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POWER PROJECT
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LO-129873

November 14, 2022

Docket No. 99902052

U.S. Nuclear Regulatory Commission
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SUBJECT: NuScale Power, LLC Submittal on Behalf of Carbon Free Power Project, LLC (CFPP), "CFPP Decommissioning Cost Estimate Methodology" White Paper, WP-129872, Revision 0

REFERENCE: LO-118003, NuScale Power, LLC Submittal of Presentation Materials Entitled "Carbon Free Power Project (CFPP) Combined License Application (COLA) Presentation Regulatory Engagement Plan, (Closed Session)" PM-117791, Revision 0 (ML22130A800)

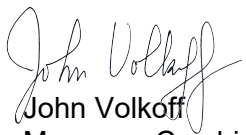
During a closed session public meeting on May 19, 2022, CFPP presented to the NRC staff an overview of the CFPP decommissioning funding planned approach (Reference). During this meeting the staff indicated that this topic would best be addressed through the submission of a white paper.

The purpose of this letter is to submit the enclosed CFPP Decommissioning Cost Estimate Methodology white paper for the staff's review on behalf of CFPP. The paper describes the approach being used by the CFPP to determine the decommissioning cost estimate.

CFPP respectfully requests the NRC's feedback on the enclosed white paper by December 14, 2022.

If you have any questions, please contact Susan Baughn at 541-452-7319 or at sbaughn@nuscalepower.com

Sincerely,



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Enclosure 1: "CFPP Decommissioning Cost Estimate Methodology" White Paper, WP-129872, Revision 0, nonproprietary

Enclosure 1:

"CFPP Decommissioning Cost Estimate Methodology" White Paper, WP-129872, Revision 0, nonproprietary

CFPP Decommissioning Cost Estimate Methodology

1.0 Introduction

The Carbon Free Power Project (CFPP) and the Nuclear Regulatory Commission (NRC) Staff held a meeting on May 19, 2022, to discuss the CFPP regulatory engagement plan. One of the issues addressed in that meeting is CFPP's planned approach to address decommissioning funding assurance (DFA) pursuant to the requirements of 10 CFR 50.75. The planned approach utilizes for the initial decommissioning cost estimate (DCE) the regulatory formula prescribed by 10 CFR 50.75(c) applied to the cumulative thermal power rating of the six-module NuScale Power Plant (NPP) planned for CFPP.

This paper further elaborates on the summary presented in that meeting. As discussed therein, CFPP determined that the planned approach is allowable under existing rules without an exemption. From this white paper, CFPP seeks feedback on the planned approach, particularly NRC's regulatory interpretation as to whether an exemption request must be submitted with the Combined License Application (COLA).

2.0 Discussion

2.1 Background

10 CFR 50.75, "Reporting and Recordkeeping for Decommissioning Planning," imposes requirements for a reactor licensee's provision of reasonable assurance that funds will be available for the decommissioning process. In the requisite DFA report, a COLA applicant must certify that DFA will be provided no later than 30 days after the NRC publishes the notice of intended operation under 10 CFR 52.103(a). 10 CFR 50.75(b) provides two options for the initial DCE for certification—a prescriptive minimum, or a larger amount from a site-specific DCE.

The table in 10 CFR 50.75(c)(1) sets the minimum DFA amounts for power reactors based on reactor type and thermal power level, in 1986 dollars; that amount must be annually adjusted by at least the adjustment factor prescribed by 10 CFR 50.75(c)(2). The table provides three ranges of reactor power levels: those greater than or equal to 3,400 megawatts thermal (MWt) require a fixed, maximum amount; reactors between 1,200 and 3,400 MWt are calculated using a formula; and all reactors with a thermal power rating of 1,200 MWt or less must have at least the amount required for a 1,200 MWt reactor.

Pursuant to 10 CFR 50.75(b)(4), the certified DFA amount for power reactors "may be based on a cost estimate for decommissioning the facility." However, subparagraph (b)(1) limits that facility-specific cost estimate to an amount that is more than the minimums prescribed by the table. Non-power reactor licensees must provide a facility-specific DCE and provide for the DFA funds in accordance with it, with no funding minimums prescribed.

NRC regulations do not provide DCE formulas specific to Small Modular Reactor (SMR) designs, and for power reactors such as CFPP's planned NPP the minimum amounts prescribed in 10 CFR 50.75(c)(1) apply. While the regulations do allow the use of a site-specific estimate instead of the amount calculated through a generic formula for large pressurized-water

and boiling-water reactors, that site-specific estimate must be equal to or greater than the amount of the generic formula.

In SECY-11-0181, "Decommissioning Funding Assurance for Small Modular Nuclear Reactors," NRC Staff summarized their efforts and conclusions assessing the issue of DFA for SMRs. The Staff recognized the differences in size and design features between SMRs and large light-water reactors (LLWRs) were expected to yield differences in the decommissioning cost. The Staff's conclusion was to allow SMR applicants in the near term to deviate from the 10 CFR 50.75 minimum DFA amounts using an exemption and "fully justified and supported" site-specific DCE, while in the longer term Staff would seek to update the DFA rules.

2.2 NuScale Facility Within the Decommissioning Funding Framework

The SMRs considered by Staff in SECY-11-0181, and the Nuclear Energy Institute (NEI) in their position paper "Decommissioning Funding for Small Reactors"[1] cover a wide range of reactor types and sizes. The NuScale design that will be incorporated into the CFPP COLA is composed of six NuScale Power Modules (NPMs) within a single reactor building. The NPMs are integral PWRs, each rated at 250 MWt, for a plant gross thermal power rating of 1,500 MWt.

Thus, unlike some other SMRs, the NPP when considered in total is of a reactor design and scale contemplated by the existing regulations. However, the NuScale design incorporates features—reduced size and quantity of components, and less complexity and modular construction—that the Staff recognized in SECY-11-0181 are expected to yield differences in decommissioning costs.

Considered on a per-reactor basis, under 10 CFR 50.75(c) each NPM would be treated as a 1,200 MWt PWR reactor. The minimum DFA amount would thus be over $85 million (1986 dollars) per reactor, and over $500 million (1986 dollars) for a six NPM power plant. A comparable minimum amount would be required for six separate PWRs on the scale of San Ononfre Unit 1, a Westinghouse 3-loop PWR.

2.3 Alternative Approaches

In light of the DFA amount suggested by the 10 CFR 50.75(c) minimums on a per-reactor basis, NuScale commissioned a study of other options. While not specific to the CFPP site, this study was used to assess the practicability of different approaches and compare their preliminary results.

First, as suggested by SECY-11-0181, the study developed a simplified site-specific cost estimate. A preliminary assessment used recent decommissioning cost estimates for several sites in one region of the United States to determine a representative size-based decommissioning rate in dollars per MWt. That base rate would be applied to the total NPP power rating, and adjusted by a "design adjustment factor" that adjusts the representative cost estimate to an NPP based on differences in design relevant to decommissioning.

The study also considered using the 10 CFR 50.75(c) table amounts, but treating the total cumulative six-module power rating as a single reactor for the DCE. This approach would rely

[1] Adams accession number ML103070135.

on the established, power-level based DCE formula and annual adjustment factor, but recognizes the nature of the NuScale design as separate NPMs sharing major site features.

The preliminary results of these calculations were similar (within several percent of each other), with the 10 CFR 50.75(c) formulaic approach the larger of the two. Therefore, this cost estimate investigation showed that the approach prescribed by regulation, using cumulative power level, is feasible, yields reasonable results for the NPP, and is straightforward to implement.

2.4 CFPP Proposed Approach to DFA

CFPP plans to include in the COLA an initial DCE calculated in accordance with the formula and adjustment factor codified in 10 CFR 50.75(c)(1) and (c)(2), respectively. The adjustment factor will incorporate escalation factors taken from regional data of U.S. Department of Labor, Bureau of Labor Statistics (BLS), and NUREG-1307, "Report on Waste Burial Charges." The calculation will use the latest available NRC guidance, including updated guidance expected in early 2023, to yield an amount in 2022 dollars. The estimated funding amount will be included in the decommissioning report submitted in Part 1 of the CFPP COLA.

In order to utilize this prescriptive approach, CFPP intends to use the cumulative thermal capacity of the CFPP six-module plant (1,500 MWt) as *P* in the 10 CFR 50.75(c)(1)(i) formula. CFPP has determined, as explained next, that this cumulative power level approach is allowable under the existing regulations.

As a general notion, CFPP recognizes that the decommissioning planning framework of 10 CFR 50.75 was envisioned to apply to individual large reactors. That approach is consistent with large reactor units largely independent from one another (even where sharing some systems and buildings at a multi-unit site) and separately licensed. However, for CFPP's plant, the six separate NPMs will share major features (e.g., the reactor building and radioactive waste building) and may be licensed under a single license.[2]

Considering these differences in design and licensing, CFPP reviewed 10 CFR 50.75 for any obvious incompatibility with the cumulative power level fund calculation approach. CFPP found no clear conflicts. 10 CFR 50.75(b) requires each applicant for a COL to submit a decommissioning report; it does not expressly forbid a single decommissioning report for multiple reactors. 10 CFR 50.75(b)(1) provides that the COL applicant's financial assurance certification in that report must be for an amount equal to or more than the amount stated in paragraph (c)(1); this provision applies to the license applicant or holder in general, not an individual reactor. Finally, the table of paragraph (c)(1) prescribes the minimum amounts for decommissioning "by reactor type and power level," and the first row addresses "a PWR" of various power levels. While "a PWR" suggests the power levels apply to individual reactors, the language is not so clear as to preclude other interpretations—NuScale's plant design is of "a PWR" reactor type.

Therefore, CFPP believes the language of 10 CFR 50.75(c) is sufficiently flexible to allow the cumulative power level approach without an exemption. In SECY-11-0181, NRC Staff discussed the use of exemptions and site-specific decommissioning cost estimates as the near-term approach to SMR DFA. However, Staff did not address the possibility of using the existing

[2] CFPP has not yet determined an intended license structure; that determination will be the subject of a future pre-application engagement with the Staff. However, common licensing is recognized as a possibility by 10 CFR 52.103(g) and SECY-11-0079.

regulatory formulas, which are reasonable for the scale of the NuScale design on a cumulative power level basis.

2.5 Other SMR Decommissioning Issues

As noted in the NEI position paper, there are other issues that may need consideration with respect to the funding and decommissioning of CFPP's planned NPP. For example, due to the multi-module design that can operate with one to six modules, structuring the timing of financial assurance to align with the start-up of individual modules may be appropriate. At this time CFPP is not seeking to address issues beyond the total decommissioning fund amount for the NPP. CFPP believes the cumulative power level question can be separately considered.

3.0 Conclusion

CFPP plans to include in the COLA an initial DCE calculated per 10 CFR 50.75(c), using the cumulative thermal power of the six-module NPP as the input power level. This approach is consistent with the modular, shared feature design of the NPP. As noted in Regulatory Guide 1.159, the certification amounts in 10 CFR 50.75(c)(1) are threshold review levels not necessarily representing the actual cost of decommissioning for specific reactors, but assuring the bulk of funds for safe decommissioning are considered and planned for early in the life of the facility. CFPPs preliminary assessment showed that the cumulative power level formula yields a DCE comparable and conservative to a simplified site-specific DCE, and therefore fulfills its purpose as a reasonable cost estimate.

CFPP determined that the existing 10 CFR 50.75(c) provides sufficient flexibility to implement the cumulative power level approach without an exemption. CFPP requests NRC's interpretation with respect to that determination.