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FOR: The Commissioners

FROM: Mirela Gavrilas, PhD
Executive Director for Operations

SUBJECT: SITE-SPECIFIC CONSIDERATIONS FOR REVIEW OF REQUESTS TO
COMPLETE POWER REACTOR DECOMMISSIONING BEYOND
60 YEARS FROM PERMANENT CESSATION OF OPERATIONS

PURPOSE:

This paper informs the Commission about activities that are receiving significant public interest. Specifically, this paper addresses site-specific considerations that the staff examines when evaluating requests for alternative decommissioning schedules beyond 60 years after permanent cessation of operations under Title 10 of the *Code of Federal Regulations* (10 CFR) 50.82(a)(3). While the regulation explains that a request for an alternate decommissioning schedule should be granted "only when necessary to protect public health and safety," the "only when necessary" standard has not been detailed previously.

The staff is currently reviewing two such requests, from Peach Bottom Atomic Power Station (PBAPS), Unit 1 ([ML23293A305](#)), and Dresden Nuclear Power Station (DNPS), Unit 1 ([ML24074A437](#)). Both requests concern decommissioning units that are adjacent to operating units, and presence of other nuclear facilities at the site is one consideration for alternative decommissioning schedule reviews. Because there are a number of reactor sites in SAFSTOR¹ adjacent to other nuclear facilities, including other operating reactors, the staff expects that these requests may become more frequent in the near future. This paper does not address any new resource implications.

CONTACT: Amy Snyder, NMSS/DUWP
301-415-6822

¹ SAFSTOR is a decommissioning method in which a permanently shutdown nuclear power plant enters a long-term storage condition. During SAFSTOR, radioactive contamination decreases substantially, and the amount of low-level waste is reduced, thereby decreasing the risks associated with subsequent decontamination, demolition, and waste disposal. While 50.82(a)(3) applies to all decommissioning power reactors regardless of status, the focus of this discussion is specifically on how the staff evaluates alternative decommissioning schedule requests for SAFSTOR units approaching the 60-year deadline.

SUMMARY:

The U.S. Nuclear Regulatory Commission (NRC) regulation 10 CFR 50.82(a)(3) requires that power reactor licensees complete decommissioning within 60 years of permanent cessation of operation and states that requests for completion of decommissioning beyond 60 years will be approved “only when necessary to protect public health and safety.”² The regulation states the factors to be considered in evaluating such requests, including “unavailability of waste disposal capacity and other site-specific factors affecting the licensee’s capability to carry out decommissioning, including presence of other nuclear facilities at the site.” While each request is considered on a case-by-case basis, documenting site-specific considerations and how the staff evaluates them under 10 CFR 50.82(a)(3) provides transparency and ensures that staff’s analyses are well understood by the industry and the public.

The staff’s approach when evaluating alternative decommissioning schedule requests draws on the methods historically used for nuclear safety reviews, such as the SAFSTOR hazards assessment approach used before the 1997 Decommissioning Rule (62 *Federal Register* (FR) 39058; July 21, 1997), and the seven safety cornerstones of the Reactor Oversight Process (ML23093A184). The approach also captures the staff’s considerations in one previous alternative decommissioning schedule review (for the General Electric Hitachi (GEH) Vallecitos Nuclear Center).³ As explained in more detail below, the staff considers waste disposal capacity, the presence of other nuclear facilities, SAFSTOR conditions, physical security, and partial approvals.

BACKGROUND:

The Atomic Energy Act of 1954, as amended, does not require a reactor licensee to complete decommissioning within a certain timeframe after permanently shutting down. However, in 1988, the Commission issued a rule “General Requirements for Decommissioning Nuclear Facilities” (53 FR 24018; July 14, 1988), establishing a 60-year period for an electric utility licensee to complete decommissioning. The 60-year timeframe was based on the time estimated to significantly reduce potential dose to workers, the ability to effectively maintain institutional controls, the allowance of about 10 years for dismantlement and decontamination, and

² Language identical to that in 10 CFR 50.82(a)(3) is also found in 10 CFR 52.110(c). The same approach to alternative decommissioning requests outlined here for 10 CFR 50.82(a)(3) would also apply to requests for alternative decommissioning schedules pursuant to 10 CFR 52.110(c).

³ GEH initially requested an alternate decommissioning schedule for two power reactors and one non-power reactor at the Vallecitos Nuclear Station under 10 CFR 50.82(a)(3) and 10 CFR 50.82(b)(4)(i), respectively. GEH subsequently revised the request to seek an exemption using the criteria of 10 CFR 50.12, “Specific Exemptions.” The staff determined that use of 10 CFR 50.12 to grant this extension would constitute a change in the Commission’s policy, since 10 CFR 50.82(a)(3) and 10 CFR 50.82(b)(4)(i) detail the Commission’s exclusive standards that licensees must satisfy to obtain an extended decommissioning period (i.e., “only when necessary to protect [the] public health and safety”). Due to the policy issue and to meet the requirement under 10 CFR 50.12(a)(2)(vi) for the Executive Director for Operations to consult with the Commission before granting an exemption under 10 CFR 50.12(a)(2), the staff submitted a SECY paper to provide the Commission with their recommendation to approve the GEH 10 CFR 50.12 exemption request (ML19304B459). The SECY paper also notes that GEH did not meet the 10 CFR 50.82(a)(3) criteria, because the extended decommissioning schedule was not necessary to protect the public health and safety; there was no shortage of radioactive waste disposal capacity; there were no other nuclear facilities at the site whose safety or security might be affected by decommissioning activities; and there were no other site-specific considerations that could not be reasonably mitigated. The GEH request for an alternative decommissioning schedule under 10 CFR 50.12 was ultimately denied by the Commission (ML21218A110).

considerations of the overall cost of decommissioning. In 1996, in a revision to this rule, “Decommissioning of Nuclear Power Reactors” (61 FR 39278, July 29, 1996), the Commission clarified that for power reactor licensees, decommissioning will be completed within 60 years of the permanent cessation of operations, and for nonpower reactor licensees, decommissioning will be completed “without significant delay.” The staff used the 60-year decommissioning schedule in the November 2017 regulatory basis for the “Regulatory Improvements for Power Reactors Transitioning to Decommissioning” rulemaking ([ML17215A010](#)). The staff did not recommend any changes related to the 60-year decommissioning requirement in the proposed rule (87 FR 12254, March 3, 2022), or in SECY-24-0011, “Final Rule: Regulatory Improvements for Production and Utilization Facilities Transitioning to Decommissioning (3150-AJ59; NRC-2015-0070)” ([ML23258A200](#) (Pkg)). Currently, there are nine units in SAFSTOR at multi-unit sites, and four⁴ of those units are approaching the timeframe when they will need to start active decommissioning (beyond the initial decommissioning performed to prepare the units for SAFSTOR) to complete the process within 60 years.

Regulation and Guidance

The regulation in 10 CFR 50.82(a)(3) states the following:

Decommissioning will be completed within 60 years of permanent cessation of operations. Completion of decommissioning beyond 60 years will be approved by the Commission only when necessary to protect public health and safety. Factors that will be considered by the Commission in evaluating an alternative that provides for completion of decommissioning beyond 60 years of permanent cessation of operations include unavailability of waste disposal capacity and other site-specific factors affecting the licensee’s capability to carry out decommissioning, including presence of other nuclear facilities at the site.

In the statements of consideration (SOCs) for the 1988 final rule, “General Requirements for Decommissioning Nuclear Facilities” (53 FR 24018, June 27, 1988), the Commission reiterated the factors that it will consider in evaluating extensions, as follows:

The case-by-case considerations, such as... shortage of radioactive waste disposal space offsite or presence of an adjacent reactor whose safety might be affected by dismantlement procedures, or other similar site-specific considerations, mean that the appropriate delay for a specific facility must be based on factors unique to that facility and could result in extension of completion of decommissioning beyond 60 years.

Other than indicating that any such requests will be reviewed on a case-by-case basis (see Regulatory Guide (RG) 1.185, “Standard Format and Content for Post-Shutdown Decommissioning Activities Report”), there is little precedent or guidance⁵ regarding how to

⁴ General Electric Test Reactor (being addressed through both decommissioning and license transfer); PBAPS, Unit 1 (alternative decommissioning schedule request under review); DNPS, Unit 1 (alternative decommissioning schedule request under review); and Fermi 1 (currently in pre-decommissioning planning).

⁵ In the statements of consideration for the 1988 final rule, “General Requirements for Decommissioning Nuclear Facilities” (53 FR 24018, June 27, 1988), the Commission also referenced expected revisions to RG 1.86, “Termination of Operating Licenses for Nuclear Reactors,” for setting out guidance on the considerations outlined

apply the considerations for an alternative schedule for decommissioning a power reactor that has permanently ceased operations.

DISCUSSION:

While section 50.82(a)(3) requires decommissioning to be completed within 60 years, it also offers an exemption⁶ to the 60-year requirement “only when necessary to protect public health and safety.” Typically, exemptions from 10 CFR Part 50, “Domestic Licensing of Production and Utilization Facilities,” are sought under the more general exemption provision in 10 CFR 50.12, “Specific exemptions.” Under 10 CFR 50.12, one of the factors that the NRC analyzes to determine whether a request should be granted is whether the request will “*present an undue risk to the public health and safety.*” The regulatory language in 10 CFR 50.82(a)(3), that approval will be given “*only when necessary to protect public health and safety*” is much more limiting than the language in 10 CFR 50.12, “*will not present an undue risk....*”

In determining whether a request for an alternate decommissioning schedule is necessary, the staff does not simply weigh whether the risk of decommissioning is greater than the risks associated with continuing SAFSTOR. On its own, evidence that continued SAFSTOR would have less risk than proceeding with decommissioning is not sufficient to approve decommissioning beyond 60 years. Instead, in order to meet the “only when necessary” standard established in the regulation, the applicant must demonstrate that decommissioning in the 60 year timeframe would present a potential for a hazard to occur such that the licensee would not be able to maintain public health and safety and security, and that there is no reasonable mitigation available to a licensee that could alleviate the hazard.⁷ Specific considerations that are addressed by the staff in the safety evaluation are discussed below.⁸

Waste Disposal Capacity

Currently, there is no waste disposal capacity issue, so this consideration has not been identified as an issue in the alternative decommissioning schedule requests submitted to date. However, if waste disposal capacity were to become an issue in the future, the staff would consider that as part of its review.

in 10 CFR 50.82(a)(3). However, RG 1.86 was not updated and was subsequently withdrawn (81 FR 53507, August 12, 2016).

⁶ Although 10 CFR 50.82(a)(3) does not use the term “exemptions” when explaining the interplay between 10 CFR 50.82(a)(3) and 10 CFR 50.12 in the SOC for the 1985 final rule that established 10 CFR 50.12, “Specific Exemptions; Clarification of Standards” (50 FR 50764, December 12, 1985), the Commission described the 10 CFR 50.82(a)(3) criteria as “specific exemption criteria.”

⁷ In determining what constitutes “reasonable mitigation,” the staff recognizes that site-specific mitigation may increase the overall cost of decommissioning. Therefore, when determining whether such efforts are reasonable, the staff considers the impact of the mitigation costs on the adequacy of funds in the decommissioning trust fund. The staff also recognizes that extending decommissioning beyond 60 years would provide additional time for trust fund assets to accrue.

⁸ When evaluating exemption requests under 10 CFR 50.82(a)(3), in addition to the safety evaluation, the staff also follows its environmental review process. Pursuant to 10 CFR 51.21, “Criteria for and identification of licensing and regulatory actions requiring environmental assessments,” the staff will prepare an environmental assessment (EA) as part of its review and intends to make the draft EA for the first request for approval of an alternative decommissioning schedule available for public comment in accordance with 10 CFR 51.33(b)(1) and (2). For any subsequent requests of this type, the staff would consider site-specific factors in deciding whether to make the draft EA available for comment.

Of note, most reactor licensees store irradiated fuel and Greater-Than-Class-C Waste (GTCC) waste in a generally-licensed independent spent fuel storage installation (ISFSI). These ISFSIs are subject to the 60-year decommissioning timeframe in 10 CFR 50.82(a)(3). Therefore, if the 60-year timeframe for decommissioning approaches and waste continues to be stored at the generally-licensed ISFSI, waste storage capacity may become a relevant consideration when evaluating a request for an alternative decommissioning schedule.⁹

Site-Specific Considerations

While additional site-specific factors may be relevant in certain situations, in general, the staff considers four site-specific issues when evaluating an alternative decommissioning schedule request under 10 CFR 50.82(a)(3):

(1) Presence of Other Nuclear Facilities at the Site

The NRC considers the interconnectivity of decommissioning and operating units when reviewing requests for alternative decommissioning schedules. Except for potential fuel-related accidents in the first years after a reactor ceases operation, the offsite consequences of potential accidents at decommissioning sites (i.e., where all units have ceased operations permanently) are very small. However, at multi-unit sites where one or more units continue operating following a permanent cessation of operation at other units, there is the potential for decommissioning activities to impact the safety and security of the operating units.

In considering requests for alternative decommissioning schedules at multi-unit sites, the NRC evaluates the licensee's assessment of potential adverse impacts due to physical, functional, and spatial interconnectivity of the decommissioning and operating unit(s) for both safety and security (e.g., the seven cornerstones in the Reactor Oversight Process), of decommissioning the SAFSTOR unit while another unit continues to operate. Specifically, the staff reviews systems, structures, or components (SSCs) directly associated with an operating reactor that would be impacted during decommissioning of the SAFSTOR unit. The staff evaluates whether the licensee used a systematic process to identify accident sequences or threats, including significant human errors, that could lead to core damage or large early releases¹⁰ at a multi-unit site.

Finally, the staff evaluates whether the licensee could apply reasonable mitigative measures to address the issues raised by the interconnectivity of the units and still decommission within the 60-year requirement. These mitigative measures may include

⁹ For a decommissioning reactor site that is approaching the 60 years and has irradiated fuel and/or GTCC waste stored in a general-licensed ISFSI, and there is a waste storage capacity issue, the licensee could: (1) apply for an exemption to 10 CFR 50.82(a)(3) specific to waste disposal capacity, (2) apply for a specific license for the ISFSI, or (3) if co-located with at least one operating unit, the licensee could submit a license amendment to transfer the irradiated fuel and/or or GTCC waste from the decommissioning unit's 10 CFR Part 50 license to the license for the operating unit(s). Conversely, if there is no waste disposal capacity issue for such sites without multi-units that are currently operating, then the licensee's options would be to 1) decommission the ISFSI for termination of the Part 50 license, 2) apply for an exemption under 10 CFR 50.82 (a)(3) based on criteria other than waste disposal capacity, or 3) apply for a specific license for the ISFSI.

¹⁰ Early large releases and core damage are defined in NUREG -2122, "Glossary of Risk-Related Terms in Support of Risk-Informed Decisionmaking", November 2013, page 4-60 and page 4-28 respectively ([ML13311A353](#)).

moving or installing new SSCs or implementing alternative operational strategies. For example, a licensee may have a relay switch that is designated as an SSC important to safety for the operating units housed in the contaminated portion of the SAFSTOR unit's foot print. If relocation or use of an alternative SSC is possible, then reasonable mitigation would be necessary. This change may require a license amendment for the operating units to implement. Again, the potential increase in risk is not by itself sufficient to support a determination that an alternative decommissioning schedule is *necessary*.

(2) SAFSTOR Conditions Beyond 60 Years

As part of staff's determination of whether a delay in decommissioning is necessary to protect the public health and safety, the aging of SSCs important to safety, including the structural integrity of containment is an important component of the review. Once all the fuel is removed from the spent fuel pool and the technical specifications are updated and approved for the SAFSTOR unit, a decommissioning reactor normally has no remaining SSCs important to safety. However, there are still hazards associated with a facility in SAFSTOR that the staff considers in reviewing requests for alternative decommissioning schedules, and these hazards may create a public health and safety risk that would then factor against approving of an alternative decommissioning schedule. These hazards include the amount and type of remaining contamination; the degree of confinement of the remaining radioactive materials; the susceptibility to release of radioactive material because of natural phenomena; any changes to hydrologic conditions around the SAFSTOR containment; the proposed duration of surveillance and maintenance activities to address aging of SSCs important to safety, if any; the integrity of the containment building as part of SAFSTOR; and any other areas of known subsurface contamination near or under the containment structure.

The staff performed this type of hazard assessment for facilities that entered SAFSTOR before the 1997 Decommissioning Rule; however, those assessments only considered the period of 60 years following shutdown. To demonstrate that there is not an additional public health and safety issue created by the request for an alternative decommissioning schedule, the assessment would need to be updated, as necessary, to reflect the proposed period of extended duration. For sites shut down after the 1997 Decommissioning Rule, the staff may obtain this information through inspection documentation, facility records, or responses to requests for additional information about potential hazards and any mitigative measures planned over the proposed, extended duration. Further, in evaluating SAFSTOR conditions over the proposed duration of the requested alternative decommissioning schedule, the staff considers the total period between the permanent cessation of operations for the unit in question and the proposed new decommissioning date. The staff evaluates the effectiveness of institutional controls for the extended period, including application of risk insights for an appropriate level of aging management, such as whether there is concrete decay due to placement issues, exposure due to weather, thaw-freeze cycles, or steel support corrosion, or foundation or roofing moisture issues, to ensure that public health and safety will be maintained.¹¹

¹¹ The Commission has explained that one of the factors in determining the length of time that may be approved for an alternative decommissioning schedule is the reasonableness of the timeframe in relation to the ability to effectively maintain safety and institutional controls throughout the project. (See the Final Rule, "General Requirements for Decommissioning Nuclear Facilities," 53 FR 24018, 24023, June 27, 1988; and Regulatory Basis for the 2017 proposed rule, "Regulatory Improvements for Power Reactors Transitioning to Decommissioning" ([ML17215A010](#))). Therefore, if the staff determines that a request to decommission beyond

(3) Physical Security Considerations

In cases where the licensee contends that decommissioning a unit in SAFSTOR would adversely impact the physical security of operating units, the NRC reviews the physical protection information provided by the licensee and evaluates whether reasonable mitigative measures could be taken. For example, a licensee could submit a license amendment to change the protected area to allow for decommissioning. If the NRC staff agrees that physical security of the operating units cannot be maintained during decommissioning of the SAFSTOR unit, and reasonable mitigation is not possible because of site-specific factors, this would weigh in favor of approving an alternative decommissioning schedule.

(4) Partial Approvals

If the staff determines that a request for an alternative decommissioning schedule under 10 CFR 50.82(a)(3) is supported by site-specific conditions that impact the ability to safely decommission the SAFSTOR unit or secure the site, even with reasonable mitigation, then the NRC may approve an alternative decommissioning schedule. However, if only a portion of, for example, an adjacent operating facility prevents safe decommissioning or the ability to secure the site, the staff may instead grant partial approvals where licensees may be authorized to extend the 60-year timeframe for decommissioning a portion of the site where the extension of time is necessary to protect public health and safety and security. For example, if there were a site-specific situation (e.g., portion of SAFSTOR unit's contaminated buried underground utilities that must be removed but run under an operational unit's building) that prevented a portion of the site from being decommissioned, the staff may grant the request in part, to allow only that portion of the site to be decommissioned with the remaining, operating units. All other portions of the SAFSTOR site that are radiologically impacted would still be required to decommission within the 60-year decommissioning requirement.

COMMITMENT:

The staff will notify the Commission, via a Commissioners' Assistant note, at least 10 business days before issuing a decision on the first completed review of an alternative decommissioning schedule under 10 CFR 50.82(a)(3)¹². The staff will notify the Commission of subsequent decisions on alternative decommissioning schedule requests via the One-Week Look Ahead communication tool.¹³

60 years is appropriate, the staff will ensure that adequate institutional controls are in place to account for management of the facility in question until the new proposed license termination date.

¹² See Management Directive 9.17, "Organization and Functions, Office of the Executive Director for Operations," Section III.A, dated June 24, 2024 (Agencywide Documents Access and Management System (ADAMS) Accession No. [ML24141A096](#)); Management Directive 9.26, "Organization and Functions, Office of Nuclear Material Safety and Safeguards," Section III.A., 9(b), dated February 1, 2021 ([ML20345A147](#)); and Office of Nuclear Material Safety and Safeguards (NMSS) Office Procedure 10-4, "NMSS Delegation of Signature Authority," dated March 24, 2021, Appendix A: "Table—Delegated Signature Authority," Section 2, "Licensing," Item 2.7.c, "Granting Exemptions" ([ML21067A227](#) (nonpublic)).

¹³ See Office of the Executive Director for Operations (OEDO) Procedure – 0310, Revision 2, "Guidance for Preparing Notes to Commissioners' Assistants," dated September 7, 2018 ([ML17104A271](#)), and OEDO

CONCLUSION:

Upon receipt of a request for decommissioning using an alternative schedule beyond 60 years, the staff's evaluation focuses on whether the alternative schedule is necessary to protect public health and safety. The staff's review considers site-specific considerations that could prohibit safe and secure decommissioning and, therefore, necessitate an alternative schedule to protect public health and safety. The staff applies this approach to all requests for alternative decommissioning schedules beyond 60 years under 10 CFR 50.82(a)(3), including the current requests for PBAPS, Unit 1, and DNPS, Unit 1.

COORDINATION:

The Office of the General Counsel reviewed this package and has no legal objection. The Office of Nuclear Reactor Regulation, the Office of Nuclear Security and Incident Response, the Office of the Chief Financial Officer, and the regional offices have reviewed this paper for awareness and had no comments.



Mirela Gavrilas, PhD
Executive Director
for Operations

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