



Ron Benham
Director Nuclear and Regulatory Affairs

October 26, 2021
RA 21-0074

Shana R. Helton
U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Director, Division of Fuel Management
Office of Nuclear Material Safety and Safeguards
Washington, DC 20555-0001

Reference: Letter WM 21-0003, dated March 31, 2021, from Cleveland Reasoner, WCNOG, to USNRC, Wolf Creek Generating Station (WCGS) Financial Assurance Requirements for Decommissioning Nuclear Power Reactors 10 CFR 50.75(f)(1)

Subject: Docket No. 50-482 and 72-79: Independent Spent Fuel Storage Installation (ISFSI) Decommissioning Funding Plan

Dear Ms. Helton,

In accordance with 10 CFR 72.30, "Financial assurance and recordkeeping for decommissioning," Wolf Creek Nuclear Operating Corporation (WCNOG) is hereby submitting a Decommissioning Funding Plan for the ISFSI located at the Wolf Creek Generating Station (WCGS). In addition, this submittal is consistent with Nuclear Regulatory Commission (NRC) guidance that general licensees submit a decommissioning funding plan to the NRC no later than the date that the general licensee first uses a spent fuel storage cask to store spent fuel.

This letter does not contain any new commitments. If you have any questions on this report, please contact Robert Kelley at (620) 364-8831 extension 8436 or Ron Benham at (620) 364-4204.

Sincerely,

A handwritten signature in black ink that reads "Ron Benham".

Ron Benham

RDB/rlt

Attachment: 10 CFR 72.30 ISFSI Decommissioning Funding Plan

cc: S. S. Lee (NRC)
S. A. Morris (NRC)
G. E. Werner (NRC)
Senior Resident Inspector (NRC)

10 CFR 72.30 ISFSI Decommissioning Funding Plan

1. Background and Introduction

The Nuclear Regulatory Commission (NRC) issued its final rule on Decommissioning Planning on June 17, 2011,^[1] with the rule becoming effective on December 17, 2012. Subpart 72.30, "Financial assurance and recordkeeping for decommissioning," requires that each holder of, or applicant for, a license under this part must submit for NRC review and approval a decommissioning funding plan that contains information on how reasonable assurance will be provided that funds will be available to decommission the Independent Spent Fuel Storage Installation (ISFSI).

In accordance with the rule, this letter provides a detailed cost estimate for decommissioning the ISFSI at Wolf Creek Generating Station (Wolf Creek) in an amount reflecting:

1. The work is performed by an independent contractor;
2. An adequate contingency factor; and
3. Release of the facility and dry storage systems for unrestricted use, as specified in 10 CFR Part 20.1402

This letter also provides:

1. Identification of the key assumptions contained in the cost estimate; and
2. The volume of onsite subsurface material containing residual radioactivity, if any, that will require remediation to meet the criteria for license termination.

2. Spent Fuel Management Strategy

The operating license for Wolf Creek, renewed on November 20, 2008, is set to expire on March 11, 2045. Approximately 3,364 spent fuel assemblies are projected to be generated over the operating life of the plant. For the purpose of this analysis, 2,439 assemblies would be placed in dry storage at an on-site ISFSI. The ISFSI would operate (under a Part 50 General License in accordance with 10 CFR 72 Subpart K) until the transfer of spent fuel to the DOE is completed. At that time, the ISFSI could be decommissioned.

Completion of the ISFSI decommissioning process is dependent upon the DOE's ability to remove spent fuel from the site. DOE's repository program assumes that

¹ U.S. Code of Federal Regulations, Title 10, Parts 20, 30, 40, 50, 70 and 72 "Decommissioning Planning," Nuclear Regulatory Commission, Federal Register Volume 76, Number 117 (p 35512 et seq.), June 17, 2011.

spent fuel allocations will be accepted for disposal from the nation's commercial nuclear plants, with limited exceptions, in the order (the "queue") in which it was discharged from the reactor.^[2] Wolf Creek Nuclear Operating Corporation (WCNOC) is the licensed operator for Wolf Creek. As such, WCNOC's current spent fuel management plan is based in general upon completion of spent fuel receipt by the DOE in the year 2078.

3. ISFSI Decommissioning Strategy

At the conclusion of the spent fuel transfer process the ISFSI can be decommissioned by removing and disposing of residual radioactivity and verifying that remaining materials satisfy NRC release criteria.

For purposes of providing an estimate for a funding plan, financial assurance is expected to be provided on the basis of a prompt ISFSI decommissioning scenario. In this estimate the ISFSI decommissioning is considered an independent project, regardless of the decommissioning alternative identified for the nuclear power plant.

4. ISFSI Description

The Wolf Creek ISFSI is based upon the Orano TN's NUHOMS Matrix (HSM-MX) system. The NUHOMS MATRIX is a two-story horizontal storage system made of concrete and steel that is designed to safely increase storage density at nuclear reactors' onsite used fuel storage facilities. The 28-foot-high (8.5-meter-high) concrete array stores used fuel canisters up to 16 feet (4.88 meters) in length and approximately 75 inches (1.91 meters) in diameter.

Wolf Creek will utilize the Orano TN EOS-37PTH dry shielded canister (DSC). Each canister is designed to contain 37 spent fuel assemblies.

Using the (HSM-MX) technology, the WCNOC ISFSI pad is designed to accommodate 66 Horizontal Storage Modules (HSM) of spent nuclear fuel.

The DSCs are assumed to be transferred directly to the DOE and not returned to the station. Some of the HSMs are assumed to have residual radioactivity due to some minor level of neutron-induced activation as a result of the long-term storage of the spent fuel. The cost to dispose of residual radioactivity and verify that the remaining facility and surrounding environs meet the NRC's radiological limits established for unrestricted use, form the basis of the ISFSI decommissioning estimate.

In addition to the spent fuel casks located on the ISFSI pad after shutdown there may be additional casks used for Greater-than-Class-C (GTCC) waste storage. The HSMs used to store the GTCC canisters (estimated quantity of five) are not expected to have any interior contamination or residual activation and can be reused or disposed of by conventional means after a final status survey.

² U.S. Code of Federal Regulations, Title 10, Part 961.11, Article IV – Responsibilities of the Parties, B. DOE Responsibilities, 5. (a) "... DOE shall issue an annual acceptance priority ranking for receipt of SNF and/or HLW at the DOE repository. This priority ranking shall be based on the age of SNF and/or HLW as calculated from the date of discharge of such materials from the civilian nuclear power reactor. The oldest fuel or waste will have the highest priority for acceptance, except as ..."

Table 1 provides the significant quantities and physical dimensions used as the basis in developing the ISFSI decommissioning estimate.

5. Key Assumptions / Estimating Approach

The decommissioning estimate is based on the configuration of the ISFSI at the cessation of plant operations (operating until 2045), and the assumptions associated with DOE's spent fuel acceptance, as previously described.

The size of the ISFSI pad to store the projected amount of spent fuel is approximately 201 feet in length, and 90 feet in width.

To support an application for License Termination, the estimate assumes that a Final Status Survey will be performed; this will include a 100% survey of the concrete HSM interior surfaces, and a significant fraction of the ISFSI pad and the immediate area surrounding the pad, and the other ISFSI structures.

It is not expected that the HSMs will have any interior or exterior radioactive surface contamination (excepted as noted in Section 4 above regarding neutron activation of a limited number of HSMs). It is expected that this assumption would result from a good radiological practice of surveying potentially impacted areas after each spent fuel transfer campaign. Any neutron activation of the steel and concrete is expected to be extremely small. To validate this assumption, the estimate accounts for further characterization of 10% of the HSMs; it is likely that some of this characterization will take place well before the last of the fuel is removed from the ISFSI in order to establish a more definitive decommissioning scope.

The decommissioning estimate conservatively assumes that six HSMs (equivalent to the number of casks to store the final full core offload of 193 assemblies) will contain low levels of neutron-induced residual radioactivity that would necessitate remediation at the time of decommissioning. For purposes of this estimate, these HSMs are designated for controlled disposal as low-level radioactive waste.

It is not expected that there will be any residual contamination left on the concrete ISFSI pad or other Wolf Creek facilities once the HSMs are removed. It is expected that these assumptions would be confirmed as a result of good radiological practice of surveying potentially impacted areas after each spent fuel transfer campaign. As such, only verification surveys are included for the other facilities in the decommissioning estimate. The ISFSI pad construction at Wolf Creek was completed in 2021. The pad was constructed in a space outside the existing protected area with no radioactivity. As such, the decommissioning estimate assumes that no soil remediation is required to meet the unrestricted use of criteria of 10 CFR 20.1402.

Decommissioning is assumed to be performed by an independent contractor. As such, essentially all labor, equipment, and material costs are based on national averages, i.e., costs from national publications such as RSMeans Building Construction Cost Data (adjusted for regional variations), and laboratory service costs are based on vendor price lists. Those craft labor positions are expected to be provided locally. WCNOG as licensee, will oversee the site activities; the estimate includes labor and overhead costs.

Low-level radioactive waste packaging and transport costs are based on industry data. Disposal costs are based on WCNOG existing contracted disposal rates.

Costs are reported in 2020 dollars and based upon a decommissioning analysis performed for WCNOG in 2020.^[3] Contingency has been added at an overall rate of 25%. This is consistent with the contingency evaluation criteria referenced by the NRC in NUREG-1757.^[4]

The estimate is limited to costs necessary to terminate the ISFSI's NRC license and meet the §20.1402 criteria for unrestricted use. Disposition of released material and structures is outside the scope of the estimate.

The Wolf Creek ISFSI construction was completed in 2021. There has been no previous submittal of an ISFSI decommissioning funding plan. The following events listed in 10 CFR 72.30 (c) (1)- (4) have been addressed, taking into consideration the newly designed and constructed ISFSI:

- (1) Spills of radioactive material producing additional residual radioactivity in onsite subsurface material: There have been no spills at the ISFSI. ISFSI loading has not begun at this time.
- (2) Facility modifications: WCNOG has completed ISFSI pad, apron, approach and 11.5 HSM storage module fabrication. The analysis has been updated to address these actual values.
- (3) Changes in authorized possession limits: There are no changes in authorized possession limits that affect the decommissioning cost estimate
- (4) Actual remediation costs that exceed the previous cost estimate: No actual remediation costs have been incurred, so no actual remediation costs exceed the previous cost estimate.

³ "Decommissioning Cost Analysis for the Wolf Creek Generating Station," TLG Document W11-1781-001, Rev. 0, dated August 2020

⁴ "Consolidated Decommissioning Guidance, Financial Assurance, Recordkeeping, and Timeliness," U.S. Nuclear Regulatory Commission's Office of Nuclear Material Safety and Safeguards, NUREG-1757, Volume 3, Revision 1, February 2012.

6. Cost Estimate

The estimated cost to decommission the ISFSI and release the facility for unrestricted use is provided in Table 2. The cost has been organized into three phases, including:

- An initial planning phase - empty HSMs are characterized and the specifications and work procedures for the decontamination (including steel liner removal if applicable) developed.
- The remediation phase - residual radioactivity is removed, packaged in certified waste containers, transported to the low-level waste site, and disposed of as low-level waste.
- The final phase - license termination surveys, independent surveys are completed, and an application for license termination submitted.

In addition to the direct costs associated with a contractor providing the decommissioning services, the estimate also contains costs for the NRC (and NRC contractor), WCNOO oversight staff, site security, and other site operating costs.

For estimating purposes, it should be conservatively assumed that all expenditures would be incurred in the year 2079, the year following the last of the spent fuel removal.

7. Financial Assurance

This section describes the methodology by which Evergy Metro, Inc., Evergy Kansas South, Inc. and Kansas Electric Power Cooperative, Inc. ("KEPCo") (collectively, the "Wolf Creek Owners") will provide financial assurance for decommissioning the ISFSI at the end of its useful life.

ISFSI operations at Wolf Creek are required due to the United States Department of Energy (DOE's) failure to remove spent nuclear fuel from the Wolf Creek plant in a timely manner pursuant to a written agreement. The costs for management of the spent fuel are costs for which the DOE is responsible under federal law and the Standard Contract.

It is uncertain as to whether the DOE will provide reimbursement for the ISFSI decommissioning costs; and, if such reimbursement is provided, when it will occur. Consequently, the Wolf Creek Owners intend to provide financial assurance for the ISFSI decommissioning as described in the following paragraphs:

10 CFR 72.30 (e) states (in part):

(e)Financial assurance for decommissioning must be provided by one or more of the following methods:

(5) In the case of licensees who are issued a power reactor license under part 50 of this chapter or ISFSI licensees who are an electric utility, as defined in part 50 of this chapter, with a specific license issued under this part, the methods of 10 CFR 50.75(b), (e), and (h), as applicable. In the event that funds remaining to be placed into the licensee's ISFSI decommissioning external sinking fund are no longer approved for recovery in rates by a competent rate making authority, the licensee must make changes to provide financial assurance using one or more of the methods stated in paragraphs (1) through (4) of this section.

As the Wolf Creek Owners have been issued a power reactor license and are electric utilities, it meets the foregoing criteria, and they intend to utilize the "External Sinking Fund" method of providing financial assurance for decommissioning the ISFSI, as defined in 10 CFR 50.75 (e) (1) (ii). This is the financial assurance method that the Wolf Creek Owners currently use for the Wolf Creek decommissioning.

Missouri regulations and Kansas statutes, cited below, require the triennial filing of updated decommissioning cost estimates and associated funding levels required for decommissioning funding assurance. Missouri and Kansas regulations and laws also provide for the changing of rates charged to ratepayers to recover any changes in funding levels necessitated by the triennial decommissioning cost estimate updates.

4 CSR 240-3.185 Submission of Reports Pertaining to the Decommissioning of Electric Utility Plants

(3) On or before September 1, 1990 and every three (3) years after that, utilities with decommissioning trust funds shall perform and file with the commission cost studies detailing the utilities' latest cost estimates for decommissioning their nuclear generating unit(s) along with the funding levels necessary to defray these decommissioning costs. These studies shall be filed along with appropriate tariff(s) effectuating the change in rates necessary to accomplish the funding required. In addition, the commission, at any time for just cause, may require a utility to file an updated decommissioning cost study, funding requirement and associated tariff(s).

4 CSR 240-20.070 Decommissioning Trust Funds

(7) *Upon the filing of the appropriate tariff(s) as set in 4 CSR 240-3.180, the commission shall establish a schedule of proceedings which shall be limited in scope to the following issues:*

- (A) *The extent of any change in the level or annual accrual of funding necessary for the utility's decommissioning trust fund; and*
- (B) *The changes in rates which would reflect any change in the funding level or accrual rate.*

K.S.A. 66-128o

(a) If the commission approves a decommissioning financing plan under K.S.A. 66-128n and amendments thereto, it shall, at least every five years until the facility's closing and at least annually after the closing, review the financing plan to assess its adequacy. If changed circumstances make a more frequent review desirable or if the licensee requests it, the commission may review the plan after a shorter time interval. The review shall include, but not be limited to, the following considerations: 1. The estimated date of closing the nuclear power generating facility; 2. the estimated cost of decommissioning; 3. the reasonableness of the method selected for cost estimate purposes; and 4. the adequacy of plans for financing the decommissioning and any shortfall resulting from a premature closing.

K.S.A 66-128p

(d)The commission shall include all decommissioning funding requirements of an electric utility, which are approved by the commission under K.S.A. 66-128n and 66-128o, in the revenue requirements of the utility.

To comply with the foregoing regulations and statutes, the Wolf Creek Owners prepare an updated site- specific decommissioning cost estimate for the Wolf Creek plant every three (3) years and files this estimate and an updated funding level analysis with the Missouri Public Service Commission ("MPSC") and the Kansas Corporation Commission ("KCC"). The site-specific estimate includes radiological license termination expenses, non-radiological site restoration expenses and spent fuel management expenses. The funding level analysis is based on this total decommissioning cost estimate amount. Although the external sinking fund described in 10 CFR 50.75 is for radiological decommissioning costs only,

to the extent that the fund balance exceeds costs required for Part 50 radiological decommissioning, excess funds would be available for non-radiological site restoration expenses and spent fuel management expenses.

The most recent triennial update filing was made with the MPSC and the KCC on September 1, 2020. Both dockets were settled by stipulation. The Stipulations have been approved by the state commissions and both dockets have been closed. The next triennial filing is required to be made no later than September 1, 2023.

The Wolf Creek Owners have had a decommissioning cost estimate for the ISFSI prepared by the same firm that prepares the cost estimate for the Wolf Creek decommissioning. The estimated cost for radiological decommissioning of the ISFSI and release the facility for unrestricted use is \$10,380,000 (2020\$). Non-radiological site restoration costs for green fielding the site are estimated at an additional \$1,569,000 (2020\$). This estimate projects that the ISFSI decommissioning will take place in 2079.

Assuming the foregoing ISFSI decommissioning estimated costs is to be funded based on the actuarial assumptions filed with the MPSC and KCC as part of the September 1, 2020 triennial filing, the Wolf Creek Owners would be required to make an annual contribution of \$9,634,750.00 to the external sinking fund (assuming funding commencing as of 2021). This contribution is the current authorized funding rate and was validated to cover the necessary ISFSI funding costs in both the 2020 general decommissioning plan study (W11-1781-001) and the 2021 study (W11-1781-21001).

As 10 CFR 72.30 (c) states, in part:

(c) At the time of license renewal and at intervals not to exceed 3 years, the decommissioning funding plan must be resubmitted with adjustments as necessary to account for changes in costs and the extent of contamination.

To comply with this requirement, the Wolf Creek Owners intend to obtain updated site- specific decommissioning cost estimates for the ISFSI concurrently with updated plant decommissioning cost estimates and file both on a triennial basis with the MPSC and the KCC, along with updated funding level analyses, as required by Missouri and Kansas statutes and regulations. As previously indicated, the next filing will be made by September 1, 2023, and then every three (3) years thereafter. Concurrent with these state filings, updated ISFSI cost estimates and funding level analyses will be submitted to the NRC in accordance with 10 CFR 72.30 (c).

Table 1
Significant Quantities and Physical Dimensions

ISFSI Pad

Item	Length (ft.)	Width (ft.)	Residual Radioactivity
ISFSI Pad (dimensions are for current pad)	201	90	No

ISFSI Storage Module

Item	Value	Notes (all dimensions are nominal)
Overall Length (inches)	277	
Outside Width (inches)	129	
Overall Height (inches)	163	Average height per HSM
ORANO HSM-MX storage systems (total)	71	66 spent fuel + 5 GTCC
Quantity (with residual radioactivity)	6	Equivalent to the number of HSMs needed to store each units last core offload from Wolf Creek
Low-Level Radioactive Waste (cubic feet)	23,409	
Low-Level Radioactive Waste (lbs/ft ³)	127	Average weight density

Other Potentially Impacted Items

Item	Value	Notes
Cask Transporter (leased by WCNOG)	1	No residual radioactivity
ISFSI Equipment Storage Building	1	No residual radioactivity
Number of HSMs used for GTCC storage	5	No residual radioactivity

Table 2
ISFSI Decommissioning Costs¹ and Waste Volumes

	(Thousands, 2020 dollars)						Waste Volume (ft3)	Person-Hours	
	Removal	Packaging	Transport	Disposal	Other	Total		Craft	Oversight and Contractor
Decommissioning Contractor									
Planning (characterization, specs, and procedures)	-	-	-	-	227	227	-	-	1,072
Decontamination (activated disposition)	57	232	1,010	4,096	-	5,396	23,409	378	-
License Termination (radiological surveys)	-	-	-	-	1,061	1,061	-	7,713	-
Subtotal	57	232	1,010	4,096	1,288	6,685	23,409	8,091	1,072
Supporting Costs									
NRC and NRC Contractor Fees and Costs					454	454			1,153
Insurance					140	140			
Property taxes					316	316			
Plant energy budget					14	14			
Corporate A&G Cost					5	5			
Security Staff Cost					366	366			4,999
Utility Staff Cost					323	323			3,792
Subtotal					1,619	1,619			9,945
Total (w/o contingency)	57	232	1,010	4,096	2,907	8,304	23,409	8,091	11,017
Total (w/25% contingency)	72	290	1,263	5,120	3,634	10,380			

Note 1: For funding planning purposes decommissioning costs can be assumed to be incurred in year 2079