

Report on Nuclear Plant Decommissioning

**Pursuant to
Minnesota Statutes, Section 216B.2445**

March 16, 2023

Legislative Report – Generally Required Information

Minnesota Public Utilities Commission
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Minnesota Statutes, Section 216B.2445, subdivision 3, requires the Minnesota Public Utilities Commission (Commission) to report on the costs of decommissioning Minnesota nuclear power plants and related issues within 180 days of the Commission's orders on its periodic review of nuclear decommissioning costs.

Pursuant to Minnesota Statutes, Section 3.197, the Commission estimated costs for preparing this Report are minimal as most of the information contained in this Report is developed in the normal course of business. Special funding was not appropriated for the costs of preparing this Report.

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BACKGROUND

Minnesota Statutes, Section 216B.11, Depreciation Rates and Practices, directs the Minnesota Public Utilities Commission (Commission) to set depreciation, amortization, or depletion rates for utility property which every public utility is required to follow. Commission rules require utilities to file for depreciation certification at least every five years.

Nuclear facilities present the need to plan for very large end-of-life decommissioning costs compared to other types of electric power facilities, due to the costs of handling and removing radioactive plant elements, related equipment, and spent fuel. The Commission first addressed nuclear decommissioning issues independent of normal depreciation methods in its February 26, 1981 Order in Docket No. E-002/D-79-956. In its October 27, 1987 Order in Docket No. E-002/D- 86-604, the Commission determined that future comprehensive reviews of Xcel Energy's decommissioning costs and financial parameters would occur every three years instead of every five years, and the Commission has continued that practice.

In 2011, Minnesota Statutes, Section 216B.2445, was enacted, pertaining specifically to nuclear power plant decommissioning and storage of used nuclear fuel.

Subdivision 1 requires the Commission to evaluate Minnesota government entities' and tribal communities' costs related to storing used nuclear fuel following the cessation of nuclear plant operations. It also requires Xcel Energy to provide costs estimates for storing such fuel in the state for 60, 100, and 200 years after the nuclear plants cease operations.

Subdivision 3 requires the Commission to submit a Report to the Legislature after each periodic review that includes the following:

- 1) an explanation of the commission's funding decisions regarding nuclear decommissioning;
- 2) the progress of the United States Department of Energy to remove from Minnesota spent fuel produced by nuclear generating plants in Minnesota;
- 3) an analysis of the financial and other obligations related to decommissioning and storage of used fuel of the utility holding title to spent nuclear fuel to the state and to host communities, including affected tribal communities; and
- 4) any recommendations to the legislature on legislation or other actions that may be necessary for addressing long-term or indefinite storage costs.

This Report covers the Commission's most recent review of Xcel Energy's nuclear decommissioning accruals, for the period 2022 through 2024, in Docket No. E-002/M-20-855.

The Commission's *Order Approving Decommissioning Study, Decommissioning Accrual, and Taking Other Action*, was issued on August 24, 2022, (2022 Order). The Order is attached to this Report.

Xcel Energy's next full triennial decommissioning plan is due December 1, 2024.

COMMISSION'S FUNDING DECISIONS REGARDING NUCLEAR DECOMMISSIONING

Introduction

The Commission's triennial nuclear decommissioning reviews examine Xcel Energy's decommissioning planning and assumptions and establish accrual rates to be collected in its electric utility rates necessary to fund the post-operation decommissioning costs of its Monticello and Prairie Island nuclear generating plants. All nuclear decommissioning amounts are deposited into a Nuclear Decommissioning Trust Fund (NDT). In addition to the federal Nuclear Regulatory Commission (NRC) requirements related to nuclear decommissioning trusts and investments, the Commission also examines Xcel Energy's NDT's financial parameters, returns and investment safety/risks.

When establishing the accrual amounts to be collected in Xcel Energy's rates, the Commission attempts to arrive at a reasonable cost estimate for decontamination and removal of nuclear facilities at the end of their operating lives and to set an accrual to accumulate funds sufficient to pay those decommissioning costs.

Timeframe for Storage and Removal of On-site Spent Fuel

Due to the delays in the Federal Government's ability to take ownership of the spent nuclear fuel, the Commission, starting in Docket No. E-002/M-11-939, began using a 60-year post-operation assumption for the storage and removal of the spent nuclear fuel. The 2022 Order continued to base the accrual amounts on the 60-year assumption. However, as required by statute, the record also contains analysis of 100- and 200-year assumptions.

Decommissioning Cost Assumptions

The Commission's January 7, 2019 Order in Docket No. E-002/M-17-828 set the January 1 to December 31, 2019 annual decommissioning and the end-of life nuclear fuel accruals to remain at \$14,030,861 and \$2,020,602, respectively. That Order stated that, beginning in 2020, the two accruals changed to \$44,400,000 and \$2,003,526 respectively; however, to reflect changes in assumptions since Xcel Energy's initial filing, in its March 13, 2020, Order in the same docket, the Commission revised the accruals to \$27,418,421 and \$2,087,026, respectively. Finally, in its April 2, 2021, Order approving Xcel Energy's rate case stay-out proposal in Docket No. E-002/M-20-743, the Commission reduced the accruals to \$14,030,861 and \$2,087,026, respectively.

As shown in Table 1, Xcel Energy's current triennial study presented an array of possible decommissioning scenarios for each plant along with their respective accrual, including early shutdown and life extensions, and under two different methods of decommissioning. Under

these scenarios the results ranged from annual accruals of \$234.9 million under the 200-Year SAFSTOR¹ scenario to \$18.8 million under the 42-Year DECON² Scenario that includes the Monticello 10-year License Extension discussed below. Most recently, the Commission’s preferred accrual scenario has been the 60-year DECON scenario which has a \$31.4 million accrual. Xcel Energy noted that the increases since its 2017 triennial study are almost entirely attributable to lower forward-looking expected returns.

Table 1 - Decommissioning Accrual Calculations as of June 30, 2020

Scenario	Total Accrual (\$M)
200-Year Scenario (SAFSTOR)	\$234.9
200-Year Scenario (DECON)	\$181.0
100-Year Scenario (SAFSTOR)	\$147.2
200-Year Scenario Monticello 10 yr License Extension (DECON)	\$135.2
100-Year Scenario (DECON)	\$107.1
100-Year Scenario Monticello 10 yr License Extension (DECON)	\$80.2
60-Year Scenario (SAFSTOR)	\$63.8
42-Year Scenario (SAFSTOR)	\$60.3
60-Year Scenario (DECON)	\$31.4
42-Year Scenario (DECON)	\$25.2
60-Year Scenario Monticello 10 yr License Extension (DECON)	\$21.2
42-Year Scenario Monticello 10 yr License Extension (DECON)	\$18.8

Xcel Energy’s triennial filing noted that, in its 2019 Integrated Resource Plan (2019 IRP)³, the Company sought approval to seek a 20-year license extension for the Monticello plant. However, if the Nuclear Regulatory Commission (NRC) approves the 20-year extension, the Company’s 2019 IRP contemplates Monticello operating for only the first ten years. The Commission’s April 15, 2022 Order in the 2019 IRP granted Xcel Energy’s request to seek the Monticello operating license extension. On January 9, 2023, Xcel Energy filed its Monticello extension request with the NRC.⁴

¹ The Nuclear Regulatory Commission (NRC) defines DECON as, “[a] method of decommissioning in which the equipment, structures, and portions of a facility and site containing radioactive contaminants are removed and safely buried in low-level radioactive waste landfill or decontaminated to a level that permits the property to be released for unrestricted use shortly after cessation of operations.”

² The NRC defines SAFSTOR as, “[a] method of decommissioning in which a nuclear facility is placed and maintained in a condition that allows the facility to be safely stored and subsequently decontaminated (deferred decontamination) to levels that permit release for unrestricted use.”

³ Electricity generated by the Monticello and Prairie Island Nuclear Generating Plants comprise nearly 30% of the electricity used by Xcel Energy’s customers in the upper Midwest. Xcel Energy filed its 2020-2035 resource plan on July 1, 2019 in Docket No. E-002/RP-19-368.

⁴ A copy of the extension request was filed on January 10, 2023, in Docket No. E-999/PR-23-26.

The Department of Commerce reviewed Xcel Energy’s triennial filing and agreed with Xcel Energy’s assumptions and calculations. However, based on the updated information shown in Table 2, the Department of Commerce recommended that the updated \$25.7 million accrual amount for the 60-year DECON scenario be approved. The Department of Commerce also requested that, in reply comments, Xcel Energy provide an updated 2022 accrual proposal that includes the Monticello 10-year extension.

Table 2 - Decommissioning Accrual Calculations as of December 31, 2020

Scenario	Total Accrual (\$M)
42-Yr DECON	\$18.2
60-Yr DECON	\$25.7
100-Yr DECON	\$115.8
200-Yr DECON	\$220.9
42-yr DECON w/ Monti 10-Yr Extension	\$17.0
60-Yr DECON w/ Monti 10-Yr Extension	\$17.9
100-Yr DECON w/ Monti 10-Yr Extension	\$85.8
200-Yr DECON w/ Monti 10-Yr Extension	\$163.0
42-Yr SAFSTOR	\$72.3
60-Yr SAFSTOR	\$76.1
100-Yr SAFSTOR	\$173.2
200-Yr SAFSTOR	\$298.8
42-Yr SAFSTOR-SUPP	\$46.6
60-Yr SAFSTOR-SUPP	\$50.1
100-Yr SAFSTOR-SUPP	\$146.4
200-Yr SAFSTOR-SUPP	\$272.2

As shown in Table 3, Xcel Energy’s updated accrual calculation that incorporates a 10-year Monticello extension reduced the annual accrual amount to \$21,571,110.

Table 3 - Updated Accrual Calculations

Unit	At Current Retirement Years	Monticello 10-Year Extension
Monticello	\$6,932,038	\$1,556,921
Prairie Island 1	\$13,002,996	\$13,002,996
Prairie Island 2	\$7,011,193	\$7,011,193
Total	\$26,946,227	\$21,571,110

In addition to the decommissioning accrual calculation, the triennial study also includes an end-of-life (EOL) nuclear fuel calculation. EOL nuclear fuel relates to any fuel remaining at the time a

plant shuts down. Since the unused fuel cannot be transferred to another facility, Xcel Energy estimates the expected cost of unused fuel at the end of operations and, using a sinking fund, amortizes the expense over the remaining life of each unit.

As shown in Table 4, the estimated EOL amount to be recovered is \$84.9 million which is lower than the \$122.9 million projected in 2017. Xcel Energy attributed the reduction to leveling of \$/MWH through optimization of the multicycle core fuel designs close to end of licensed life, primarily at Prairie Island Unit 2, and lower projected nuclear fuel commodity prices in the future.

Table 4 - End of Life Nuclear Fuel Recovery Amounts

Plant	Book Value
Monticello	\$51,267,783
Prairie Island	\$33,584,742
Total	\$84,852,525

As a result of the anticipated decrease in EOL costs, Xcel Energy proposed an annual EOL accrual of \$714,366.

The Department of Commerce reviewed the EOL nuclear fuel accrual calculations and found them to be reasonable and recommended the \$714,366 accrual be approved.

The Commission’s August 24, 2022 Order in Docket No. E-002/M-20-855 set the annual decommissioning and the end-of life nuclear fuel accruals at \$21,571,110 and \$714,366, respectively, beginning in 2022. The Commission’s decommissioning accrual assumes the Monticello plant will continue operations under a 10-year license extension. While this estimate is less conservative than Xcel Energy’s preferred option, it has potential to provide more immediate relief to ratepayers. The Commission’s Order set a December 1, 2024 due date for the next triennial decommissioning plan.

STATUS OF PROGRESS BY THE UNITED STATES DEPARTMENT OF ENERGY TO REMOVE SPENT NUCLEAR FUEL FROM MINNESOTA

Background on Federal Program for Disposal of Spent Nuclear Fuel

The Nuclear Waste Policy Act (NWPA) of 1982 established a federal program to dispose of spent nuclear fuel and other high-level radioactive wastes. The NWPA set a deadline of January 31, 1998 for the United States Department of Energy (DOE) to begin removal and disposal of spent nuclear fuel and other high-level nuclear waste from commercial nuclear reactors. The NWPA also set out procedures and standards for licensing a selected repository through independent review by the federal Nuclear Regulatory Commission (NRC).

The NWPA established a nuclear waste fund (NWF) to pay for the program, through a one mil (one-tenth of a cent) per kilowatt-hour charge for electricity generated from nuclear plants. DOE entered into contracts with commercial reactor operators to take the waste in exchange for payment of the nuclear waste fees. The NWPA also included provisions intended to ensure that there would be adequate on-site interim storage of spent fuel, including the development of dry cask storage facilities.

By 1986, DOE had studied nine potential nuclear waste repository sites in six states, narrowed the list to three sites, and found Yucca Mountain, Nevada to be the highest-ranking site. In 1987, the NWPA was amended to direct the DOE to consider only the Yucca Mountain site for a permanent repository. In 2002, the DOE Secretary recommended Yucca Mountain for the development of repository, and a joint resolution of Congress affirming the selection was passed into law, over the objections of the state of Nevada.

In 2008, DOE submitted its license application to the NRC for the repository. In 2009, the then Administration announced plans to terminate DOE's Yucca Mountain project and funding related to the project was significantly reduced for both the DOE and NRC.

In 2010, the Administration effectively shut down the Yucca Mountain project, and established a Blue-Ribbon Commission (BRC) to recommend a new approach for the nuclear waste program. The BRC presented its *Report to the United States Secretary of Energy on America's Nuclear Future* in January of 2012, containing specific recommendations to use a consent-based, incremental approach to implementing the federal waste management program and siting disposal facilities.

In January 2013, the DOE responded to the BRC's report and committed to apply a consent-based process for its spent fuel disposal program, with the intent to:

- license a pilot-scale interim storage facility to be operational by 2021,
- license a larger consolidated interim storage facility by 2025, and
- establish a permanent geologic repository with license and design by 2042 and operations starting in 2048.

Since 2014, the NRC staff has completed the Yucca Mountain Safety Evaluation Report (SER), in which it concluded that, with exceptions relating to ownership of land and water rights that DOE had not yet secured, safety requirements were met. On May 16, 2016, the NRC staff issued a Supplement to DOE's Environmental Impact Statement addressing certain Yucca Mountain ground water issues. An adjudicatory hearing on both DOE's safety analysis and the SER, which is a prerequisite for the NRC's licensing decision, remains in suspension.

Current Status of Federal Program for Disposal of Spent Nuclear Fuel

As of September 2021, about 86,000 metric tons of spent nuclear fuel from commercial reactors was being stored at 75 U.S. sites.⁵ This amount continues to grow. Policymakers have been at an impasse over what to do with the spent fuel since the licensing of the Yucca Mountain repository stopped in 2010. Unable to meet its disposal commitment, the U.S. government has paid reactor owners about \$9 billion for storage.

In September 2021, the NRC issued a license to Interim Storage Partners, LLC to construct and operate a consolidated interim storage facility (CSIF) for spent nuclear fuel in Andrews, Texas. The license authorized the company to receive, possess, transfer, and store up to 5,000 metric tons of spent fuel and 231.3 metric tons of greater-than-Class C radioactive waste for 40 years. In March 2022, several environmental groups challenged NRC's licensing of the facility, claiming the license violates the Nuclear Waste Policy Act and the Administrative Procedures Act by allowing DOE to take title of commercial spent fuel before a permanent repository is available. On January 27, 2023, the U.S. Court of Appeals for the D.C. Circuit issued a judgment upholding the license granted by the NRC. NRC is also reviewing a license application for a CSIF in Lea County, New Mexico.

While a comprehensive federal policy on spent fuel disposal remains elusive, consensus regarding the need for action by the Federal Government is emerging. The General Accountability Office (GAO) published a report articulating the need for congressional action and providing several policy recommendations based on input from numerous experts. The report highlighted concerns about the effect of the continuing impasse on environmental, health, and security risks; efforts to combat climate change; and taxpayer costs. According to GAO, most experts said Congress should (1) amend the NWPA to authorize the DOE to implement a new consent-based process for siting consolidated interim storage and permanent geologic repository facilities, (2) restructure the Nuclear Waste Fund to ensure reliable and sufficient funding, and (3) direct DOE to develop and implement an integrated waste management strategy. DOE has agreed with GAO's recommendations. As of this date, there are no bills proposed to codify these recommendations.

On March 9, 2023, U.S. Senator Joe Manchin convened a meeting of the Energy & Natural Resources Committee.⁶ The hearing's stated purpose was to examine the nuclear fuel cycle. Despite the robust discussion that took place, no tangible solution regarding a final disposal site for spent nuclear fuel problem was achieved.

Status of the Federal Nuclear Waste Fund

⁵ In Minnesota, the Monticello Nuclear Generating Plant currently stores approximately 30 waste canisters with 60 spent fuel assemblies each and has requested PUC approval to expand its capacity another 12-15 canisters to enable operation of the plant through its NRC licensure in 2040. The Prairie Island Nuclear Generating Plant is authorized to store up to 2,560 fuel assemblies to facilitate operations through its current operating licenses (Unit 1 is licensed through August 9, 2033, and Unit 2 is licensed through October 29, 2024).

⁶ [Full Committee Hearing to Examine the Nuclear Fuel Cycle - U.S. Senate Committee...](#)

As noted above, the NWPA established a nuclear waste fund (NWF) to pay for the DOE civilian nuclear waste disposal program, through a one mil (one-tenth of a cent) per kilowatt-hour charge to utility nuclear plant operators for electricity generated from nuclear plants. The fee became effective in 1983. Utilities collected the federally mandated fees from their ratepayers as part of their cost of energy.

After protracted legal battles, which included active participation by the National Association of Regulatory Utility Commissions (NARUC), nuclear utilities, and others, the U.S. Court of Appeals ruled in November 2013 that DOE must, within six months, do a thorough assessment of whether continuing to collect the one-mil/kWh nuclear waste fee was necessary. The Court put DOE on notice that if DOE did not suspend the fees after its evaluation, the Court had authority to suspend the fees and find that they could not be reinstated unless the DOE complied with the NWPA or Congress enacted an alternative program. The DOE suspended the fees on May 16, 2014.

Xcel Energy stopped collecting the one-mil/kWh nuclear waste fee from its customers through its fuel clause effective May 16, 2014, reflected on bills starting in June 2014.

U.S. ratepayers have paid in more than \$20 billion to the NWF, and when including accumulated interest, the fund had a balance at the time of suspension of more than \$30 billion. Minnesota ratepayers have paid more than \$457 million (not including interest earned on those funds) into the NWF. In theory, these monies are still in the NWF and continue to earn interest.

DOE Settlement Payments to Xcel Energy

The NWPA required the DOE and the utilities to enter into a standard contract for the disposal of the reactor sites' spent nuclear fuel. Starting no later than January 31, 1998, the DOE was required to take title to, transport, and dispose of the nuclear fuel; however, the DOE not only did not meet the deadline, but the spent fuel still remains stranded at the utilities' facilities. As a result, several utilities, including Xcel Energy, filed federal lawsuits against the DOE for breach of contract.

The lawsuits sought to recover damages for the resulting on-site spent fuel's on-site storage costs. In July 2011, Xcel Energy and the U.S. Government agreed to settle both lawsuits (Settlement). The Settlement included payment for the spent fuel's 1998 through 2008 costs and a mechanism to recover damages, without further litigation, through 2013.⁷ The Settlement has subsequently been extended to cover damages through December 31, 2019.

⁷ As with other claims against the federal government, damages payments come from general federal funds and not from the NWF.

The Government’s initial \$100 million payment, \$74.4 million attributable to Minnesota ratepayers,⁸ was made to Xcel Energy to cover costs through December 31, 2008. The Commission’s December 16, 2011 Order (2011 Order) in Docket No. E-002/M-11-807 found the settlement to be reasonable and approved Xcel Energy’s proposal to refund to ratepayers the \$74.4 million, less \$2 million for legal fees and \$2 million to fund the Power On program for low-income customers. Starting in mid-January 2012, the one-time refunds to Minnesota ratepayers’ bills began. Xcel Energy has now received thirteen refunds that cover expenses through December 31, 2021. Subsequent refunds have been used in a variety of ways: one-time ratepayer refunds, deposits into the nuclear decommissioning fund and rate increase moderation in rate cases. Table 5 summarizes the Minnesota-jurisdiction amounts of all DOE refunds to date and the Commission-approved usage of those funds.

Table 5 – Historical Usage of DOC Settlement Funds

Payment No.	Damage Period	Initial Notice of Payment Compliance Filing Date	MN Allocated \$ Amount, in millions	Bill Credit to Customers	Nuclear Decommissioning Trust Account Deposits	Rate Moderation	PUC-Approved Expenses
1	Jan 31, 1998 - Dec 31, 2008	August 5, 2011	\$74.12	\$70.52	\$0.00	\$0.00	\$3.90 ⁹
2	Jan 1, 2009 - Dec 31, 2010	April 3, 2012	\$13.67	\$13.67	\$0.00	\$0.00	\$0.00
3	Jan 1, 2011 - Dec 31, 2011	November 14, 2012	\$15.32	\$0.00	\$14.19	\$0.00	\$0.00
4	Jan 1, 2012 - Dec 31, 2012	December 6, 2013	\$31.54	(\$0.27)	\$14.19	\$17.62	\$0.00
5	Jan 1, 2013 - Dec 31, 2013	January 12, 2015	\$24.39	\$2.09	\$14.19	\$8.11	\$0.00
6	Jan 1, 2014 - Dec 31, 2014	December 31, 2015	\$9.74	\$9.74	\$0.00	\$0.00	\$0.00
7	Jan 1, 2015 - Dec 31, 2015	November 21, 2016	\$13.83	\$13.83	\$0.00	\$0.00	\$0.00
8	Jan 1, 2016 - Dec 31, 2016	December 8, 2017	\$11.21	\$11.21	\$0.00	\$0.00	\$0.00
9	Jan 1, 2017 - Dec 31, 2017	November 21, 2018	\$11.35	\$11.35	\$0.00	\$0.00	\$0.00
10	Jan 1, 2018 - Dec 31, 2018	January 22, 2020	\$22.98	\$22.98	\$0.00	\$0.00	\$0.00
11	Jan 1, 2019 - Dec 31, 2019	January 21, 2021	\$9.59	\$9.59	\$0.00	\$0.00	\$0.00
12	Jan 1, 2020 - Dec 31, 2020	November 24, 2021	\$12.12	\$12.12	\$0.00	\$0.00	\$0.00
13	Jan 1, 2021 - Dec 31, 2021	January 17, 2023	\$18.41	\$18.41	\$0.00	\$0.00	\$0.00

⁸ The difference was allocated to North and South Dakota ratepayers and wholesale customers.

⁹ As ordered in Docket No. E-002/M-11-807, \$2 million was set aside for the Power On program (Order Point No. 5) and \$1.9 million was used for litigation expense (Order Point No. 9). Order Establishing Refund Plan, December 16, 2011.

THE OBLIGATIONS OF THE UTILITY HOLDING SPENT NUCLEAR FUEL TO STATE AND LOCAL HOST COMMUNITIES RELATED TO DECOMMISSIONING AND STORAGE

In Docket No. E-002/11-939, the Commission required Xcel Energy to work with the host communities and the Prairie Island Indian Community (PIIC) prior to the next triennial filing to address the requirement to evaluate the cost, if any, arising from the storage of spent nuclear fuel to the state, tribal, and local governments once the plants are no longer operating. The Commission required Xcel Energy to file periodic status reports on those discussions.

Xcel Energy asserted that once the nuclear plants cease operations and the fuel is stored on-site, there is no "design-based accident" that would result in radioactive releases that would exceed federal Environmental Protection Agency (EPA) guidelines, and that no off-site radiological emergency plan would be required by the NRC. In 2014, the NRC issued a decision that the Kewaunee nuclear plant in Wisconsin will no longer be required to maintain off-site radiological emergency preparedness plans.

The concerns raised by the host communities for long-term storage of nuclear fuel after the plants cease operations included: lost property tax revenues from the lower tax base, the need to provide emergency services, and the impact on the ability of a city to grow. The PIIC has previously stated that it would need to continue to be involved in and monitor NRC proceedings and activities.

In Docket No. E-002/14-761, the Commission required Xcel Energy to continue working with its host communities, and that in its next nuclear decommissioning filing, Xcel Energy develop 60, 100, and 200-year plans for the City of Red Wing to enable better communications with the city and foster an understanding of the long-term safety-related costs of spent fuel storage on host communities.

Most recently, in Docket No. E-002/M-17-828, the PIIC filed comments expressing strong concern that spent nuclear fuel will remain at the Prairie Island Independent Spent Fuel Storage Facility (ISFSI) for many years following discontinuation of generation from the plant, with little assurance of a specific timeline given the Federal government's inaction on permanent storage. PIIC stated it has spent considerable resources over the last 20 years to remind members of the Minnesota Congressional delegation of its obligation to fund Yucca Mountain in accordance with the NWPA and suggested that the State of Minnesota should have the same interest and take action to help assure that spent nuclear fuel is not left in the state for hundreds of years.

RECOMMENDATIONS OF THE COMMISSION TO THE MINNESOTA LEGISLATURE

The Commission is a member of the National Association of Regulatory Utility Commissioners (NARUC), which is comprised of state commissions from all states and territories which regulate industries including energy, telecommunications, water, and transportation. Its mission is to serve the public interest by improving the quality and effectiveness of public utility regulation. The Commission is active in many NARUC committees and activities, including the Subcommittee on Nuclear Issues-Waste Disposal.

Minnesota was a founding member of the Nuclear Waste Strategy Coalition (NWSC), formed in 1993 to advocate for a comprehensive federal solution to the issue of nuclear waste storage. The NWSC now has members from 18 states and has evolved into an ad hoc organization representing the interest of state utility regulators, state attorneys general, consumer advocates, electric utilities, local governments, tribes, and other stakeholders on resolving nuclear waste policy issues. Minnesota members include the Commission, Xcel Energy, the City of Red Wing, and the Prairie Island Indian Community. The mission of the NWSC is to reform and adequately fund the U.S. civilian high-level nuclear waste transportation, storage, and disposal program that ensures timely and safe waste removal from operating and decommissioned nuclear power plants and that protects ratepayers' substantial investment in the program.

As part of its August 10, 1992 Order granting a limited certificate of need to Xcel Energy for construction of a spent fuel storage facility at its Prairie Island nuclear plant, the Commission required the company to file an annual report on its spent fuel storage program at both Prairie Island and Monticello. These reports, now filed in Docket No. E-002/PR-09-36, are required to include a description of company initiatives to expedite DOE compliance with its responsibilities to remove and dispose of spent nuclear fuel.

The Commission does not have specific recommendations for the Minnesota Legislature at this time. The situation with respect to the storage of spent nuclear fuel is in a continuous state of change. The Commission will continue to monitor the situation through participation in NARUC and the NWSC, and through other means, including future Xcel Energy triennial nuclear decommissioning filings.

Attachments:

Order Approving Decommissioning Study, Decommissioning Accrual, and Taking Other Action, Docket No. E-002/M-20-855 issued on August 24, 2022.

BEFORE THE MINNESOTA PUBLIC UTILITIES COMMISSION

Katie J. Sieben	Chair
Valerie Means	Commissioner
Matthew Schuerger	Commissioner
Joseph K. Sullivan	Commissioner
John A. Tuma	Commissioner

In the Matter of Norther States Power
Company d/b/a Xcel Energy's 2022–2024
Triennial Nuclear Plant Decommissioning
Study & Assumptions

ISSUE DATE: August 24, 2022

DOCKET NO. E-002/M-20-855

ORDER APPROVING
DECOMMISSIONING STUDY,
DECOMMISSIONING ACCRUAL,
AND TAKING OTHER ACTION

PROCEDURAL HISTORY

Every three years since 1987, the Commission has reviewed the financial plan to decommission the Monticello and Prairie Island Nuclear Generating Facilities operated by Northern States Power Company d/b/a Xcel Energy (Xcel). In the years between triennial filings, Xcel files an annual letter discussing the financial performance of funds accrued for the eventual decommissioning, known as the Nuclear Decommissioning Trust fund (NDT).

On December 1, 2020, Xcel filed its 2022–2024 Triennial Nuclear Plant Decommissioning Study & Assumptions Petition and supporting materials.

On January 19, 2021, Xcel filed supplemental supporting information.

On April 1, 2021, Xcel filed the NDT Annual Report.

On June 23, 2021, the Minnesota Department of Commerce, Division of Energy Resources (Department) filed comments.

On July 22, 2021, Xcel filed reply comments.

On March 28, 2022, Xcel filed the NDT Annual Report.

On July 21, 2022, the Commission met to consider the matter.

FINDINGS AND CONCLUSIONS

I. Background

The Commission requires periodic review of Xcel's plans for the eventual decommissioning of its three nuclear generating units located in Minnesota. The Monticello Nuclear Generating Plant has been operating since September 8, 1970, under a license that is set to expire in 2030. The Prairie Island Nuclear Generating Plant (Units 1 and 2) operates under licenses that are set to expire in 2033 (Unit 1) and 2034 (Unit 2).

Xcel seeks Commission approval of its triennial nuclear decommissioning study and of accrual and investment plans for its nuclear decommissioning trust (NDT) for 2022–2024.

The primary purpose of this docket is to determine a reasonable cost estimate for decontamination and removal of nuclear facilities at the end of their operating lives. Based on that cost estimate, the Commission approves accrual and investment plans intended to establish a fund sufficient to pay decommissioning costs when incurred.

II. Xcel's Petition

In its petition, Xcel requested that the Commission:

- Approve the decommissioning study and assumptions as compliant with Xcel's obligations under Minnesota statutes, Commission rules, and prior orders;
- Approve an annual accrual of \$31,368,901 effective in 2022 to meet the needs of Xcel's 60-year spent fuel scenario, with no recasking of fuel, for 2022 through 2024 while strategic decisions about the future of Xcel's nuclear units are decided in Xcel's 2019 Integrated Resource Plan (IRP);
- Approve an annual accrual of \$0.7 million for end-of-life (EOL) nuclear fuel for the calendar years 2022 through 2024; and
- Approve the current asset allocation for the NDT.

Xcel noted that issues addressed in this triennial filing may be impacted by ongoing processes in other dockets. First, Xcel referenced a June 2020 filing in its 2019 IRP stating that Xcel's Preferred Plan includes a 10-year extension of the license to operate the Monticello plant.¹ Xcel highlighted the potential impact on decommissioning costs and planning if the Monticello plant continues to operate during the contemplated 10-year license extension. Second, Xcel referenced its 2020 Multi-Year Rate Plan² and 2021 Stay Out Request.³ Since the filing of the Petition in

¹ Docket No. E-002/RP-19-368.

² *In the Matter of Xcel Energy's Application for Authority to Increase Electric Rates*, Docket No. E-002/GR-20-723 (November 2, 2020).

³ *See* Petition for Approval of 2021 True-up Mechanisms, Docket No. E-002/M-20-743 (October 1, 2020). Xcel's 2021 Stay Out Request was initially filed on September 15, 2020, as part of Xcel's Response and Petition in the COVID-19 Relief & Recovery dockets (Docket Nos. E,G-999/CI-20-492; E,G-002/M-20-716). On October 1, 2020, it was assigned to its own docket: Docket No. E-002/M-20-743.

this docket, the Commission has granted Xcel's 2021 Stay Out Request, which affirmed that any increase in NDT accrual arising out of the 2017 filing would be delayed until January 1, 2022.⁴

Consistent with the requirements of Minn. Stat. § 216B.2445, Xcel explored various scenarios that assume spent fuel will be stored in Minnesota for periods of 60, 100, and 200 years following cessation of plant operations. Xcel also explored scenarios assuming the spent fuel would remain in Minnesota for 42 years.

Xcel assessed the application of both DECON⁵ (immediate decontamination) and SAFSTOR⁶ (deferred decontamination) decommissioning methods.

Xcel explained that the decommissioning analysis is comprised of three discrete steps. The first is to determine a decommissioning cost estimate for a specific scenario. The second is to determine the forward-looking expected-return estimate and escalation rate for the NDT. The third step is to calculate an annual accrual necessary to fully fund the costs of decommissioning for each site based on the escalation rates and earnings estimates developed for the chosen scenario.

Consistent with previous filings, Xcel examined the impact of assumptions related to (1) the engineering cost estimate; (2) costs associated with spent-fuel storage following plant shutdown; (3) inflation and escalation; (4) earnings rates; (5) fund investment structure; and (6) recovery period.

Xcel identified changes to three primary categories that most impacted anticipated decommissioning costs: (1) changes to engineering and other cost estimates; (2) changes in assumptions about escalation/inflation of costs over time; and (3) revisions to the forward-looking expected returns.

III. Parties' Comments

As discussed in more detail below, the Department stated that, based on its analysis, Xcel's assumptions and calculations were reasonable. The Department recommended that the Commission approve Xcel's 2022–2024 Triennial Nuclear Plant Decommissioning Study & Assumptions Petition.

⁴ Order Approving True-Ups with Modifications and Requiring Xcel to Withdraw Its Notice of Change in Rates and Interim Rate Petition, Docket No. E-002/M-20-743 (April 2, 2021).

⁵ DECON is defined by the NRC as, “[a] method of decommissioning in which the equipment, structures, and portions of a facility and site containing radioactive contaminants are removed and safely buried in a low-level radioactive waste landfill or decontaminated to a level that permits the property to be released for unrestricted use shortly after cessation of operations.” *United States Nuclear Regulatory Commission*, DECON, <https://www.nrc.gov/reading-rm/basic-ref/glossary/decon.html>.

⁶ SAFSTOR is defined by the NRC as, “[a] method of decommissioning in which a nuclear facility is placed and maintained in a condition that allows the facility to be safely stored and subsequently decontaminated (deferred decontamination) to levels that permit release for unrestricted use.” *United States Nuclear Regulatory Commission*, SAFSTOR, <https://www.nrc.gov/reading-rm/basic-ref/glossary/safstor.html>.

As required by the Commission's order in Docket No. E-002/M-17-828,⁷ Xcel provided Statement of Financial Accounting Standards No. 143 (SFAS 143) balance sheet accounts with a brief narrative explaining the numbers provided in the asset retirement obligation (ARO) balance sheet for nuclear decommissioning.

The Department explained that these balance sheets provide a big-picture overview of the estimated decommissioning liability and funds available to pay for decommissioning expenses in the future. Based on the Department's analysis, it stated that Xcel's accounting for SFAS 143 was reasonable and recommended that Xcel continue to provide this information in its next triennial filing. Additionally, the Department emphasized that SFAS 143 is appropriately employed for accounting purposes, but it is not a determination for rate-setting purposes.

A. Decommissioning Costs

Xcel engaged the services of TLG Services, Inc. (TLG) to perform site-specific cost estimates on various decommissioning scenarios for each of the two sites.

1. Radiological Removal

Regardless of whether DECON or SAFSTOR methods are employed, Xcel stated that it anticipates that each plant's used fuel will be placed into dry storage containers and placed in the Independent Spent Fuel Storage Installation (ISFSI)⁸ within four years immediately following plant shutdown.⁹ ISFSIs are on-site facilities for dry storage of spent fuel. Once the fuel is placed in dry casks, the spent-fuel pool and supporting systems can be dismantled, meaning that the pool can be drained and supporting equipment can be de-energized and secured. In SAFSTOR, the plant is left intact during a dormancy period that provides additional time for radioactive decay to occur, which allows for reduction in dismantling worker dose rates and decreased volumes of radioactive waste.

2. Factors Impacting Timelines and Costs

The periods of 42, 60, 100, and 200 years relate to possible lengths of time that spent fuel could remain onsite before it is transferred to another location for interim or permanent storage. Xcel noted that the duration that spent fuel will remain on site is impacted by (1) the status of federal and private storage initiatives, and (2) the Nuclear Regulatory Commission's (NRC) Continued Storage of Spent Nuclear Fuel Rule.¹⁰

Xcel provided cost estimates that include the operating and maintenance of the ISFSIs. These estimates were broken down into cost components such as utility staff, property taxes, and

⁷ *In the Matter of the Petition of Northern States Power Company for Approval of the 2019-2021 Triennial Nuclear Decommissioning Study and Assumptions*, Docket No. E-002/M-17-828, Order Approving Decommissioning Study, Decommissioning Accrual, and Taking Other Action, at 10, Ordering Paragraph 9 (February 27, 2019).

⁸ ISFSIs are on-site facilities used for dry storage of spent fuel.

⁹ Xcel noted that industry peers have been completing this transfer in as little as 2–3 years after shutdown.

¹⁰ Continued Storage of Spent Nuclear Fuel Rule, 79 Fed. Reg. 56,238 (September 19, 2014) (codified at 10 C.F.R. pt. 51), available at <https://www.govinfo.gov/content/pkg/FR-2014-09-19/pdf/2014-22215.pdf>.

operating costs. In addition, the cost estimates included payments of emergency planning fees. Xcel's estimates showed that no costs are expected to be incurred by the state of Minnesota or any tribal community, county, city, or township where used nuclear fuel is located following the cessation of nuclear plant operations.

a. Status of Potential Off-Site Storage Options

While the timeline for an off-site storage repository for spent nuclear fuel remains uncertain, Xcel referenced an NRC statement indicating that off-site storage options will likely be available within 60 years of plant closures.¹¹ Xcel noted that there are private companies undertaking initiatives that have the potential to offer off-site storage options; however, the ultimate viability of these operations is uncertain.

b. Use of Third-Party Contractors for Decommissioning

The Commission previously required Xcel to provide information about the potential for third-party contractors to decommission the Prairie Island facility.¹² Xcel discussed several third-party entities that have been providing decommissioning services and referenced two instances of the decommissioning process occurring more quickly than was initially anticipated by the utilities responsible for decommissioning.

In response to the Department's request, Xcel filed additional breakdowns of the estimated costs of the third-party decommission projects. Xcel noted that meaningful cost comparisons between these projects and decommissioning its facilities are challenging because of site-specific differences and the available cost data not being final.

The Department recognized that this data may suggest that the cost estimates for decommissioning Prairie Island and Monticello are reasonable but could be on the high end for overall costs of decommissioning.

c. Recasking Assumptions

Xcel cited to recent activities by NRC indicating that cask life is at least 100 years or longer, which supports Xcel's argument that it is reasonable and appropriate to assume that no recasking will be necessary for the 42-year and 60-year scenarios.

The Department agreed that it was reasonable to assume no recasking will be necessary for the 42-year and 60-year scenarios.

¹¹ *Id.* at 56,254 (“The United States national policy remains disposal of spent fuel in a geologic repository, and, as stated in the [Generic Environmental Impact Statement], the NRC believes that the most likely scenario is that a repository will become available by the end of the short term timeframe (60 years beyond the licensed life for operation of a reactor).”).

¹² See *In the Matter of Northern States Power Company's Petition for Approval of its 2016–2018 Triennial Nuclear Plant Decommissioning Accrual*, Docket No. E-002/M-14-761, Order Directing Xcel to Analyze Fund Investments and Retain Outside Expert, at 11, Ordering Paragraph 10 (February 27, 2017).

3. NRC Minimum Cost Calculation

The Department explained that there is an NRC minimum cost calculation that serves as a benchmark of the minimum expected costs of decommissioning. If a company's decommissioning cost estimates fall below the NRC minimum, it may demonstrate that there will be insufficient funds to decommission the units. Xcel applied the blended burial option to calculate the NRC minimum for each unit. The Department determined that Xcel's estimates prepared by TLG exceed the NRC minimum and satisfy the requirement.

B. Decommissioning Assets

The NDT investments are contained in three Qualified Trusts, which are standard decommissioning funds that cannot be refunded to customers until all decommissioning activities are completed. As required by NRC, Xcel has established an individual Qualified Trust for each nuclear operating unit to hold the decommissioning funds.

The Qualified Trust balances for Minnesota Jurisdictions as of December 31, 2020, are as follows:

<i>Unit</i>	<i>Book Value</i>	<i>Market Value</i>
Monticello	\$623,292,529	\$951,021,148
Prairie Island Unit 1	\$349,508,130	\$544,161,309
Prairie Island Unit 2	\$389,085,607	\$606,391,153
Total	\$1,361,886,267	\$2,101,573,610

The difference between book and market values is unrealized gains and losses. Xcel's forward-looking calculations accounted for the tax implications of realizing these gains.

The Department considered the methodology of using adjusted market values less estimated tax payments for calculating the decommissioning accrual to be reasonable.

1. Earnings Rate Forecast

Goldman Sachs Asset Management (GSAM) is Xcel's investment advisor for the NDT. GSAM provided analysis for the forecasted earnings rate. These projections demonstrated reduction in the expected percentage for after-tax returns for 2020 rates when compared to 2017 rates. Xcel explained that the decrease was largely due to lower overall interest rates in the market impacting forward-looking expected returns for multiple asset classes.

The Department agreed that Xcel's proposed forecasted earnings rates are reasonable and recommended that the Commission approve them.

2. Investment Strategy

Xcel explained that it undertook a comprehensive review of the investment allocations to evaluate portfolio changes that would be effective over the next triennial period. The process of determining the portfolio's asset mix is called asset allocation optimization. Asset allocation techniques are used to evaluate the various possible asset mixes and determine those combinations that are likely to deliver optimal performance in terms of risk and return.

Xcel indicated that its recommended investment mix was developed in a process deemed prudent by the independent, third-party investment review required by prior Commission order.¹³ Xcel noted that the independent review concluded that Xcel “has found an appropriate balance to achieving a reasonable risk adjusted return” and that the asset allocation is “properly diversified amongst a reasonable amount of non-correlated assets classes.”

Xcel argued that the proposed asset allocation results in an optimized trade-off between risk and return over the long term on a forward-looking basis. Xcel also stated that it will continue to analyze the portfolio asset mix and make updates and changes as necessary.

The Department concluded that Xcel’s proposed asset allocation is reasonable because no alternative portfolios would offer a better expected return for the same level of risk, and Xcel has adequately supported its chosen level of risk.

3. Escalation Rate

GSAM provided forecast analysis for escalation/inflation rates used to generate accrual calculations in Xcel’s filing. The analysis included discussion of economic and inflation factors, including gross domestic product growth, labor productivity, and other considerations utilized in estimating long-term inflation rates.

Xcel initially recommended a 3.78% escalation rate for the labor component of decommissioning and a 2.58% escalation rate for the non-labor components. Xcel noted that the 1.2 percent difference in escalation rates exists because increases in labor productivity will not have an impact on escalation of non-labor costs. Xcel updated its analysis to reflect information as of December 31, 2020, and recommended adopting escalation rates of 3.02% for non-labor and 4.22% for labor components.

The Department agreed that having GSAM calculate the escalation rate in a two-step process with separate escalation rates for labor and non-labor costs was reasonable. The Department also recommended that these calculations continue to be prepared by a consultant rather than Xcel for future filings.

4. Annual Accrual

While the Department initially recommended setting the annual accrual at \$25.7 million, during the hearing, the Department indicated that it supported setting annual accrual at \$21.5 million, which is the amount derived using assumptions of 60-year DECON method without recasking and that the Monticello Plant will continue to operate under an extended 10-year license. The Department preferred this option because it has more potential to provide near-term relief to ratepayers.

¹³ See *In the Matter of Northern States Power Company’s Petition for Approval of its 2016-2018 Triennial Nuclear Plant Decommissioning Accrual*, Docket No. E-002/M-14-761, Order Directing Xcel to Analyze Fund Investments and Retain Outside Expert, at 11, Ordering Paragraph 2 (February 27, 2017).

Xcel ultimately recommended a \$26.9 million annual accrual amount based on 60-year DECON method without recasking, but its preferred calculation does not assume continued operation of Monticello beyond its current license period. While Xcel acknowledged that the Department's recommended accrual is reasonable, Xcel expressed reservations about setting the annual accrual at the Department's recommended level because of uncertainty with remaining regulatory hurdles related to the proposed 10-year license extension.

5. Department of Energy Funding

The federal government entered contracts with Xcel to assume responsibility for spent nuclear fuel and high-level radioactive waste, and Xcel has been receiving payments under a settlement agreement with the Department of Energy (DOE) that allows Xcel to recover damages for the federal government's failure to take possession of spent nuclear fuel as agreed.¹⁴

Xcel proposed assuming that the DOE will continue to provide refunds for dry cask storage costs during the decommissioning process.

The Department supported the assumption that DOE refunds will continue and noted its continued support for using these funds as an offset to spent-fuel costs to mitigate the decommissioning accrual. Specifically, the Department supported an assumption that 75% of spent-fuel costs will be recovered through DOE reimbursements. The Department noted that this assumption is consistent with accrual calculation estimates approved in a prior Commission order.¹⁵

C. End of Life Nuclear Fuel Accrual

End-of-life (EOL) nuclear fuel refers to nuclear fuel that remains unused at the time of reactor shutdown. Xcel explained, that while the unit of production method assures full recovery for these costs, condensed amortization would create a price spike when a nuclear plant's operations permanently cease. In order to eliminate this spike, Xcel explained that the remaining recovery associated with the partially burned fuel becomes the amount to recover over the remaining life of the plant, using the sinking fund method.

Xcel indicated its EOL nuclear fuel cost estimates were approximately \$38 million lower than estimated in its 2017 filing. Expected costs decreased due to improved fuel utilization methods and lower nuclear fuel commodity prices. Based on these decreased cost estimates, Xcel requested EOL nuclear fuel accrual of \$714,366.

The Department noted that unlike the decommissioning funds, which are held in external accounts, EOL nuclear fuel accrual is held in internal funds at Xcel. The Department found Xcel's calculations relating to EOL nuclear fuel accrual to be reasonable. The Department recommended approving EOL nuclear fuel annual accrual of \$714,366.

¹⁴ *In the Matter of the Petition of Northern States Power Company for Approval of the 2019–2021 Triennial Nuclear Decommissioning Study and Assumptions*, Docket No. E-002/M-17-828, Order Accepting Filing, Establishing Accrual Amounts, and Authorizing Implementation Delay, at 3, n.4 (March 13, 2020).

¹⁵ *Id.*, at 4.

D. Premature Decommissioning Risk

Xcel analyzed the following aspects of the risks of premature decommissioning:

- The availability of commercial insurance;
- The availability of electric industry co-insurance;
- Any programs, which may be proposed, mandated, or administered by the NRC or any other United States Government agency;
- Specific, detailed information pertaining to any steps Xcel has taken to minimize any possible loss, which may occur as a result of premature decommissioning; and
- Xcel's ability to withstand possible economic and financial trauma, which may be associated with premature decommissioning.

The Department agreed that the information Xcel submitted addressing the risk of premature decommissioning was reasonable.

E. Timing of Next Triennial Filing

Because additional time will allow for more information about the finality of the license-extension process of the Monticello plant, the Department and Xcel requested that the filing deadline for Xcel's next triennial review be extended to December 1, 2024.

IV. Commission Action

The Commission will approve Xcel's decommissioning study as compliant with requirements of Minn. Stat. § 216B.2445, Minn. R. 7825.0500 through 7825.0800, and terms of prior Commission orders.

The Department agreed with Xcel's assertion that the calculations in the petition and supplemental information reasonably estimated decommissioning costs and implemented investment strategies and annual accruals to accumulate adequate funds to pay for those costs when they are incurred. The Commission finds that the record demonstrates that Xcel and the Department thoroughly assessed issues of various potential decommissioning scenarios and outlined investment and accrual plans to ensure that the NDT is sufficiently funded.

Xcel and the Department disagreed on the annual decommissioning accrual amount, but they each recognized that the other's preferred option was a reasonable alternative. The Commission will authorize use of the Department's preferred annual decommissioning accrual recommendation, which assumes the Monticello plant will continue operations under a 10-year license extension. While this estimate is less conservative than Xcel's preferred option, it has potential to provide more immediate relief to ratepayers.

Given that Xcel's 10-year license extension of the Monticello plant faces additional regulatory hurdles, the Commission will allow a one-year extension and require Xcel to file its next triennial filing by December 1, 2024.¹⁶ The additional time is expected to allow for more clarity on the proposed extension's status, which will better inform analyses of decommissioning cost estimates.

¹⁶ Without the extended deadline, Xcel's next triennial review filing would have been due by December 1, 2023.

ORDER

1. The Commission approves Xcel's decommissioning study.
2. Beginning in 2022, the Commission approves:
 - a. an Annual End of Life Nuclear Fuel accrual of \$714,366; and
 - b. a \$21,571,110 Annual Decommissioning Accrual, which is consistent with projections based on the 60-year DECON scenario where Monticello continues operation under a 10-year license extension.
3. The Commission approves escalation rates of 4.22% for the decommissioning labor component and 3.02% for the non-labor components.
4. The Commission approves Xcel's proposed NDT investment mix.
5. The Commission accepts the information Xcel filed regarding premature decommissioning risk.
6. Xcel shall continue using a consultant to calculate escalation rates in future triennial decommissioning filings.
7. Xcel shall provide balance sheet accounts for SFAS 143 in its next triennial decommissioning filing, with a brief narrative explaining the numbers provided on the ARO balance sheet for nuclear decommissioning.
8. Xcel shall file its next triennial decommissioning study by December 1, 2024.
9. This Order shall become effectively immediately.

BY ORDER OF THE COMMISSION

Will Seuffert
Executive Secretary



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