG-1575, "Multi-Agency Radiation Survey and Site Investigation Manual ("MARSSIM")" (Reference 8), to develop the final radiological survey plan and survey methods. The use of MARSSIM to develop the final radiological survey plan and survey methods will demonstrate compliance with the requirements 10 CFR Part 20, Subpart E, "Radiological Criteria for License Termination." Once the LTP is approved, the final remediation of the site facilities and services can commence. These activities include, but are not limited to:

- Removal of remaining plant systems, structures and components as they become nonessential to the decommissioning program, or worker health and safety (for example, waste collection and processing systems, electrical power, and ventilation systems).
- Removal of remaining contaminated yard piping and any contaminated soil.
- Remediation and removal of the remaining contaminated equipment and material from the auxiliary and fuel buildings, and any other contaminated facility.

Use of the NUREG-1575 guidance ensures that the surveys are conducted in a manner that provides a high degree of confidence that applicable NRC criteria are satisfied. Once the final survey is complete, the results are provided to the NRC. The NRC will terminate the license if it determines that site remediation has been performed in accordance with the LTP, and that the terminal radiation survey and associated documentation demonstrate that the facility is suitable for release.

Following completion of major decommissioning activities (except for the ISFSI), final site restoration activities will begin. Site restoration will involve the dismantling and disposal of any remaining non-radiological structures. Restored areas of the site will be backfilled, graded and landscaped to support vegetation for erosion control.

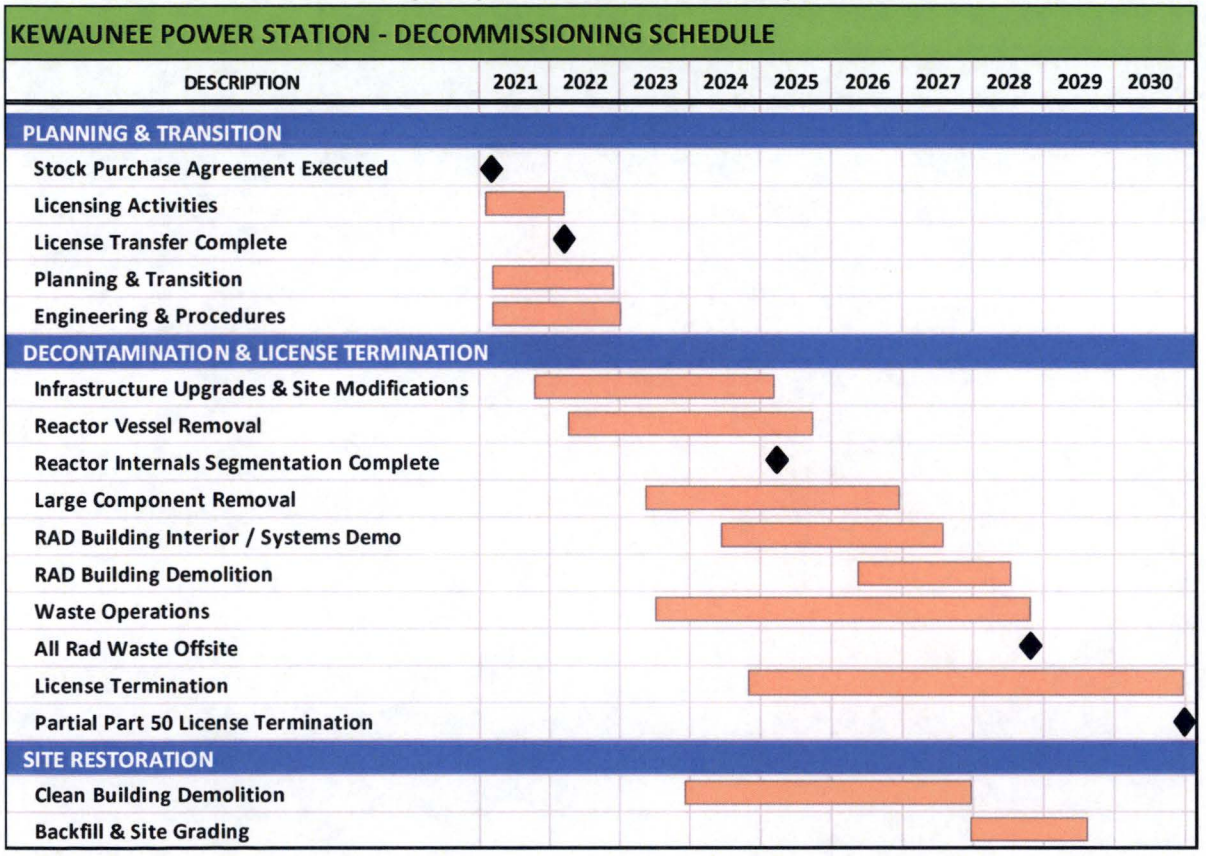
Table 2-1 provides a summary of the current Decommissioning Schedule for KPS. Detailed schedules are provided in Enclosure 1A, Figure 1A (Confidential) and Enclosure 1B, Figure 1B (Non-Confidential).

Since Kewaunee Solutions will likely be required to manage spent fuel at the site for an extended period of time following the completion of decommissioning, an update to the plan for management of spent fuel for the site is included in this section. The spent fuel at KPS is currently stored at the KPS ISFSI and is expected to remain there until possession is transferred to the DOE, currently predicted to commence in 2050. ISFSI Decommissioning is expected to be completed by 2054.

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 the site specific decommissioning activities are bounded by the appropriate previously issued environmental impact statements discussed in Section V.

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

Table 2-1 Decommissioning Schedule
(except ISFSI-related activities)



A. SAFSTOR Discussion

KPS is currently in SAFSTOR, which is the period of time when the facility is maintained in safe storage prior to decontamination and dismantlement activities.

During SAFSTOR, sufficient personnel are 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 are 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 are monitored and maintained.

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

B. Decommissioning Activities (DECON)

Following the closing of the transaction described in the Purchase Agreement, Kewaunee Solutions will begin planning to conduct major decommissioning activities with detailed preparations and procedures. A transition from SAFSTOR to decontamination and dismantlement activities will occur. The required organizational structure will be established including retaining available plant staff and outside resources, as needed.

1. Planning and Transition

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 site characterization. Begin site characterization so that radiological, regulated, and hazardous materials may 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 LTP and other decommissioning licensing documents.
- Obtain necessary environmental permits to support the work
- 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.
- Modify the containment structure as needed to permit removal of large components.
- Finalize radioactive material inventory.

2. Decontamination and License Termination

During this 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.E 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. (Kewaunee Solutions 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 remaining portions of the reactor coolant pumps.
- Submit LTP for NRC review and approval.
- Decontaminate or remove site buildings, structures, soils and land areas, and identify, package, and send for disposal remaining LLRW and hazardous materials.
- Decontaminate or remove remaining site buildings and facilities having residual contaminants. Segment, package and dispose of remaining LLRW 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 and demolition period is considered complete after NRC has approved the LTP, final status surveys and reduced the facility license to the ISFSI area.

3. Site Restoration

Any remaining buildings, structures, and other facilities which are not radiologically contaminated, such as the warehouse, training building, and administrative buildings, will be dismantled as part of clean building demolition.

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.

C. Spent Fuel Management

Following core off-load, spent fuel was stored in the SFP until it was transferred to the KPS ISFSI. All the spent fuel currently maintained at KPS is located in the KPS ISFSI. Consistent with the DEK April 25, 2014 Irradiated Fuel Management Plan (IFMP) (Reference 9), this spent fuel will continue to be maintained at the KPS ISFSI until acceptance by DOE. The 2014 IFMP predicted the DOE would start accepting spent fuel in 2021. As described in Section III, it is now predicted that DOE will start accepting spent fuel in 2050 and all fuel will be removed from the KPS ISFSI by 2052. This PSDAR therefore notifies the NRC of the change in the expected timeline for DOE acceptance compared to the 2014 IFMP.

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. 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.

After DOE acceptance of the spent fuel, any radiological decommissioning associated with the ISFSI would be conducted under the requirements of the Part 50 License or Part 72 general license, as applicable. As a generally licensed installation, the ISFSI will be included in the LTP.

The projected costs of managing spent fuel are summarized in Table 4-1 with a corresponding detailed discussion included in Enclosure 1A of this report. Table 4-1 and Table 1A-1 of Enclosure 1A incorporate additional costs expected to be incurred by

Kewanee Solutions related to the extended period of storage of spent fuel until acceptance by DOE.

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 remaining portions of the reactor coolant 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 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. The segments that are GTCC, if any, 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, and spent fuel bridge crane. The dismantling of the containment structure would be undertaken as part of the reactor building demolition.

2. Turbine Building 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 is achieved through advanced vessel segmentation techniques that minimize the time personnel are near radioactive structures, systems, and components, and the use of robotics where appropriate to aid in dismantlement.

The second objective is to separate as much clean material as possible, thereby permitting non-radiological demolition and disposal and minimizing the quantities of material that must be disposed of by burial as radioactive waste. 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.

LLRW 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 LLRW disposal facility.

Contaminated concrete and structural steel components will be 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 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 volume reduction, and packaging for shipment to a processing facility or to a LLRW disposal facility, as necessary.

Buried and imbedded contaminated components (e.g., piping, drains, etc.) will be decontaminated in place or excavated and disposed. Appropriate 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 LLRW will be disposed of at a licensed disposal site such as the *EnergySolutions* facility located in Clive, Utah. If other licensed LLRW facilities become available in the future, Kewaunee Solutions 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, surveys will be conducted to maintain the site characterization current and ensure that decommissioning activities are adjusted accordingly.
An activation analysis 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 Part 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 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 in excess of regulatory thresholds 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

KPS has been in SAFSTOR since its permanent shutdown and defueling. Upon the transfer of control of the Renewed Facility Operating License, and completion of appropriate engineering and licensing actions, Kewaunee Solutions plans to transition to DECON and accelerate the decommissioning schedule. Kewaunee Solutions' goal will be to complete the decontamination and dismantlement, site restoration, and release of the KPS site (except for any onsite waste storage facilities) approximately eight and one-half years after the license transfer.

The schedule provided in Table 2-1 recognizes that spent fuel will be retained in the ISFSI, until possession is transferred to the DOE, currently predicted to occur by 2052.

Enclosure 1A, Figure 1A-1 (Confidential), provides a detailed schedule of decommissioning activities. The schedule begins with the date that the various contractual agreements are signed between the parties and ends with the NRC approval of the partial Part 50 License termination.

IV. ESTIMATE OF EXPECTED DECOMMISSIONING, SPENT FUEL MANAGEMENT, AND SITE RESTORATION 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. A revised summary of the site-specific decommissioning cost analysis and projected cost of managing spent fuel is provided in Table 4-1.

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 10). Energy*Solutions* maintains a proprietary decommissioning cost model based upon the fundamental technical approach established in AIF/NESP-036. The cost model is continuously updated in accordance with regulatory requirements, Energy*Solutions*' actual project experience, and the latest decommissioning industry technologies. The cost model includes elements for estimating distributed (direct costs) and undistributed costs. Distributed costs are activity specific and include planning and preparation costs as well as the decontamination, packaging, disposal, and removal of major components and systems. For example, the segmentation, packaging, and disposal of the reactor internals is a distributed cost. Undistributed costs are typically time dependent costs such as utility and decommissioning contractor staff, property taxes, insurance, regulatory fees and permits, energy costs, security staff, etc. The cost analysis recognizes the present state of KPS, contingency for unknown or uncertain conditions, the availability of low and high level radioactive waste disposal sites, and site remediation requirements.

At the time that operations ceased at KPS, sufficient funds were available in the plant decommissioning fund to complete the planned decommissioning activities.

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, no such activities have been identified.

An updated analysis was developed utilizing site-specific commodity quantities, and currently estimated unit cost factors. The updated cost estimate takes into consideration the new decommissioning execution strategy and the methods and schedule discussed in Section III above. The latest available industry experience (e.g., information from the Zion, La Crosse and TMI-2 projects, and 25 years of experience in planning and engineering for other facilities, including complex decommissioning) was also utilized.

The decommissioning cost estimate for KPS has been summarized in Table 4-1. A detailed cost estimate associated with the decommissioning of KPS is presented in Enclosure 1A, Table 1A-1 "Decommissioning Cost Estimate" (Confidential). In addition, Table 1A-2 presents the "KPS Sinking Fund Analysis" (Confidential). Table 1B-1 of Enclosure 1B presents "KPS Estimated Annual Spending" (Non-Confidential).

The KPS Sinking Fund Analysis demonstrates that adequate funds exist in the NDT to complete the decommissioning of KPS by 2054. The analysis conservatively presumes a starting NDT value of $800M at closing of the transaction described in the Application, to account for potential pre-closing withdrawals. As described in the 2020 decommissioning funding status report for KPS (Reference 17), currently, the NDT has $900M in assets as of December 31, 2020. The KPS Sinking Fund Analysis thereafter conservatively accounts for taxes on unrealized gains up front in the analysis, resulting in approximately $730M being made available for decommissioning upon completion of the transfer of control of KPS to Energy*Solutions*. This amount is sufficient to complete decommissioning of KPS through partial Part 50 license termination, and for decommissioning of the ISFSI after DOE acceptance of the spent fuel and GTCC waste stored in the ISFSI. As discussed further below, management of the ISFSI after partial Part 50 license termination until DOE acceptance is funded by a mix of NDT funds and credited DOE reimbursements.

This PSDAR is not updated for minor changes in anticipated decommissioning costs. However, the status of KPS decommissioning funding will continue to be reported to the NRC in accordance with 10 CFR 50.75(f)(1) and 10 CFR 50.82(a)(8)(v). These reports will include, at a minimum, the assumptions used in the rates of escalation of decommissioning costs and rates of earnings used in funding projections. Additionally, Kewaunee Solutions, in accordance with 10 CFR 50.82(a)(7), will inform the NRC in

writing (with a copy sent to the State of Wisconsin), 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.

Kewaunee Solutions will also include an updated site-specific estimate of remaining decommissioning costs in the LTP in accordance with 10 CFR 50.82(a)(9)(ii)(F).

As demonstrated in the KPS Sinking Fund Analysis in Table 1A-2, the costs of spent fuel management following partial Part 50 license termination are expected to be addressed through decommissioning funds, pursuant to the current DEK May 21, 2014 exemption (Reference 16), and expected reliable reimbursements from DOE. As described in Section V, "Financial Qualifications," of the NRC license transfer application dated May 10, 2021, pursuant to DOE Contract DE-CR01-83NE44429 ("KPS Standard Contract"), DOE has ultimate responsibility for collection and permanent disposal of the spent fuel at KPS, and the NRC staff has concluded that "DOE reimbursement is a reasonable source of additional funding."[2] Per the KPS Sinking Fund Analysis, DOE reimbursements are expected to be utilized for spent fuel management starting in 2031. Reimbursements from the DOE will either be deposited into the NDT or set aside in a separate account dedicated to supporting KPS spent fuel management activities.

In the event that future estimated costs or funding levels change significantly, Kewaunee Solutions will make the necessary adjustments to ensure that sufficient funds remain available for decommissioning and provide notifications to the NRC, as appropriate.

[2] Safety Evaluation Report for the Transfer of Beaver Valley, Davis-Besse, and Perry Nuclear Power Plants (Dec. 2, 2019), at 15 (ADAMS Accession No. ML19326A759).

TABLE 4-1 Decommissioning Cost Summary

Kewaunee Power Station Summary of Decommissioning Costs (thousands of 2021 dollars)	
Description	**Total Cost**
Planning & Transition Direct Costs	8,302
Undistributed Planning & Transition Costs	1,865
PLANNING & TRANSITION	**10,166**
Infrastructure Upgrades & Site Modifications	27,949
Reactor Vessel Removal	43,786
Large Component Removal	11,398
Decontamination & Rad Building Demolition	52,676
Other Direct Decommissioning Activities	56,701
Waste Transportation & Disposal	159,002
Final Status Surveys & License Termination	14,029
Undistributed Decommissioning Costs	200,118
DECONTAMINATION & LICENSE TERMINATION	**565,659**
Clean Building & Site Demolition	25,899
Other Direct Site Restoration Costs	9,296
Undistributed Site Restoration Costs	12,513
SITE RESTORATION	**47,708**
Total Estimated Costs	**623,533**
Contingency	**100,236**
TOTAL DECOMMISSIONING & SITE RESTORATION	**723,769**
ISFSI Security & Operations	141,854
Fuel & GTCC Transfer to DOE	11,137
Undistributed Fuel/GTCC Storage & Transfer Costs	39,404
SPENT NUCLEAR FUEL (SNF)/ GTCC STORAGE & TRANSFER	**192,395**
ISFSI Decommissioning & Demolition	9,195
ISFSI Final Status Surveys & License Termination	1,561
Undistributed Costs for ISFSI Decommissioning	5,345
ISFSI DECOMISSIONING	**16,102**
Total Estimated Costs	**208,497**
Contingency	**22,824**
TOTAL SPENT FUEL MANAGEMENT	**231,321**
GRAND TOTAL	**955,090**

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 6) (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 11) (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 12).

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 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. No changes in land use beyond the site boundary are anticipated during decommissioning. Therefore 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 defueled, the amount of water used by the service water system was much less than during normal operation of the plant. The need for cooling water continued to decrease as the heat load of spent fuel in the SFP declined due to radioactive decay and as spent fuel was relocated from the SFP to the ISFSI. After the plant shutdown, the use of potable water also decreased commensurate with the 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 compared to plant operations. Therefore, the impacts of KPS decommissioning on water use is bounded by the previously issued GEIS.

3. Water Quality – Non-Radiological

Kewaunee Solutions has chosen to decommission the plant using the DECON method upon approval of the license transfer. The WPDES permit, which regulates water discharges from the site, will remain in place, and other WDNR permits will be obtained as necessary to support decommissioning, such as a General Permit to Discharge Construction Site Storm Water Runoff. Programs and processes designed to minimize, detect, and contain spills will be maintained throughout the decommissioning process, and site-specific Erosion Control and Storm Water Management Plans will be developed. 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

Kewaunee Solutions plans to obtain an operating permit issued by the WDNR for air emission sources needed to support decommissioning. If new sources of air emissions are added or changed at the facility to support decommissioning, then the permit will be modified as required. There are many types of decommissioning activities that have the potential to affect air quality. These activities are listed in the GEIS. No activities beyond those listed in the GEIS that could potentially affect air quality are anticipated. Fugitive dust created during demolition activities will be minimized using water sprays. 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. Disturbance of lands beyond the current operational areas of the plant are not anticipated. 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. Kewaunee Solutions does not anticipate conducting activities, including ISFSI operations, 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) is no longer in use. Eliminating use of normal cooling water systems reduces the effects of 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 current list of threatened and endangers species (Reference 18) was reviewed to determine if any additional species were added for Kewaunee County that could be present on site.

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

At some point during decommissioning, any active peregrine falcon nest on the property that will be impacted during decommissioning will be removed or relocated. 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 Part 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.

Kewaunee Solutions has chosen to decommission the plant using the DECON method upon consummation of license transfer, and completion of the necessary engineering and licensing actions. It is expected that the occupational dose required to complete the decommissioning activities at KPS will be within the range of dose estimates (560-1000 person rem) provided for the reference PWR using the DECON 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.

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 was controlled under work procedures designed to minimize the likelihood and consequences of a fuel handling accident during spent fuel transfer to the ISFSI. In addition, emergency plans and procedures will remain in place to protect the health and safety of potentially affected on-site personnel while the possibility of significant radiological releases exists.

The GEIS also considers the possibility of a zircalloy fire in the SFP. All spent fuel has been transferred to the ISFSI and the possibility of a zircalloy fire no longer exists.

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, the impacts of decommissioning on radiological accidents are small and bounded by the GEIS.

10. Occupational Issues

Kewaunee Solutions 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. The occupational hazards and injuries in the GEIS 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 the enclosures 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

SAFSTOR of KPS resulted in negative socioeconomic impacts as compared to plant operations. As KPS transitioned from an operating plant to a shutdown plant and into SAFSTOR, an overall decrease in plant staff occurred. The lost wages of these plant staff resulted in decreases in revenues available to support the local economy and local tax authorities. Some laid-off workers relocated, thus potentially impacting the local cost of housing and availability of public services.

Decommissioning of KPS is expected to result in positive socioeconomic impacts. As KPS transitions from SAFSTOR to a unit undergoing decommissioning, the potential for local employment to support decommissioning operations becomes available. Increases to site staffing levels needed to support decontamination and dismantlement activities is expected to result in an increase in revenues available to support the local economy and local tax authorities.

The GEIS recognizes that these impacts are likely and concluded that the impacts are not destabilizing. Accordingly, 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 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.

Because the activities of the decommissioning plan are similar to activities performed during plant refueling outages, the impact of decommissioning is similar to the impact of a normal refueling outage with respect to environmental justice. There has been little change in the low-income and minority populations in the immediate area of the plant since the SEIS. Therefore, it has been concluded that the impacts of decommissioning KPS on environmental justice are bounded by the SEIS and GEIS and there will be no disproportionate adverse impacts on minority or low income groups as a result of decommissioning KPS. 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. It is expected that most decommissioning activities will be conducted within the plant areas impacted by previous plant operations. DEK has a cultural resources plan in place for land disturbing activities performed outside of the plant area, which Kewaunee Solutions will maintain following the transfer of control. Contractors who perform work activities outside the plant area are briefed to contact the site environmental coordinator if they discover archeological or cultural resources while performing their work activities.

The 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, the impact of decommissioning on aesthetic issues is bounded by the GEIS.

16. Noise

General noise levels during the decommissioning process are not expected to be 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, the impact of decommissioning on noise is bounded by the GEIS.

17. Transportation

The GEIS states that NRC regulations are adequate to protect the public against unreasonable risk from the transportation of radioactive material and that the effects of transportation of radioactive waste on public health and safety are considered to be neither detectable nor destabilizing. The NRC analysis further determined that their consideration of the existing data for decommissioning methods and transportation modes should bound the transportation impacts for all decommissioning options for pressurized water reactors and boiling water reactors.

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 shipments from the plant would be primarily radioactive wastes and non-radioactive wastes associated with dismantlement and disposal of structures, systems and components.

For the decommissioning of KPS, the transportation modes assumed are container removal by rail or truck. The reactor vessel internal components are expected to be transported by truck and rail depending on their waste class. Other highly radioactive wastes will be transported in shielded containers via truck. The major transport mode for waste generated from filtering and demineralization of the reactor coolant system is assumed to require shipment in shielded truck casks. The LLRW requiring controlled disposal are expected to be sent to a waste processor or a LLRW disposal facility by truck, rail and/or barge.

The estimated radioactive waste associated with decommissioning KPS is:

Class A	2,800,000 cubic feet
Class B & C	1,300 cubic feet

It is expected that most of the LLRW containers will be trucked to a nearby rail head and transferred to rail cars for shipment to the disposal facility. This process was successfully used for decommissioning the La Crosse Boiling Water Reactor near La Crosse, Wisconsin. The number and distance of LLRW waste shipments expected to occur during decommissioning are expected to be below the number and distance 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.

Kewaunee Solutions will comply with applicable regulations when shipping radioactive waste, and the NRC has concluded in the GEIS that these regulations are adequate to protect the public against unreasonable risk from transportation of radioactive materials. In addition, shipments of waste from the site are not expected to result in measurable deterioration of affected roads or a destabilizing increase in traffic density.

Therefore, 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 are commitments of resources that result in a loss 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, 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 LTP for KPS will not be developed until approximately two years prior to final site decontamination. At that time, a supplemental environmental report will be submitted as required by 10 CFR 50.82(a)(9). Detailed planning for license termination activities will be performed during DECON. 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 Part 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 Part 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 KPS environmental report at that time (Reference 13), 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.

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 and ALARA.
- 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, 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 6) and the most recent SEIS for KPS (Reference 11), as well as where appropriate the general environmental impact statement for license termination (Reference 12).

1. The postulated impacts associated with the decommissioning method chosen, DECON, 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.
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.

VI. REFERENCES

1. Regulatory Guide 1.185, "Standard Format and Content for Post-Shutdown Decommissioning Activities Report," Revision 1, June 2013.
2. Letter from K. W. Robuck (ES) and D. G. Stoddard (DEK) to NRC Document Control Desk, "Application for Order Approving Transfer of Control of KPS License and Conforming License Amendments," dated May 10, 2021.
3. Kewaunee Power Station, Post-Shutdown Decommissioning Activities Report, Revision 1, dated April 2014.
4. Letter from David A. Heacock (DEK) to NRC Document Control Desk, "Certification of Permanent Cessation of Power Operations," dated November 2, 2012.
5. Letter from D. G. Stoddard (DEK) to NRC Document Control Desk, "Certification of Permanent Cessation of Power Operations," dated February 25, 2013.
6. NUREG-0586, "Final Generic Environmental Impact Statement on Decommissioning of Nuclear Facilities: Supplement 1, Regarding the Decommissioning of Nuclear Power Reactors," October 2002.
7. Regulatory Guide 1.179, "Standard Format and Content of License Termination Plans for Nuclear Power Reactors," Revision 2, July 2019.
8. NUREG-1575, "Multi Agency Radiation Survey and Site Investigation Manual (MARSSIM)," Revision 1, dated August 2000.
9. 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.
10. AIF/NESP-036, "A Guideline for Producing Commercial Nuclear Power Plant Decommissioning Cost Estimates."
11. NUREG-1437, "Generic Environmental Impact Statement for License Renewal of Nuclear Plants, Supplement 40, Regarding Kewaunee Power Station," published August 2010.
12. NUREG-1496, "Generic Environmental Impact Statement in Support of Rulemaking on Radiological Criteria for License Termination of NRC-Licensed Nuclear Facilities," dated July 1997.
13. 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].
14. Letter from D. G. Stoddard (DEK) to Document Control Desk, "Certification of Permanent Removal of Fuel from the Reactor Vessel," dated May 14, 2013.

15. Letter from M.D. Sartain (DEK) to Document Control Desk, "Certification of Permanent Removal of All Spent Fuel Assemblies from the Spent Fuel Pool", dated June 22, 2017.
16. Letter from C. Gratton (NRC) to D. A. Heacock (DEK), "Exemptions from the Requirements of 10 CFR Part 50, Section 50.82(a)(8)(i)(A) and Section 50.75(h)(1)(iv) (TAC NO. MF1438)," dated May 21, 2014.
17. Letter from M. D. Sartain (DEK) to Document Control Desk, "Decommissioning Funding Status Report, Financial Test and Independent Public Accountants' Letter of Attestation," dated March 25, 2021.
18. Wisconsin Department of Natural Resources (2020, November 2), *Natural Heritage Inventory Data*, https://dnr.wi.gov/topic/NHI/Data.asp?tool=county&mode=detail&county=31.

ENCLOSURE 1B

DETAILED COST AND SCHEDULE INFORMATION

(Non-Confidential)

Table 1B-1 Kewaunee Power Station Estimated Annual Spending (thousands of 2021 Dollars)				
Year	License Termination	Spent Fuel Management	Site Restoration	Total
2021	10,878	-		10,878
2022	49,527	7,134	-	56,661
2023	81,911	7,134	-	89,045
2024	85,499	7,134	6,118	98,751
2025	84,525	7,134	11,012	102,671
2026	105,053	7,134	11,527	123,714
2027	107,684	7,134	10,341	125,160
2028	102,934	7,134	10,154	120,223
2029	34,072	7,134	5,464	46,671
2030	6,911	6,214	160	13,285
2031		6,214		6,214
2032		6,214		6,214
2033		6,214		6,214
2034		6,214		6,214
2035		6,214		6,214
2036		6,214		6,214
2037		6,214		6,214
2038		6,214		6,214
2039		6,214		6,214
2040		6,214		6,214
2041		6,214		6,214
2042		6,214		6,214
2043		6,214		6,214
2044		6,214		6,214
2045		6,214		6,214
2046		6,214		6,214
2047		6,214		6,214
2048		6,214		6,214
2049		8,067		8,067
2050		11,962		11,962
2051		12,292		12,292
2052		12,292		12,292
2053		7,232		7,232
2054		4,324		4,324
2055		-		-
Total	668,993	231,321	54,776	955,090

Figure 1B-1

KEWAUNEE POWER STATION - SCHEDULE