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10 CFR 72.30(b)
10 CFR 72.4

Serial: RA-15-0011
March 30, 2015

ATTN: Document Control Desk
Director, Division of Spent Fuel Storage and Transportation,
Office of Nuclear Material Safety and Safeguards,
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001

H.B. ROBINSON STEAM ELECTRIC PLANT, UNIT 2
INDEPENDENT SPENT FUEL STORAGE INSTALLATION, DOCKET NO. 72-3

H.B. ROBINSON STEAM ELECTRIC PLANT, UNIT 2
INDEPENDENT SPENT FUEL STORAGE INSTALLATION, DOCKET NO. 72-60

BRUNSWICK STEAM ELECTRIC PLANT
INDEPENDENT SPENT FUEL STORAGE INSTALLATION, DOCKET NO. 72-6

CATAWBA NUCLEAR STATION
INDEPENDENT SPENT FUEL STORAGE INSTALLATION, DOCKET NO. 72-45

MCGUIRE NUCLEAR STATION
INDEPENDENT SPENT FUEL STORAGE INSTALLATION, DOCKET NO. 72-38

OCONEE NUCLEAR STATION
INDEPENDENT SPENT FUEL STORAGE INSTALLATION, DOCKET NO. 72-04

OCONEE NUCLEAR STATION
INDEPENDENT SPENT FUEL STORAGE INSTALLATION, DOCKET NO. 72-40

SUBJECT: DECOMMISSIONING FUNDING PLAN FOR INDEPENDENT SPENT FUEL STORAGE INSTALLATIONS (ISFSIs)

REFERENCE:

1. Duke Energy letter, *Biennial Decommissioning Financial Assurance Reports*, dated March 30, 2015.

Ladies and Gentlemen:

Pursuant to 10 CFR 72.30(b), Duke Energy Progress and Duke Energy Carolinas submit the required decommissioning funding plans covering the ISFSIs for H.B. Robinson Steam Electric

Plant, Unit 2, Brunswick Steam Electric Plant, Catawba Nuclear Station, McGuire Nuclear Station and Oconee Nuclear Station. 10 CFR 72.30(b) requires that "each holder of, or applicant for, a license under this part must submit for NRC review and approval a decommissioning funding plan...." In accordance with 10 CFR 72.13(b) and 10 CFR 72.13(c), the requirement in 10 CFR 72.30(b) is applicable to both specific and general licensed ISFSIs. The required plans are attached.

As a convenience to the NRC, the attached decommissioning funding plan for the Catawba Nuclear Station ISFSI addresses North Carolina Electric Membership Corporation's 30.754 percent ownership, North Carolina Municipal Power Agency No. 1's 37.5 percent ownership and Piedmont Municipal Power Agency's 12.5 percent ownership. In a similar manner, the attached decommissioning funding plan for the Brunswick Steam Electric Plant ISFSI addresses North Carolina Eastern Municipal Power Agency's 18.33 percent ownership.

Because these 10 CFR 72.30(b) reports rely on information contained in the 10 CFR 50.75(f)(1) decommissioning financial assurance reports (Reference 1), Duke Energy is submitting the reports under each regulation concurrently. Aligning the reporting cycle for decommissioning the ISFSIs under 10 CFR 72.30(b) with the reporting cycle for plant radiological decommissioning under 10 CFR 50.75(f)(1) reduces the ongoing administrative burden of submitting these reports on separate schedules.

There are no regulatory commitments associated with this letter. If you have additional questions, please contact Art Zaremba at (980) 373-2062.

Sincerely,

Regis T. Repko
Senior Vice President
Governance, Projects and Engineering

Attachments:

1. H.B. Robinson Steam Electric Plant, Unit 2 ISFSI Decommissioning Funding Plan
2. Brunswick Steam Electric Plant ISFSI Decommissioning Funding Plan
3. Catawba Nuclear Station ISFSI Decommissioning Funding Plan
4. McGuire Nuclear Station ISFSI Decommissioning Funding Plan
5. Oconee Nuclear Station ISFSI Decommissioning Funding Plan

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File: (Corporate)

Attachment 1

H.B. Robinson Steam Electric Plant, Unit 2 ISFSI Decommissioning Funding Plan

Attachment 1
RA-15-0011

Decommissioning Funding Plan for Independent Spent Fuel Storage Installation

H. B. Robinson Steam Electric Plant Unit 2, Docket No. 72-03/License SNM-2502

H. B. Robinson Steam Electric Plant Unit 2, Docket No. 72-60

In accordance with 72.30(c), this decommissioning funding plan is being resubmitted with adjustments as necessary to account for changes in costs and the extent of contamination. This decommissioning funding plan updates the information submitted with the original plan on December 13, 2012 and subsequent RAI responses on September 30, 2013 and specifically considers the effect of the following events on decommissioning costs:

- Spills of radioactive material producing additional residual radioactivity in onsite subsurface material.
- Facility modifications.
- Changes in authorized possession limits.
- Actual remediation costs that exceed the previous cost estimate.

The requirements of a decommissioning funding plan in 10 CFR 72.30(b) are provided below.

1. Information on how reasonable assurance will be provided that funds will be available to decommission the ISFSI or MRS.

10 CFR 72.30(c) requires a decommissioning funding plan be provided at least every three years and at the time of license renewal. Compliance with this part, together with the method of assuring funds described in Part 4 below, will provide reasonable assurance that funds will be available to decommission the Robinson ISFSI.

2. A detailed cost estimate for decommissioning, in an amount reflecting:

- **The cost of an independent contractor to perform all decommissioning activities;**
- **An adequate contingency factor; and**
- **The cost of meeting the § 20.1402 of this chapter criteria for unrestricted use, provided that, if the applicant or licensee can demonstrate its ability to meet the provisions of § 20.1403 of this chapter, the cost estimate may be based on meeting the § 20.1403 criteria.**

The design and capacity of the Robinson ISFSI is based upon the NUHOMS-24P and NUHOMS-7P spent fuel storage systems. The systems consist of a stainless steel Dry Shielded Canister (DSC), and a concrete Horizontal Storage Module (HSM) which houses the DSC during storage. The 7P ISFSI consists of site-specific license HSM's with NUHOMS-7P DSCs that house 7 spent fuel assemblies each. The 24P ISFSI consists of general license HSMs with NUHOMS-24P DSCs that house 24 spent fuel assemblies each.

Assuming Robinson operates until the expiration of the last of the current operating licenses in 2030, approximately 2355 spent fuel assemblies are projected to be generated over the life of the plant, 504 of which have been shipped to DEP's Shearon Harris Nuclear Power Plant and

304 of which have been shipped to DEP's Brunswick Steam Electric Plant.[1] Based on a 2025 DOE start date for Robinson and 42 HSMs remaining after cessation of operations, all Robinson spent fuel is projected to be fully removed from the site in 2058. The 42 HSMs include 37 for spent fuel (29 in the 24PTH ISFSI and 8 in the 7P ISFSI) and 5 for GTCC storage.

Details of the NUHOMS spent fuel storage system, including physical dimensions, can be found in the proprietary version of the Final Safety Analysis Report for the Transnuclear NUHOMS, Docket Number 72-1004.

The methodology used to develop this detailed cost estimate follows the basic approach originally presented in the AIF/NESP-036 study report, "Guidelines for Producing Commercial Nuclear Power Plant Decommissioning Cost Estimates."[2] The methodology includes elements for estimating distributed and undistributed costs. Distributed costs are activity specific and include planning and preparation costs as well as the decontamination, packaging, disposal and removal of components. Undistributed costs are typically time-dependent costs such as utility and decommissioning general contractor staff, property taxes, insurance, regulatory fees and permits, energy costs, and security staff. The methodology also uses a unit factor method for estimating decommissioning activity costs, which simplifies the estimating calculations. Unit factors for concrete removal ($/cubic yard), steel removal ($/ton), and cutting costs ($/inch) are developed using local labor rates.

Inherent in any cost estimate that does not rely on historical data is the inability to specify the precise source of costs imposed by factors such as tool breakage, accidents, illnesses, weather delays, and labor stoppages. In this detailed cost estimate, contingency fulfills this role. Specifically, contingency is added to all costs at a constant 25% rate, consistent with the contingency evaluation criteria referenced by the NRC in NUREG-1757[3].

The detailed cost estimate assumes a spent fuel management strategy, which determines the estimated number of casks of canisters that may be installed at the Robinson ISFSI and the estimated date for ISFSI decommissioning. The current spent fuel management strategy is based in general upon: (1) an industry and site-specific start date for DOE initiating transfer of commercial spent fuel to a federal facility (not necessarily a final repository), (2) DOE's generator allocation/receipt schedules, which are based upon the oldest fuel receiving the highest priority, (3) a maximum rate of transfer of 3,000 metric tons of uranium/year, and (4) any fuel residing in the spent pool at the time of shutdown or license expiration being remaining in the pool until transfer to the DOE. Assumptions regarding the removal of spent fuel by the DOE will continue to be assessed and revised, as necessary, with updates to be reflected in future ISFSI decommissioning plans that are submitted to the NRC pursuant to 10 CFR 72.30(c).

In addition, the detailed cost estimate is based on or includes the following:

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[1] Ownership of the 504 and 304 spent fuel assemblies have been transferred to the Shearon Harris Nuclear Power Plant and Brunswick Steam Electric Plant, respectively, and are included in each respective decommissioning spent fuel inventory and strategy.

[2] Atomic Industrial Forum, Inc., "Guidelines for Producing Commercial Nuclear Power Plant Decommissioning Cost Estimates," AIF/NESP-036, May 1986. This document is referenced in NRC's NUREG-1713, "Standard Review Plan for Decommissioning Cost Estimates for Nuclear Power Reactors."

[3] "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.

- the plant operating until the end of its current license;
- the expected ISFSI configuration after all spent fuel and Greater-than-Class-C (GTCC) material has been removed from the site;
- the ISFSI pads not being contaminated, with only verification surveys to be performed;
- the ISFSI being promptly decommissioned (similar to the power reactor DECON alternative) after all spent fuel and GTCC has been removed from the ISFSI, irrespective of the decommissioning alternative identified for the nuclear power plant;
- the costs necessary to terminate the ISFSI's NRC license and meet the §20.1402 criteria for unrestricted use;
- no remediation of contaminated (radiological) soil being required in order to terminate the site operating license;
- no expected interior or exterior radioactive surface contamination of the HSMs; and
- an allowance, equal to the number of HSMs required for final core offload, of HSMs (including heat shield, canister support structure, and miscellaneous steel components within the HSMs) assumed to have some level of neutron-induced activation as a result of the long-term storage of the fuel or GTCC. Controlled disposal costs are included for this allowance of concrete and steel.

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, forms the basis of this cost estimate. Disposition of released material and structures is assumed to be outside the scope of this cost estimate.

A detailed breakdown of the cost to decommission the Robinson ISFSI is provided in the table below. These costs were developed in conjunction with the 2014 Decommissioning Cost Analysis for the Robinson Nuclear Station prepared by TLG Services, Inc. Activity costs for ISFSI decommissioning are divided into 3 phases. The first phase covers initial planning during which the empty casks, ISFSI pads, and surrounding environs are characterized and the activity specifications and work procedures for the decontamination are developed. The next phase includes the cost of removal, packaging, transportation and disposal of the activated components, including supporting equipment, materials and supplies. The final phase includes the cost for the license termination survey, the verification survey, and the associated equipment and laboratory support. The cost estimate also includes costs for the NRC and NRC contractor reviews, Duke Energy's oversight staff, site security (industrial), and other site operating costs. The activities are estimated to begin in 2058 following the removal of all spent fuel from the ISFSI, and are estimated to occur in 123 days.

The methodology employed by TLG Services, Inc., does not assume that all decommissioning activities will be performed by an independent contractor. Because it would be impractical to identify the activities in the cost estimate that are assumed to be performed by an independent contractor, Duke Energy has, as a conservative measure, applied a 20% markup to all costs in the estimate in order to determine the cost of an independent contractor to perform all

decommissioning activities. This markup accounts for profit margin (15%) and risk premium (5%) in amounts consistent with what is applied in Duke Energy's Asset Retirement Obligation. This markup can be seen in the table below and is deemed appropriate because it is conservatively applied to all activity costs even though certain costs already account for performance by an independent contractor or are not activity costs (e.g., property taxes, insurance).

3. Identification of and justification for using the key assumptions contained in the DCE.

The assumptions and justification for those assumptions included in the Robinson ISFSI decommissioning cost estimate are presented in the Section 2 above.

4. A description of the method of assuring funds for decommissioning from paragraph (e) of this section, including means for adjusting cost estimates and associated funding levels periodically over the life of the facility.

Funds from Part 50 external sinking funds are to be used for Part 72 decommissioning. Concurrently with this report and pursuant to 10 CFR 50.75(f)(1), Duke Energy has filed Biennial Decommissioning Financial Assurance Reports (the "2015 DFAs") (Reference 1) and reported in the 2015 DFAs for Robinson Unit 2 that the amounts accumulated and the annual amounts remaining to be collected, together with future earnings on such amounts, includes funding for both estimated reactor and Robinson ISFSI decommissioning costs. When the methodology described in LIC-205, Revision 5 is used to determine whether Duke Energy's decommissioning funding assurance for Robinson Unit 2 exceeds the minimum financial assurance, the amount of surplus in the Part 50 external sinking funds is more than sufficient to fund the estimated Robinson ISFSI decommissioning cost.

In addition, Duke Energy is an electric utility and, as such, can rely solely on the external sinking fund in accordance with 10 CFR 72.30(e)(5). Cost estimates will be adjusted at least every three years and plans submitted to NRC as required by 10 CFR 72.30(b). Funding levels can be periodically adjusted through rate recovery.

5. The volume of onsite subsurface material containing residual radioactivity that will require remediation to meet the criteria for license termination.

There is currently no known subsurface material containing residual radioactivity that will require remediation at decommissioning.

6. A certification that financial assurance for decommissioning has been provided in the amount of the cost estimate for decommissioning.

Duke Energy hereby certifies that financial assurance for decommissioning the Robinson ISFSI has been provided in the amount of the cost estimate for decommissioning using the methodology described in Part 4 above.

Attachment 1
RA-15-0011

H.B. Robinson Steam Electric Plant Unit 2
ISFSI Decommissioning Cost Estimate [1]
(thousands of 2014 dollars)

Activity Description	Removal Costs	Packaging Costs	Transport Costs	Disposal Costs	Other Costs	Total Costs	Waste Volume (cubic feet)	Craft Manhours	Oversight and Contractor Manhours
Decommissioning Contractor									
Planning (characterization, specs and procedures)	-	-	-	-	185.8	185.8	-	-	1,024
Decontamination (activated HSM disposition)	113.1	2.9	468.0	1,089.5	263.0	1,936.5	14,611	1,047	
License Termination (radiological surveys)	-	-	-	-	877.5	877.5	-	7,398	-
Subtotal	**113.1**	**2.9**	**468.0**	**1,089.5**	**1,326.3**	**2,999.8**	**14,611**	**8,446**	**1,024**
Supporting Costs									
NRC and NRC Contractor Fees and Costs	-	-	-	-	383.7	383.7	-	-	776
Insurance	-	-	-	-	95.8	95.8			
Property Taxes	-	-	-	-	6.1	6.1			
Plant Energy Budget	-	-	-	-	22.7	22.7			
Non-Labor Overhead	-	-	-	-	3.0	3.0			
Corporate A&G	-	-	-	-	23.1	23.1			
Security Staff Cost	-	-	-	-	229.5	229.5			5,096
Oversight Staff Cost	-	-	-	-	214.9	214.9			3,866
Subtotal	**-**	**-**	**-**	**-**	**978.6**	**978.6**	**-**	**-**	**9,737**
Total (w/o contingency)	**113.1**	**2.9**	**468.0**	**1,089.5**	**2,304.9**	**3,978.4**	**14,611**	**8,446**	**10,761**
Total (w/25% contingency)	**141.4**	**3.6**	**585.0**	**1,361.9**	**2,881.1**	**4,973.0**			
Total (w/20% 3rd party markup)	**169.7**	**4.4**	**702.0**	**1,634.3**	**3,457.3**	**5,967.6**			

[1] **Includes costs for both the 7P and 24P ISFSIs**

Attachment 2

Brunswick Steam Electric Plant ISFSI Decommissioning Funding Plan

Attachment 2
RA-15-0011

Decommissioning Funding Plan for Independent Spent Fuel Storage Installation

Brunswick Steam Electric Plant, Docket No. 72-6

In accordance with 72.30(c), this decommissioning funding plan is being resubmitted with adjustments as necessary to account for changes in costs and the extent of contamination. This decommissioning funding plan updates the information submitted with the original plan on December 13, 2012 and subsequent RAI responses on September 30, 2013 and specifically considers the effect of the following events on decommissioning costs:

- Spills of radioactive material producing additional residual radioactivity in onsite subsurface material.
- Facility modifications.
- Changes in authorized possession limits.
- Actual remediation costs that exceed the previous cost estimate.

The requirements of a decommissioning funding plan in 10 CFR 72.30(b) are provided below.

1. Information on how reasonable assurance will be provided that funds will be available to decommission the ISFSI or MRS.

10 CFR 72.30(c) requires a decommissioning funding plan be provided at least every three years and at the time of license renewal. Compliance with this part, together with the method of assuring funds described in Part 4 below, will provide reasonable assurance that funds will be available to decommission the Brunswick ISFSI.

2. A detailed cost estimate for decommissioning, in an amount reflecting:

- **The cost of an independent contractor to perform all decommissioning activities;**
- **An adequate contingency factor; and**
- **The cost of meeting the § 20.1402 of this chapter criteria for unrestricted use, provided that, if the applicant or licensee can demonstrate its ability to meet the provisions of § 20.1403 of this chapter, the cost estimate may be based on meeting the § 20.1403 criteria.**

The design and capacity of the Brunswick ISFSI is based upon the NUHOMS-61BTH spent fuel storage system. The system consists of a stainless steel Dry Shielded Canister (DSC), with a nominal capacity of 61 fuel assemblies, and a concrete Horizontal Storage Module (HSM) which houses the DSC during storage.

Assuming Brunswick operates until the expiration of the last of the current operating licenses in 2036, approximately 13,225 spent fuel assemblies are projected to be generated over the life of the plant, 4,397 of which have been shipped to DEP's Shearon Harris Nuclear Power Plant.[1] Brunswick is also storing 304 spent fuel assemblies that have been shipped from DEP's B. B. Robinson Steam Electric Plant Unit 2. Based on a 2026 DOE start date for Brunswick and 75

[1] Ownership of the 4,397 spent fuel assemblies have been transferred to the Shearon Harris Nuclear Power Plant and are included in its decommissioning spent fuel inventory and strategy.

HSMs remaining after cessation of operations, all Brunswick spent fuel is projected to be fully removed from the site in 2073. The 75 HSMs include 67 for spent fuel and 8 for GTCC storage.

Details of the NUHOMS spent fuel storage system, including physical dimensions, can be found in the proprietary version of the Final Safety Analysis Report for the Transnuclear NUHOMS, Docket Number 72-1004.

The methodology used to develop this detailed cost estimate follows the basic approach originally presented in the AIF/NESP-036 study report, "Guidelines for Producing Commercial Nuclear Power Plant Decommissioning Cost Estimates."[2] The methodology includes elements for estimating distributed and undistributed costs. Distributed costs are activity specific and include planning and preparation costs as well as the decontamination, packaging, disposal and removal of components. Undistributed costs are typically time-dependent costs such as utility and decommissioning general contractor staff, property taxes, insurance, regulatory fees and permits, energy costs, and security staff. The methodology also uses a unit factor method for estimating decommissioning activity costs, which simplifies the estimating calculations. Unit factors for concrete removal ($/cubic yard), steel removal ($/ton), and cutting costs ($/inch) are developed using local labor rates.

Inherent in any cost estimate that does not rely on historical data is the inability to specify the precise source of costs imposed by factors such as tool breakage, accidents, illnesses, weather delays, and labor stoppages. In this detailed cost estimate, contingency fulfills this role. Specifically, contingency is added to all costs at a constant 25% rate, consistent with the contingency evaluation criteria referenced by the NRC in NUREG-1757[3].

The detailed cost estimate assumes a spent fuel management strategy, which determines the estimated number of casks of canisters that may be installed at the Brunswick ISFSI and the estimated date for ISFSI decommissioning. The current spent fuel management strategy is based in general upon: (1) an industry and site-specific start date for DOE initiating transfer of commercial spent fuel to a federal facility (not necessarily a final repository), (2) DOE's generator allocation/receipt schedules, which are based upon the oldest fuel receiving the highest priority, (3) a maximum rate of transfer of 3,000 metric tons of uranium/year, and (4) any fuel residing in the spent pool at the time of shutdown or license expiration being remaining in the pool until transfer to the DOE. Assumptions regarding the removal of spent fuel by the DOE will continue to be assessed and revised, as necessary, with updates to be reflected in future ISFSI decommissioning plans that are submitted to the NRC pursuant to 10 CFR 72.30(c).

In addition, the detailed cost estimate is based on or includes the following:

- the plant operating until the end of its current license;

[2] Atomic Industrial Forum, Inc., "Guidelines for Producing Commercial Nuclear Power Plant Decommissioning Cost Estimates," AIF/NESP-036, May 1986. This document is referenced in NRC's NUREG-1713, "Standard Review Plan for Decommissioning Cost Estimates for Nuclear Power Reactors."

[3] "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.

- the expected ISFSI configuration after all spent fuel and Greater-than-Class-C (GTCC) material has been removed from the site;

- the ISFSI pads not being contaminated, with only verification surveys to be performed;

- the ISFSI being promptly decommissioned (similar to the power reactor DECON alternative) after all spent fuel and GTCC has been removed from the ISFSI, irrespective of the decommissioning alternative identified for the nuclear power plant;

- the costs necessary to terminate the ISFSI's NRC license and meet the §20.1402 criteria for unrestricted use;

- no remediation of contaminated (radiological) soil being required in order to terminate the site operating license;

- no expected interior or exterior radioactive surface contamination of the HSMs; and

- an allowance, equal to the number of HSMs required for final core offload, of HSMs (including heat shield, canister support structure, and miscellaneous steel components within the HSMs) assumed to have some level of neutron-induced activation as a result of the long-term storage of the fuel or GTCC. Controlled disposal costs are included for this allowance of concrete and steel.

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, forms the basis of this cost estimate. Disposition of released material and structures is assumed to be outside the scope of this cost estimate.

A detailed breakdown of the cost to decommission the Brunswick ISFSI is provided in the table below. These costs were developed in conjunction with the 2014 Decommissioning Cost Analysis for the Brunswick Nuclear Station prepared by TLG Services, Inc. Activity costs for ISFSI decommissioning are divided into 3 phases. The first phase covers initial planning during which the empty casks, ISFSI pads, and surrounding environs are characterized and the activity specifications and work procedures for the decontamination are developed. The next phase includes the cost of removal, packaging, transportation and disposal of the activated components, including supporting equipment, materials and supplies. The final phase includes the cost for the license termination survey, the verification survey, and the associated equipment and laboratory support. The cost estimate also includes costs for the NRC and NRC contractor reviews, Duke Energy's oversight staff, site security (industrial), and other site operating costs. The activities are estimated to begin in 2073 following the removal of all spent fuel from the ISFSI, and are estimated to occur in 123 days.

The methodology employed by TLG Services, Inc., does not assume that all decommissioning activities will be performed by an independent contractor. Because it would be impractical to identify the activities in the cost estimate that are assumed to be performed by an independent contractor, Duke Energy has, as a conservative measure, applied a 20% markup to all costs in the estimate in order to determine the cost of an independent contractor to perform all decommissioning activities. This markup accounts for profit margin (15%) and risk premium (5%) in amounts consistent with what is applied in Duke Energy's Asset Retirement Obligation. This markup can be seen in the table below and is deemed appropriate because it is

conservatively applied to all activity costs even though certain costs already account for performance by an independent contractor or are not activity costs (e.g., property taxes, insurance).

3. Identification of and justification for using the key assumptions contained in the DCE.

The assumptions and justification for those assumptions included in the Brunswick ISFSI decommissioning cost estimate are presented in the Section 2 above.

4. A description of the method of assuring funds for decommissioning from paragraph (e) of this section, including means for adjusting cost estimates and associated funding levels periodically over the life of the facility.

Funds from Part 50 external sinking funds are to be used for Part 72 decommissioning. Concurrently with this report and pursuant to 10 CFR 50.75(f)(1), Duke Energy has filed on behalf of itself and the co-owners of Brunswick the Biennial Decommissioning Financial Assurance Reports (the "2015 DFAs") (Reference 1) and reported in the 2015 DFAs for Brunswick Unit 1 that the amounts accumulated and the annual amounts remaining to be collected, together with future earnings on such amounts, includes funding for both estimated reactor and Brunswick ISFSI decommissioning costs. When the methodology described in LIC-205, Revision 5 is used to determine whether Duke Energy's decommissioning funding assurance for Brunswick Unit 1 exceeds the minimum financial assurance, the amount of surplus in the Part 50 external sinking funds is more than sufficient to fund the estimated Brunswick ISFSI decommissioning cost.

In addition, Duke Energy and the co-owners of Brunswick are electric utilities and, as such, can rely solely on the external sinking fund in accordance with 10 CFR 72.30(e)(5). Cost estimates will be adjusted at least every three years and plans submitted to NRC as required by 10 CFR 72.30(b). Funding levels can be periodically adjusted through rate recovery.

5. The volume of onsite subsurface material containing residual radioactivity that will require remediation to meet the criteria for license termination.

There is currently no known subsurface material containing residual radioactivity that will require remediation at decommissioning.

6. A certification that financial assurance for decommissioning has been provided in the amount of the cost estimate for decommissioning.

Duke Energy and the co-owners of Brunswick hereby certify that financial assurance for decommissioning the Brunswick ISFSI has been provided in the amount of the cost estimate for decommissioning using the methodology described in Part 4 above.

Attachment 2
RA-15-0011

Brunswick Nuclear Plant
ISFSI Decommissioning Cost Estimate
(thousands of 2014 dollars)

Activity Description	Removal Costs	Packaging Costs	Transport Costs	Disposal Costs	Other Costs	Total Costs	Waste Volume (cubic feet)	Craft Manhours	Oversight and Contractor Manhours
Decommissioning Contractor									
Planning (characterization, specs and procedures)	-	-	-	-	215.5	215.5	-	-	1,096
Decontamination (activated HSM disposition)	172.0	5.1	1,193.9	2,505.9	353.3	4,230.2	36,637	1,743	
License Termination (radiological surveys)	-	-	-	-	933.2	933.2	-	7,960	-
Subtotal	**172.0**	**5.1**	**1,193.9**	**2,505.9**	**1,502.0**	**5,378.9**	**36,637**	**9,704**	**1,096**
Supporting Costs									
NRC and NRC Contractor Fees and Costs	-	-	-	-	383.7	383.7	-	-	776
Insurance	-	-	-	-	101.6	101.6			
Property Taxes	-	-	-	-	0.2	0.2			
Plant Energy Budget	-	-	-	-	26.9	26.9			
Non-Labor Overhead	-	-	-	-	12.0	12.0			
Corporate A&G	-	-	-	-	37.8	37.8			
Security Staff Cost	-	-	-	-	229.5	229.5			5,096
Oversight Staff Cost	-	-	-	-	214.9	214.9			3,866
Subtotal	**-**	**-**	**-**	**-**	**1,006.6**	**1,006.6**	**-**	**-**	**9,737**
Total (w/o contingency)	**172.0**	**5.1**	**1,193.9**	**2,505.9**	**2,508.6**	**6,385.5**	**36,637.0**	**9,703.5**	**10,833.4**
Total (w/25% contingency)	**215.0**	**6.4**	**1,492.4**	**3,132.4**	**3,135.8**	**7,981.9**			
Total (w/20% 3rd party markup)	**258.0**	**7.7**	**1,790.9**	**3,758.9**	**3,762.9**	**9,578.3**			

Attachment 3

Catawba Nuclear Station ISFSI Decommissioning Funding Plan

Attachment 3
RA-15-0011

Decommissioning Funding Plan for Independent Spent Fuel Storage Installation

Catawba Nuclear Station, Docket No. 72-45

In accordance with 72.30(c), this decommissioning funding plan is being resubmitted with adjustments as necessary to account for changes in costs and the extent of contamination. This decommissioning funding plan updates the information submitted with the original plan on December 13, 2012 and subsequent RAI responses on September 30, 2013 and specifically considers the effect of the following events on decommissioning costs:

- Spills of radioactive material producing additional residual radioactivity in onsite subsurface material.
- Facility modifications.
- Changes in authorized possession limits.
- Actual remediation costs that exceed the previous cost estimate.

The requirements of a decommissioning funding plan in 10 CFR 72.30(b) are provided below.

1. Information on how reasonable assurance will be provided that funds will be available to decommission the ISFSI or MRS.

10 CFR 72.30(c) requires a decommissioning funding plan be provided at least every three years and at the time of license renewal. Compliance with this part, together with the method of assuring funds described in Part 4 below, will provide reasonable assurance that funds will be available to decommission the Catawba ISFSI.

2. A detailed cost estimate for decommissioning, in an amount reflecting:

- **The cost of an independent contractor to perform all decommissioning activities;**
- **An adequate contingency factor; and**
- **The cost of meeting the § 20.1402 of this chapter criteria for unrestricted use, provided that, if the applicant or licensee can demonstrate its ability to meet the provisions of § 20.1403 of this chapter, the cost estimate may be based on meeting the § 20.1403 criteria.**

The design and capacity of the Catawba ISFSI is based upon the UMS-24 and MAGNASTOR-37 spent fuel storage systems. The system consists of a stainless steel Transportable Storage Canister (TSC), with a nominal capacity of 24 and 37 fuel assemblies, respectively, and a steel-lined Vertical Concrete Cask (VCC) which houses the TSC during storage.

Assuming Catawba operates until the expiration of the last of the current operating licenses in 2043, approximately 6088 spent fuel assemblies are projected to be generated over the life of the plant. Based on a 2028 DOE start date for Catawba and 77 casks remaining after cessation of operations, all Catawba spent fuel is projected to be fully removed from the site in 2066. The 77 casks include 63 for spent fuel and 14 for GTCC storage.

Details of the UMS-24 spent fuel storage system, including physical dimensions, can be found in the Final Safety Analysis Report (FSAR) for the NAC-UMS Universal Storage System, Docket Number 72-1015. The Docket Number for the MAGNASTOR-37 system is 72-1031.

The methodology used to develop this detailed cost estimate follows the basic approach originally presented in the AIF/NESP-036 study report, "Guidelines for Producing Commercial Nuclear Power Plant Decommissioning Cost Estimates."[1] The methodology includes elements for estimating distributed and undistributed costs. Distributed costs are activity specific and include planning and preparation costs as well as the decontamination, packaging, disposal and removal of components. Undistributed costs are typically time-dependent costs such as utility and decommissioning general contractor staff, property taxes, insurance, regulatory fees and permits, energy costs, and security staff. The methodology also uses a unit factor method for estimating decommissioning activity costs, which simplifies the estimating calculations. Unit factors for concrete removal ($/cubic yard), steel removal ($/ton), and cutting costs ($/inch) are developed using local labor rates.

Inherent in any cost estimate that does not rely on historical data is the inability to specify the precise source of costs imposed by factors such as tool breakage, accidents, illnesses, weather delays, and labor stoppages. In this detailed cost estimate, contingency fulfills this role. Specifically, contingency is added to all costs at a constant 25% rate, consistent with the contingency evaluation criteria referenced by the NRC in NUREG-1757[2].

The detailed cost estimate assumes a spent fuel management strategy, which determines the estimated number of casks of canisters that may be installed at the Catawba ISFSI and the estimated date for ISFSI decommissioning. The current spent fuel management strategy is based in general upon: (1) an industry and site-specific start date for DOE initiating transfer of commercial spent fuel to a federal facility (not necessarily a final repository), (2) DOE's generator allocation/receipt schedules, which are based upon the oldest fuel receiving the highest priority, (3) a maximum rate of transfer of 3,000 metric tons of uranium/year, and (4) any fuel residing in the spent pool at the time of shutdown or license expiration being remaining in the pool until transfer to the DOE. Assumptions regarding the removal of spent fuel by the DOE will continue to be assessed and revised, as necessary, with updates to be reflected in future ISFSI decommissioning plans that are submitted to the NRC pursuant to 10 CFR 72.30(c).

In addition, the detailed cost estimate is based on or includes the following:

- the plant operating until the end of its current license;
- the expected ISFSI configuration after all spent fuel and Greater-than-Class-C (GTCC) material has been removed from the site;
- the ISFSI pads not being contaminated, with only verification surveys to be performed;

[1] Atomic Industrial Forum, Inc., "Guidelines for Producing Commercial Nuclear Power Plant Decommissioning Cost Estimates," AIF/NESP-036, May 1986. This document is referenced in NRC's NUREG-1713, "Standard Review Plan for Decommissioning Cost Estimates for Nuclear Power Reactors."

[2] "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.

- the ISFSI being promptly decommissioned (similar to the power reactor DECON alternative) after all spent fuel and GTCC has been removed from the ISFSI, irrespective of the decommissioning alternative identified for the nuclear power plant;

- the costs necessary to terminate the ISFSI's NRC license and meet the §20.1402 criteria for unrestricted use;

- no remediation of contaminated (radiological) soil being required in order to terminate the site operating license;

- no expected interior or exterior radioactive surface contamination of the VCCs;

- an allowance, equal to the number of VCCs required for final core offload, of VCCs (including steel liner and concrete) assumed to have some level of neutron-induced activation as a result of the long-term storage of the fuel or GTCC. Controlled disposal costs are included for this allowance of concrete and steel.

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, forms the basis of this cost estimate. Disposition of released material and structures is assumed to be outside the scope of this cost estimate.

A detailed breakdown of the cost to decommission the Catawba ISFSI is provided in the table below. These costs were developed in conjunction with the 2013 Decommissioning Cost Analysis for the Catawba Nuclear Station prepared by TLG Services, Inc. Costs were escalated from 2013 to 2014 dollars using the 2014 Consumer Price Index inflation factor of 1.7%. Activity costs for ISFSI decommissioning are divided into 3 phases. The first phase covers initial planning during which the empty casks, ISFSI pads, and surrounding environs are characterized and the activity specifications and work procedures for the decontamination are developed. The next phase includes the cost of removal, packaging, transportation and disposal of the activated components, including supporting equipment, materials and supplies. The final phase includes the cost for the license termination survey, the verification survey, and the associated equipment and laboratory support. The cost estimate also includes costs for the NRC and NRC contractor reviews, Duke Energy's oversight staff, site security (industrial), and other site operating costs. The activities are estimated to begin in 2066 following the removal of all spent fuel from the ISFSI, and are estimated to occur in 123 days.

The methodology employed by TLG Services, Inc., does not assume that all decommissioning activities will be performed by an independent contractor. Because it would be impractical to identify the activities in the cost estimate that are assumed to be performed by an independent contractor, Duke Energy has, as a conservative measure, applied a 15% markup to all costs in the estimate in order to determine the cost of an independent contractor to perform all decommissioning activities. This markup accounts for profit margin (15%) and risk premium (5%) in amounts consistent with what is applied in Duke Energy's Asset Retirement Obligation. This markup can be seen in the table below and is deemed appropriate because it is conservatively applied to all activity costs even though certain costs already account for performance by an independent contractor or are not activity costs (e.g., property taxes, insurance).

3. Identification of and justification for using the key assumptions contained in the DCE.

The assumptions and justification for those assumptions included in the Catawba ISFSI decommissioning cost estimate are presented in the Section 2 above.

4. A description of the method of assuring funds for decommissioning from paragraph (e) of this section, including means for adjusting cost estimates and associated funding levels periodically over the life of the facility.

Funds from Part 50 external sinking funds are to be used for Part 72 decommissioning. Concurrently with this report and pursuant to 10 CFR 50.75(f)(1), Duke Energy has filed on behalf of itself and the co-owners of Catawba the Biennial Decommissioning Financial Assurance Reports (the "2015 DFAs") (Reference 1) and reported in the 2015 DFAs for Catawba Unit 2 that the amounts accumulated and the annual amounts remaining to be collected, together with future earnings on such amounts, includes funding for both estimated reactor and Catawba ISFSI decommissioning costs. When the methodology described in LIC-205, Revision 5 is used to determine whether Duke Energy's decommissioning funding assurance for Catawba Unit 2 exceeds the minimum financial assurance, the amount of surplus in the Part 50 external sinking funds is more than sufficient to fund the estimated Catawba ISFSI decommissioning cost.

In addition, Duke Energy and the co-owners of Catawba are electric utilities and, as such, can rely solely on the external sinking fund in accordance with 10 CFR 72.30(e)(5). Cost estimates will be adjusted at least every three years and plans submitted to NRC as required by 10 CFR 72.30(b). Funding levels can be periodically adjusted through rate recovery.

5. The volume of onsite subsurface material containing residual radioactivity that will require remediation to meet the criteria for license termination.

There is currently no known subsurface material containing residual radioactivity that will require remediation at decommissioning.

6. A certification that financial assurance for decommissioning has been provided in the amount of the cost estimate for decommissioning.

Duke Energy and the co-owners of Catawba hereby certify that financial assurance for decommissioning the Catawba ISFSI has been provided in the amount of the cost estimate for decommissioning using the methodology described in Part 4 above.

Attachment 3
RA-15-0011

Catawba Nuclear Station
ISFSI Decommissioning Cost Estimate
(thousands of 2014 dollars)

Activity Description	Removal Costs	Packaging Costs	Transport Costs	LLRW Disposal Costs	Other Costs	Total Costs	Burial Volume Class A (cubic feet)	Craft Manhours	Oversight and Contractor Manhours Hours
Decommissioning Contractor									
Planning (characterization, specs and procedures)	-	-	-	-	236.7	236.7	-	-	1,096
Decontamination (activated liner removal)	362.9	240.1	409.9	2,480.0	-	3,492.8	10,462	3,294	
License Termination (radiological surveys)	-	-	-	-	1,158.3	1,158.3	-	10,172	-
Subtotal	**362.9**	**240.1**	**409.9**	**2,480.0**	**1,394.9**	**4,887.7**	**10,462**	**13,466**	**1,096**
Supporting Costs									
NRC and NRC Contractor Fees and Costs	-	-	-	-	413.8	413.8	-	-	776
Insurance	-	-	-	-	82.9	82.9			
Property taxes	-	-	-	-	17.1	17.1			
Plant energy budget	-	-	-	-	25.2	25.2			
Corporate A&G	-	-	-	-	23.5	23.5			
Non-Labor Overhead	-	-	-	-	1.0	1.0			
Security Staff Cost	-	-	-	-	201.6	201.6			5,096
Oversight Staff Cost	-	-	-	-	249.9	249.9			3,866
Subtotal	**-**	**-**	**-**	**-**	**1,015.1**	**1,015.1**	**-**	**-**	**9,737.4**
Total (w/o contingency)	**362.9**	**240.1**	**409.9**	**2,480.0**	**2,410.0**	**5,902.8**	**10,462**	**13,466**	**10,833**
Total (w/25% contingency)	**453.6**	**300.1**	**512.3**	**3,099.9**	**3,012.5**	**7,378.5**			
Total (w/20% 3rd party markup)	**544.3**	**360.2**	**614.8**	**3,719.9**	**3,615.0**	**8,854.2**			

Attachment 4

McGuire Nuclear Station ISFSI Decommissioning Funding Plan

Attachment 4
RA-15-0011

Decommissioning Funding Plan for Independent Spent Fuel Storage Installation

McGuire Nuclear Station, Docket No. 72-38

In accordance with 72.30(c), this decommissioning funding plan is being resubmitted with adjustments as necessary to account for changes in costs and the extent of contamination. This decommissioning funding plan updates the information submitted with the original plan on December 13, 2012 and subsequent RAI responses on September 30, 2013 and specifically considers the effect of the following events on decommissioning costs:

- Spills of radioactive material producing additional residual radioactivity in onsite subsurface material.
- Facility modifications.
- Changes in authorized possession limits.
- Actual remediation costs that exceed the previous cost estimate.

The requirements of a decommissioning funding plan in 10 CFR 72.30(b) are provided below.

1. Information on how reasonable assurance will be provided that funds will be available to decommission the ISFSI or MRS.

10 CFR 72.30(c) requires a decommissioning funding plan be provided at least every three years and at the time of license renewal. Compliance with this part, together with the method of assuring funds described in Part 4 below, will provide reasonable assurance that funds will be available to decommission the McGuire ISFSI.

2. A detailed cost estimate for decommissioning, in an amount reflecting:

- **The cost of an independent contractor to perform all decommissioning activities;**
- **An adequate contingency factor; and**
- **The cost of meeting the § 20.1402 of this chapter criteria for unrestricted use, provided that, if the applicant or licensee can demonstrate its ability to meet the provisions of § 20.1403 of this chapter, the cost estimate may be based on meeting the § 20.1403 criteria.**

The design and capacity of the McGuire ISFSI is based upon the UMS-24, MAGNASTOR-37 and TN-32 spent fuel storage systems. The systems consists of a stainless steel Transportable Storage Canister (TSC), with a nominal capacity of 24, 37 and 32 fuel assemblies, respectively, and a steel-lined Vertical Concrete Cask (VCC) which houses the TSC during storage.

Assuming McGuire operates until the expiration of the last of the current operating licenses in 2043, approximately 6246 spent fuel assemblies are projected to be generated over the life of the plant. McGuire is also storing 300 spent fuel assemblies that have been shipped from DEC's Oconee Nuclear Station.[1] Based on a 2028 DOE start date for McGuire and 95 casks

[1] McGuire has taken ownership of the 300 Oconee Nuclear Station spent fuel assemblies and has included them in the decommissioning spent fuel inventory and strategy which serve as an input to the costs provided in the table below.

remaining after cessation of operations, all McGuire spent fuel is projected to be fully removed from the site in 2066. The 95 casks include 81 for spent fuel and 14 for GTCC storage.

Details of the UMS-24 spent fuel storage system, including physical dimensions, can be found in the Final Safety Analysis Report (FSAR) for the NAC-UMS Universal Storage System, Docket Number 72-1015. The Docket Numbers for the MAGNASTOR-37 and TN-32 systems are 72-1031 and 72-1021, respectively.

The methodology used to develop this detailed cost estimate follows the basic approach originally presented in the AIF/NESP-036 study report, "Guidelines for Producing Commercial Nuclear Power Plant Decommissioning Cost Estimates."[2] The methodology includes elements for estimating distributed and undistributed costs. Distributed costs are activity specific and include planning and preparation costs as well as the decontamination, packaging, disposal and removal of components. Undistributed costs are typically time-dependent costs such as utility and decommissioning general contractor staff, property taxes, insurance, regulatory fees and permits, energy costs, and security staff. The methodology also uses a unit factor method for estimating decommissioning activity costs, which simplifies the estimating calculations. Unit factors for concrete removal ($/cubic yard), steel removal ($/ton), and cutting costs ($/inch) are developed using local labor rates.

Inherent in any cost estimate that does not rely on historical data is the inability to specify the precise source of costs imposed by factors such as tool breakage, accidents, illnesses, weather delays, and labor stoppages. In this detailed cost estimate, contingency fulfills this role. Specifically, contingency is added to all costs at a constant 25% rate, consistent with the contingency evaluation criteria referenced by the NRC in NUREG-1757[3].

The detailed cost estimate assumes a spent fuel management strategy, which determines the estimated number of casks of canisters that may be installed at the McGuire ISFSI and the estimated date for ISFSI decommissioning. The current spent fuel management strategy is based in general upon: (1) an industry and site-specific start date for DOE initiating transfer of commercial spent fuel to a federal facility (not necessarily a final repository), (2) DOE's generator allocation/receipt schedules, which are based upon the oldest fuel receiving the highest priority, (3) a maximum rate of transfer of 3,000 metric tons of uranium/year, and (4) any fuel residing in the spent pool at the time of shutdown or license expiration being remaining in the pool until transfer to the DOE. Assumptions regarding the removal of spent fuel by the DOE will continue to be assessed and revised, as necessary, with updates to be reflected in future ISFSI decommissioning plans that are submitted to the NRC pursuant to 10 CFR 72.30(c).

In addition, the detailed cost estimate is based on or includes the following:

- the plant operating until the end of its current license;

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[2] Atomic Industrial Forum, Inc., "Guidelines for Producing Commercial Nuclear Power Plant Decommissioning Cost Estimates," AIF/NESP-036, May 1986. This document is referenced in NRC's NUREG-1713, "Standard Review Plan for Decommissioning Cost Estimates for Nuclear Power Reactors."

[3] "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.

- the expected ISFSI configuration after all spent fuel and Greater-than-Class-C (GTCC) material has been removed from the site;

- the ISFSI pads not being contaminated, with only verification surveys to be performed;

- the ISFSI being promptly decommissioned (similar to the power reactor DECON alternative) after all spent fuel and GTCC has been removed from the ISFSI, irrespective of the decommissioning alternative identified for the nuclear power plant;

- the costs necessary to terminate the ISFSI's NRC license and meet the §20.1402 criteria for unrestricted use;

- no remediation of contaminated (radiological) soil being required in order to terminate the site operating license;

- no expected interior or exterior radioactive surface contamination of the VCCs;

- an allowance, equal to the number of VCCs required for final core offload, of VCCs (including steel liner and concrete) assumed to have some level of neutron-induced activation as a result of the long-term storage of the fuel or GTCC. Controlled disposal costs are included for this allowance of concrete and steel.

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, forms the basis of this cost estimate. Disposition of released material and structures is assumed to be outside the scope of this cost estimate.

A detailed breakdown of the cost to decommission the McGuire ISFSI is provided in the Table 2. These costs were developed in conjunction with the 2013 Decommissioning Cost Analysis for the McGuire Nuclear Station prepared by TLG Services, Inc. Costs were escalated from 2013 to 2014 dollars using the 2014 Consumer Price Index inflation factor of 1.7%. Activity costs for ISFSI decommissioning are divided into 3 phases. The first phase covers initial planning during which the empty casks, ISFSI pads, and surrounding environs are characterized and the activity specifications and work procedures for the decontamination are developed. The next phase includes the cost of removal, packaging, transportation and disposal of the activated components, including supporting equipment, materials and supplies. The final phase includes the cost for the license termination survey, the verification survey, and the associated equipment and laboratory support. The cost estimate also includes costs for the NRC and NRC contractor reviews, Duke Energy's oversight staff, site security (industrial), and other site operating costs. The activities are estimated to begin in 2066 following the removal of all spent fuel from the ISFSI, and are estimated to occur in 123 days.

The methodology employed by TLG Services, Inc., does not assume that all decommissioning activities will be performed by an independent contractor. Because it would be impractical to identify the activities in the cost estimate that are assumed to be performed by an independent contractor, Duke Energy has, as a conservative measure, applied a 20% markup to all costs in the estimate in order to determine the cost of an independent contractor to perform all decommissioning activities. This markup accounts for profit margin (15%) and risk premium (5%) in amounts consistent with what is applied in Duke Energy's Asset Retirement Obligation. This markup can be seen in the table below and is deemed appropriate because it is

conservatively applied to all activity costs even though certain costs already account for performance by an independent contractor or are not activity costs (e.g., property taxes, insurance).

3. Identification of and justification for using the key assumptions contained in the DCE.

The assumptions and justification for those assumptions included in the McGuire ISFSI decommissioning cost estimate are presented in the Section 2 above.

4. A description of the method of assuring funds for decommissioning from paragraph (e) of this section, including means for adjusting cost estimates and associated funding levels periodically over the life of the facility.

Funds from Part 50 external sinking funds are to be used for Part 72 decommissioning. Concurrently with this report and pursuant to 10 CFR 50.75(f)(1), Duke Energy has filed Biennial Decommissioning Financial Assurance Reports (the "2015 DFAs") (Reference 1) and reported in the 2015 DFAs for McGuire Unit 2 that the amounts accumulated, together with future earnings on such amounts, includes funding for both estimated reactor and McGuire ISFSI decommissioning costs. When the methodology described in LIC-205, Revision 5 is used to determine whether Duke Energy's decommissioning funding assurance for McGuire Unit 2 exceeds the minimum financial assurance, the amount of surplus in the Part 50 external sinking funds is more than sufficient to fund the estimated McGuire ISFSI decommissioning cost.

In addition, Duke Energy is an electric utility and, as such, can rely solely on the external sinking fund in accordance with 10 CFR 72.30(e)(5). Cost estimates will be adjusted at least every three years and plans submitted to NRC as required by 10 CFR 72.30(b). Funding levels can be periodically adjusted through rate recovery.

5. The volume of onsite subsurface material containing residual radioactivity that will require remediation to meet the criteria for license termination.

There is currently no known subsurface material containing residual radioactivity that will require remediation at decommissioning.

6. A certification that financial assurance for decommissioning has been provided in the amount of the cost estimate for decommissioning.

Duke Energy hereby certifies that financial assurance for decommissioning the McGuire ISFSI has been provided in the amount of the cost estimate for decommissioning using the methodology described in Part 4 above.

Attachment 4
RA-15-0011

McGuire Nuclear Station
ISFSI Decommissioning Cost Estimate
(thousands of 2014 dollars)

Activity Description	Removal Costs	Packaging Costs	Transport Costs	LLRW Disposal Costs	Other Costs	Total Costs	Burial Volume Class A (cubic feet)	Craft Manhours	Oversight and Contractor Manhours Hours
Decommissioning Contractor									
Planning (characterization, specs and procedures)	-	-	-	-	262.2	262.2	-	-	1,144
Decontamination (activated liner removal)	435.7	311.5	409.1	3,109.4	-	4,265.7	13,099	4,069	
License Termination (radiological surveys)	-	-	-	-	1,198.0	1,198.0	-	10,858	-
Subtotal	**435.7**	**311.5**	**409.1**	**3,109.4**	**1,460.2**	**5,725.9**	**13,099**	**14,927**	**1,144**
Supporting Costs									
NRC and NRC Contractor Fees and Costs	-	-	-	-	415.6	415.6	-	-	776
Insurance	-	-	-	-	82.9	82.9			
Property taxes	-	-	-	-	0.5	0.5			
Plant energy budget	-	-	-	-	25.4	25.4			
Corporate A&G	-	-	-	-	23.5	23.5			
Non-Labor Overhead	-	-	-	-	1.0	1.0			
Security Staff Cost	-	-	-	-	201.6	201.6			5,096
Oversight Staff Cost	-	-	-	-	249.9	249.9			3,866
Subtotal	**-**	**-**	**-**	**-**	**1,000.6**	**1,000.6**	**-**	**-**	**9,737**
Total (w/o contingency)	**435.7**	**311.5**	**409.1**	**3,109.4**	**2,460.8**	**6,726.5**	**13,099**	**14,927**	**10,881**
Total (w/25% contingency)	**544.6**	**389.4**	**511.4**	**3,886.7**	**3,076.0**	**8,408.1**			
Total (w/20% 3rd party markup)	**653.5**	**467.3**	**613.7**	**4,664.1**	**3,691.1**	**10,089.7**			

Attachment 5

Oconee Nuclear Station ISFSI Decommissioning Funding Plan

Attachment 5
RA-15-0011

Decommissioning Funding Plan for Independent Spent Fuel Storage Installation

Oconee Nuclear Station, Docket No. 72-04/License SNM-2503

Oconee Nuclear Station, Docket No. 72-40

In accordance with 72.30(c), this decommissioning funding plan is being resubmitted with adjustments as necessary to account for changes in costs and the extent of contamination. This decommissioning funding plan updates the information submitted with the original plan on December 13, 2012 and subsequent RAI responses on September 30, 2013 and specifically considers the effect of the following events on decommissioning costs:

- Spills of radioactive material producing additional residual radioactivity in onsite subsurface material.
- Facility modifications.
- Changes in authorized possession limits.
- Actual remediation costs that exceed the previous cost estimate.

The requirements of a decommissioning funding plan in 10 CFR 72.30(b) are provided below.

1. Information on how reasonable assurance will be provided that funds will be available to decommission the ISFSI or MRS.

10 CFR 72.30(c) requires a decommissioning funding plan be provided at least every three years and at the time of license renewal. Compliance with this part, together with the method of assuring funds described in Part 4 below, will provide reasonable assurance that funds will be available to decommission the Oconee ISFSI.

2. A detailed cost estimate for decommissioning, in an amount reflecting:

- **The cost of an independent contractor to perform all decommissioning activities;**
- **An adequate contingency factor; and**
- **The cost of meeting the § 20.1402 of this chapter criteria for unrestricted use, provided that, if the applicant or licensee can demonstrate its ability to meet the provisions of § 20.1403 of this chapter, the cost estimate may be based on meeting the § 20.1403 criteria.**

The design and capacity of the Oconee ISFSI is based upon the NUHOMS-24P spent fuel storage system. The system consists of a stainless steel Dry Shielded Canister (DSC), with a nominal capacity of 24 fuel assemblies, and a concrete Horizontal Storage Module (HSM) which houses the DSC during storage.

Assuming Oconee operates until the expiration of the last of the current operating licenses in 2034, approximately 7414 spent fuel assemblies are projected to be generated over the life of the plant, 300 of which have been shipped to DEC's McGuire Nuclear Station.[1] Based on a 2026 DOE start date for Oconee and 166 DCSs remaining after cessation of operations, all

[1] Ownership of the 300 spent fuel assemblies have been transferred to the McGuire Nuclear Station and are included in its decommissioning spent fuel inventory and strategy.

Oconee spent fuel is projected to be fully removed from the site in 2058. The 166 DCSs include 151 for spent fuel and 15 for GTCC storage.

Details of the NUHOMS spent fuel storage system, including physical dimensions, can be found in the proprietary version of the Final Safety Analysis Report for the Transnuclear NUHOMS, Docket Number 72-1004.

The methodology used to develop this detailed cost estimate follows the basic approach originally presented in the AIF/NESP-036 study report, "Guidelines for Producing Commercial Nuclear Power Plant Decommissioning Cost Estimates."[2] The methodology includes elements for estimating distributed and undistributed costs. Distributed costs are activity specific and include planning and preparation costs as well as the decontamination, packaging, disposal and removal of components. Undistributed costs are typically time-dependent costs such as utility and decommissioning general contractor staff, property taxes, insurance, regulatory fees and permits, energy costs, and security staff. The methodology also uses a unit factor method for estimating decommissioning activity costs, which simplifies the estimating calculations. Unit factors for concrete removal ($/cubic yard), steel removal ($/ton), and cutting costs ($/inch) are developed using local labor rates.

Inherent in any cost estimate that does not rely on historical data is the inability to specify the precise source of costs imposed by factors such as tool breakage, accidents, illnesses, weather delays, and labor stoppages. In this detailed cost estimate, contingency fulfills this role. Specifically, contingency is added to all costs at a constant 25% rate, consistent with the contingency evaluation criteria referenced by the NRC in NUREG-1757[3].

The detailed cost estimate assumes a spent fuel management strategy, which determines the estimated number of casks of canisters that may be installed at the Oconee ISFSI and the estimated date for ISFSI decommissioning. The current spent fuel management strategy is based in general upon: (1) an industry and site-specific start date for DOE initiating transfer of commercial spent fuel to a federal facility (not necessarily a final repository), (2) DOE's generator allocation/receipt schedules, which are based upon the oldest fuel receiving the highest priority, (3) a maximum rate of transfer of 3,000 metric tons of uranium/year, and (4) any fuel residing in the spent pool at the time of shutdown or license expiration being remaining in the pool until transfer to the DOE. Assumptions regarding the removal of spent fuel by the DOE will continue to be assessed and revised, as necessary, with updates to be reflected in future ISFSI decommissioning plans that are submitted to the NRC pursuant to 10 CFR 72.30(c).

In addition, the detailed cost estimate is based on or includes the following:

- the plant operating until the end of its current license;

[2] Atomic Industrial Forum, Inc., "Guidelines for Producing Commercial Nuclear Power Plant Decommissioning Cost Estimates," AIF/NESP-036, May 1986. This document is referenced in NRC's NUREG-1713, "Standard Review Plan for Decommissioning Cost Estimates for Nuclear Power Reactors."

[3] "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.

- the expected ISFSI configuration after all spent fuel and Greater-than-Class-C (GTCC) material has been removed from the site;

- the ISFSI pads not being contaminated, with only verification surveys to be performed;

- the ISFSI being promptly decommissioned (similar to the power reactor DECON alternative) after all spent fuel and GTCC has been removed from the ISFSI, irrespective of the decommissioning alternative identified for the nuclear power plant;

- the costs necessary to terminate the ISFSI's NRC license and meet the §20.1402 criteria for unrestricted use;

- no remediation of contaminated (radiological) soil being required in order to terminate the site operating license;

- no expected interior or exterior radioactive surface contamination of the HSMs; and

- an allowance, equal to the number of HSMs required for final core offload, of HSMs (including heat shield, canister support structure, and miscellaneous steel components within the HSMs) assumed to have some level of neutron-induced activation as a result of the long-term storage of the fuel or GTCC. Controlled disposal costs are included for this allowance of concrete and steel.

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, forms the basis of this cost estimate. Disposition of released material and structures is assumed to be outside the scope of this cost estimate.

A detailed breakdown of the cost to decommission the Oconee ISFSI is provided in the table below. These costs were developed in conjunction with the 2013 Decommissioning Cost Analysis for the Oconee Nuclear Station prepared by TLG Services, Inc. Costs were escalated from 2013 to 2014 dollars using the 2014 Consumer Price Index inflation factor of 1.7%. Activity costs for ISFSI decommissioning are divided into 3 phases. The first phase covers initial planning during which the empty casks, ISFSI pads, and surrounding environs are characterized and the activity specifications and work procedures for the decontamination are developed. The next phase includes the cost of removal, packaging, transportation and disposal of the activated components, including supporting equipment, materials and supplies. The final phase includes the cost for the license termination survey, the verification survey, and the associated equipment and laboratory support. The cost estimate also includes costs for the NRC and NRC contractor reviews, Duke Energy's oversight staff, site security (industrial), and other site operating costs. The activities are estimated to begin in 2058 following the removal of all spent fuel from the ISFSI, and are estimated to occur in 123 days.

The methodology employed by TLG Services, Inc., does not assume that all decommissioning activities will be performed by an independent contractor. Because it would be impractical to identify the activities in the cost estimate that are assumed to be performed by an independent contractor, Duke Energy has, as a conservative measure, applied a 20% markup to all costs in the estimate in order to determine the cost of an independent contractor to perform all decommissioning activities. This markup accounts for profit margin (15%) and risk premium (5%) in amounts consistent with what is applied in Duke Energy's Asset Retirement Obligation.

This markup can be seen in the table below and is deemed appropriate because it is conservatively applied to all activity costs even though certain costs already account for performance by an independent contractor or are not activity costs (e.g., property taxes, insurance).

3. Identification of and justification for using the key assumptions contained in the DCE.

The assumptions and justification for those assumptions included in the Oconee ISFSI decommissioning cost estimate are presented in the Section 2 above.

4. A description of the method of assuring funds for decommissioning from paragraph (e) of this section, including means for adjusting cost estimates and associated funding levels periodically over the life of the facility.

Funds from Part 50 external sinking funds are to be used for Part 72 decommissioning. Concurrently with this report and pursuant to 10 CFR 50.75(f)(1), Duke Energy has filed Biennial Decommissioning Financial Assurance Reports (the "2015 DFAs") (Reference 1) and reported in the 2015 DFAs for Oconee Unit 3 that amounts accumulated, together with future earnings on such amounts, includes funding for both estimated reactor and Oconee ISFSI decommissioning costs. When the methodology described in LIC-205, Revision 5 is used to determine whether Duke Energy's decommissioning funding assurance for Oconee Unit 3 exceeds the minimum financial assurance, the amount of surplus in the Part 50 external sinking funds is more than sufficient to fund the estimated Oconee ISFSI decommissioning cost.

In addition, Duke Energy is an electric utility and, as such, can rely solely on the external sinking fund in accordance with 10 CFR 72.30(e)(5). Cost estimates will be adjusted at least every three years and plans submitted to NRC as required by 10 CFR 72.30(b). Funding levels can be periodically adjusted through rate recovery.

5. The volume of onsite subsurface material containing residual radioactivity that will require remediation to meet the criteria for license termination.

There is currently no known subsurface material containing residual radioactivity that will require remediation at decommissioning.

6. A certification that financial assurance for decommissioning has been provided in the amount of the cost estimate for decommissioning.

Duke Energy hereby certifies that financial assurance for decommissioning the Oconee ISFSI has been provided in the amount of the cost estimate for decommissioning using the methodology described in Part 4 above.

Attachment 5
RA-15-0011

Oconee Nuclear Station
ISFSI Decommissioning Cost Estimate
(thousands of 2014 dollars)

Activity Description	Removal Costs	Packaging Costs	Transport Costs	LLRW Disposal Costs	Other Costs	Total Costs	Burial Volume Class A (cubic feet)	Craft Manhours	Oversight and Contractor Manhours Hours
Decommissioning Contractor									
Planning (characterization, specs and procedures)	-	-	-	-	203.4	203.4	-	-	1,312
Decontamination (activated HSM disposition)	194.5	8.6	1,691.8	3,145.3	-	5,040.2	44,708	10,815	-
License Termination (radiological surveys)	-	-	-	-	1,569.0	1,569.0	-	15,104	-
Subtotal	**194.5**	**8.6**	**1,691.8**	**3,145.3**	**1,772.4**	**6,812.6**	**44,708**	**25,919**	**1,312**
Supporting Costs									
NRC and NRC Contractor Fees and Costs	-	-	-	-	412.4	412.4	0	-	776
Insurance	-	-	-	-	118.5	118.5			
Property taxes	-	-	-	-	2.0	2.0			
Plant energy budget	-	-	-	-	21.1	21.1			
Corporate A&G	-	-	-	-	23.5	23.5			
Non-Labor Overhead	-	-	-	-	1.0	1.0			
Security Staff Cost	-	-	-	-	201.6	201.6			5,096
Oversight Staff Cost	-	-	-	-	249.9	249.9			3,866
Subtotal	**-**	**-**	**-**	**-**	**1,030.1**	**1,030.1**	**-**	**-**	**9,737**
Total (w/o contingency)	**194.5**	**8.6**	**1,691.8**	**3,145.3**	**2,802.6**	**7,842.7**	**44,708**	**25,919**	**11,049**
Total (w/25% contingency)	**243.1**	**10.8**	**2,114.7**	**3,931.6**	**3,503.2**	**9,803.4**			
Total (w/20% 3rd party markup)	**291.7**	**13.0**	**2,537.7**	**4,717.9**	**4,203.9**	**11,764.1**			