



4300 Winfield Road  
Warrenville, IL 60555  
630 657 2000 Office

10 CFR 50.82(a)(3)

RS-24-068

July 22, 2024

U.S. Nuclear Regulatory Commission  
ATTN: Document Control Desk  
Washington, DC 20555-0001

Dresden Nuclear Power Station, Unit 1  
Facility Operating License No. DPR-2  
NRC Docket No. 50-10

Subject: Supplemental Information Supporting Request for Alternative Schedule to Complete Decommissioning Beyond 60 Years of Permanent Cessation of Operations

- References:
1. Letter from M. D. Humphrey (Constellation Energy Generation, LLC) to U.S. NRC, "Request for Alternative Schedule to Complete Decommissioning Beyond 60 Years of Permanent Cessation of Operations," dated March 14, 2024
  2. Letter from N. S. Warnek (U.S. NRC) to M. D. Humphrey (Constellation Energy Generation, LLC), "Dresden Nuclear Power Station, Unit No. 1 – Supplemental Information Needed for Acceptance Review of Requested Licensing Action Re: Alternative Schedule to Complete Decommissioning Beyond 60-Years of Permanent Cessation of Operations (EPID: L-2024-LLE-0012)," dated June 11, 2024

In Reference 1, Constellation Energy Generation, LLC (CEG) requested an alternative from the decommissioning schedule requirements specified in 10 CFR 50.82(a)(3) to allow the completion of decommissioning for Dresden Nuclear Power Station, Unit 1, beyond 60 years of permanent cessation of operations. The NRC requested supplemental information in Reference 2 that is needed to support the acceptance review of the proposed alternative. In response to this request, CEG is providing the attached information.

Attachment 2 contains Sensitive Unclassified Non-Safeguards Information (SUNSI) documentation, and accordingly, CEG requests that this attachment be withheld pursuant to 10 CFR 2.390(d)(1).

July 22, 2024  
U.S. Nuclear Regulatory Commission  
Page 2

There are no regulatory commitments contained in this letter. Should you have any questions concerning this letter, please contact Ken Nicely at [Ken.Nicely@constellation.com](mailto:Ken.Nicely@constellation.com).

Respectfully,

Mark D. Humphrey  
Senior Manager - Licensing  
Constellation Energy Generation, LLC

Attachments:

1. Supplemental Information Related to Request for Alternative Decommissioning Schedule
2. Dresden Site Arrangement (Security-Related Information – Withhold Under 10 CFR 2.390)

cc: w/o Attachment 2

Regional Administrator - NRC Region III  
NRC Senior Resident Inspector – Dresden Nuclear Power Station, Units 2 and 3  
NRC Decommissioning Project Manager – Dresden Nuclear Power Station, Unit 1  
Illinois Emergency Management Agency – Division of Nuclear Safety

## ATTACHMENT 1

### Supplemental Information Related to Request for Alternative Decommissioning Schedule

#### **NRC Request 1 – Security Measures**

Dresden Unit 1 is within the Dresden Physical Security Plan. The Physical Security Plan is inclusive of all three units and the adjacent Independent Spent Fuel Storage Installation (ISFSI). The submittal does not describe which site security measures are associated with, or credited for, the security of Dresden Unit 1.

Describe the security measures for Dresden Unit 1 during the proposed extended period for decommissioning and provide the rationale for why these security measures are adequate for Dresden Unit 1 during safe storage (SAFSTOR) prior to dismantlement. Confirm that the security measures for Dresden Unit 1 during the proposed extended period of decommissioning would not adversely impact the physical protection of Dresden Units 2 and 3 and the associated ISFSI.

Describe whether there would be any impacts to the implementation of physical security for Dresden Units 2 and 3 that could not be reasonably mitigated during the partial or full decommissioning of Dresden Unit 1, if it were to be conducted as scheduled (i.e., without an exemption for an alternative schedule). If so, describe those impacts and why reasonable mitigation wouldn't be possible.

#### **Response**

The entire site containing Dresden Units 1, 2, and 3, along with the associated ISFSIs, are within a common site Protected Area (PA). The site Physical Security Plan meets the physical protection requirements of 10 CFR 73. Under both SAFSTOR and during dismantlement, due to the physical site characteristics described in Reference 1, implementation of a Dresden Unit 1 10 CFR 72 and Part 37 security plan would not be feasible given the proximity and interconnectivity of Unit 1 to Units 2 and 3. Therefore, Dresden Units 1, 2, and 3 will remain under a combined site Physical Security Plan ensuring security measures are adequate for Dresden Unit 1 during SAFSTOR prior to dismantlement. In addition, maintaining a combined site Physical Security Plan ensures security measures for Dresden Unit 1, during the proposed extended period of decommissioning, would not adversely impact the physical protection of Dresden Units 2 and 3 and the associated ISFSIs since there would be no change to the current, approved Physical Security Plan.

Should partial or full decommissioning of Dresden Unit 1 be conducted as scheduled, all decommissioning would be required to be executed under a site security plan meeting the physical protection requirements of 10 CFR 73 to ensure physical protection of Dresden Units 2 and 3 and to ensure that the associated ISFSIs are not adversely impacted. The boundaries of the PA with cooling canals to the north, Kankakee River to the east, Units 2 and 3 structurally connected to Unit 1 to the west in combination with Units 2/3 station blackout (SBO) building, a robust FLEX building, an Interim Radioactive Storage Facility (IRSF), and various buried power and mechanical systems within the previous operating area of Unit 1, create site characteristics not normally encountered during decommissioning activities. Further discussion of decommissioning activities and spatial impacts are discussed in the response to NRC Request 6 below. These unique physical site characteristics make isolating areas of decommissioning, and implementation of a 10 CFR 72, or Part 37 security plan not be feasible. At the time of dismantlement, and pursuit of license termination is anticipated, the site Physical

## **ATTACHMENT 1**

### **Supplemental Information Related to Request for Alternative Decommissioning Schedule**

Security Plan will be reviewed and could require additional licensing actions to account for the physical changes to the site, such as the construction of material staging areas and large equipment located in close proximity to the PA boundary. The large equipment and staging of materials will interfere with line of site and fields of fire currently utilized in the Physical Security Plan, creating additional compensatory posts. Planning for decommissioning evolutions would require consideration of the site Physical Security Plan protective strategies and development of additional compensatory measures that would likely exceed the current security staffing levels to ensure that effectiveness of the Physical Security Plan is maintained as required by 10 CFR 73. This would likely result in restrictions on material and equipment staging for decommissioning evolutions and may require adjustments to the assumed responses in the site Physical Security Plan. The additional complexity of managing the dismantling activities and their impact on the site Physical Security Plan presents additional risk to the station and a significant increase of vehicle traffic that will require PA authorizations and searches to meet the dismantlement demands. Contributing to the overall increase in risk is the fact that these impacts to the site Physical Security Plan, and associated risk, will occur over multiple years. Although this risk could be mitigated with additional compensatory measures and licensing actions, the health and safety of the public would be best served if this was accomplished after Dresden Units 2 and 3 are permanently shut down and overall site risk is minimized by changing the PA boundaries after all fuel has been moved to the ISFSI, and implementing a new 10 CFR 72 and Part 37 site Physical Security Plan.

#### **NRC Request 2 – Decommissioning Measures**

Dresden Unit 1 has been monitored and controlled in SAFSTOR in accordance with the Facility Operating License, TSs as amended, and Decommissioning Plan.

Explain how decommissioning the remainder of Dresden Unit 1 would differ from the activities that occurred in the past with respect to safety of Dresden Units 2 and 3 and the licensee's ability to maintain public health and safety. Include a discussion about modifications to these systems that can be done within the structure to decommission Dresden Unit 1 on schedule that does not increase risk to public health and safety due to structural complications and allow the licensee to maintain safety requirements without an alternative schedule necessary to protect public health and safety.

The application requested that the alternative decommissioning schedule for Dresden Unit 1 coincide with the schedule for Dresden Units 2 and 3, whichever is the first to transition to permanent cessation of operations. Please clarify the additional period of required surveillance and maintenance that would result from the alternative decommissioning schedule for Dresden Unit 1.

#### **Response**

The decommissioning activities performed at Dresden Unit 1, beyond monitoring and maintenance activities for SAFSTOR, occurred between 1986 and 2006 when spent fuel from Dresden Unit 1, that was previously stored in the Unit 1 spent fuel pool (SFP) and the fuel transfer pool, was transferred to on-site ISFSI casks. The focus of the activities during this time included:

## ATTACHMENT 1

### Supplemental Information Related to Request for Alternative Decommissioning Schedule

- Maintenance and modification of systems, structures, and components needed to support operation of Dresden Units 1, 2, and 3;
- Securing non-essential systems, structures, and components to limit maintenance, prevent deterioration, and ensure there will be no potential for release of contamination or radioactivity;
- Disposal of radioactive and other wastes including lead, asbestos, and polychlorinated biphenyls (PCBs) remaining onsite, minimizing contaminated areas in Unit 1;
- Minimizing radioactive source terms in accordance with station as low as reasonably achievable (ALARA) objectives; and
- Transferring spent fuel to the ISFSI along with draining of the fuel pools.

Since that time, Dresden Unit 1 has been maintained in SAFSTOR with various component removals completed to address aging management. To complete decommissioning of Dresden Unit 1, several large components, including the reactor vessel, supporting reactor coolant systems, and steam supply systems, must be removed and shipped for disposal. Decommissioning activities also must address removal of the containment structure, main chimney, turbine building, intake structure and canals, radwaste, chemical cleaning, spent fuel pool, characterization, and remediation of areas of the facility which can remain.

Removal of the remaining large components, core components, and structural material while minimizing the spread of radioactive contamination within the plant and to the environment must occur within the spatial constraints/confines imposed by the current site PA, inside structures which support the operation of Dresden Units 2 and 3, which are located in the Dresden Unit 1 operating area, without impacting the operation of Dresden Units 2 and 3. Additional details regarding space constraints are provided below in the response to NRC Request 6. These considerations are the primary reasoning for placing Dresden Unit 1 in SAFSTOR versus commencing decommissioning at an earlier date.

Modifications to address known conflicts with future decommissioning activities would be required. These modifications present a varied level of risk from minimal to prohibitive due to an unreasonable level of mitigation to prevent an impact on operation of Dresden Units 2 and 3. Attachment 1 of Reference 1 describes interactions between Dresden Unit 1 and Dresden Units 2 and 3 which would require either prohibitive or unreasonable mitigation. Modifications that can be done within the structure to decommission Dresden Unit 1, that do not increase risk to public health and safety, were not specifically discussed in Attachment 1 of Reference 1. Examples of these modifications would be relocating portions of fire protection supply; service air, instrument air, and domestic water isolations or relocations; isolation of heating steam components; and modification of branch power supplies. These modifications were not included in Attachment 1 of Reference 1 since they present an acceptable level of risk and can be completed prior to executing decommissioning activities. Additional information is provided below to describe potential modifications required to address interactions in Attachment 1 of Reference 1, which were assessed as prohibitive or unreasonable mitigation. Additional interactions discussed in Attachment 1 of Reference 1 involve system and structure relocation to support characterization and remediation of Dresden Unit 1 subsurface areas only and are not detailed below. Relocation of these additional structures (e.g., Intake Structure, FLEX building, IRSF) was considered unreasonable mitigation since relocation does not eliminate risk, and physical relocation would require new robust structures, installation of redundant equipment, and space outside of Unit 1 operating areas being decommissioned.

**ATTACHMENT 1**

**Supplemental Information Related to Request for Alternative Decommissioning Schedule**

<b>Primary Interaction: Unit 1 and Unit 2 Turbine Building Interface and Directly Adjacent Spaces in Unit 1 Turbine Building.</b>	
<b>Potential Modification and Risk To Be Eliminated</b>	<b>Assessment</b>
<p>Main Control Room and Turbine Building structural separation to permit demolition of Unit 1 Turbine Building structure.</p> <p>Eliminates risk of performing decommissioning activities including large component removal near Main Control Room.</p>	<p>Prohibitive due to Main Control Room residing in both Dresden Unit 1 and Dresden Unit 2 Turbine Buildings. Unit 1 Turbine Building structure must remain in place to support safe operation of Units 2 and 3.</p>
<p>Relocation of Unit 1, 4kV and 480V distribution.</p> <p>Eliminates risk of power interruptions and permits de-energization of building to support decommissioning.</p>	<p>Unreasonable mitigation since relocation of 4kv and 480V buses and distribution would be required throughout the Unit 1 Turbine Building. The distribution system supports Units 2 and 3 SBO equipment and industrial power to a large portion of the site. Physical relocation would require new robust structures, installation of redundant equipment, and space outside of Unit 1 operating areas being decommissioned. As stated above, the Unit 1 Turbine Building structure must remain in place to support safe operation of Units 2 and 3. Therefore, these components will remain in place within the Unit 1 Turbine Building.</p>
<p>Relocation of Units 2 and 3 Prime Computer Room, Unit 1 125VDC, Units 2 and 3, Reactor Recirculation Pump Adjustable Speed Drive Input/Output Cabinets, and Licensed and non-licensed operator areas.</p> <p>Eliminates risk of power interruptions, permits de-energization of building to support decommissioning, and performance of decommissioning activities including large component removal near sensitive equipment.</p>	<p>Unreasonable mitigation since physical relocation would require new robust structures, installation of redundant equipment, and space outside of Unit 1 operating areas being decommissioned. As stated above, Unit 1 Turbine Building structure must remain in place to support safe operation of Units 2 and 3. Therefore, these components will remain in place within the Unit 1 Turbine Building.</p>
<b>Primary Interaction: SBO Diesel Building</b>	
<b>Potential Modification and Risk To Be Eliminated</b>	<b>Assessment</b>
<p>Relocation of building and/or tunnels.</p> <p>Eliminates risk of impacting underground cable tunnels due to proximity of containment structure and extensive decommissioning activities being executed in area over tunnels due to limited space within PA.</p>	<p>Unreasonable mitigation since physical relocation would require new robust structures, installation of redundant equipment, and space outside of Unit 1 operating areas being decommissioned.</p>

## ATTACHMENT 1

### Supplemental Information Related to Request for Alternative Decommissioning Schedule

Dresden Unit 1 permanently ceased operations on October 31, 1978. Based on the 10 CFR 50.82(a)(3) requirement for decommissioning to be complete within 60 years of permanent cessation of operations, Dresden Unit 1 decommissioning is currently required to be complete and the license terminated by October 31, 2038. Completion of decommissioning beyond this date is requested because of the concerns relative to the risks to operation of Dresden Units 2 and 3, if Unit 1 is decommissioned while Units 2 and 3 are operating.

Under an alternate decommissioning schedule, decommissioning of Unit 1 is expected to be completed within 20 years following the permanent shutdown of Units 2 and 3, such that license termination criteria can be achieved.

Dresden Units 2 and 3 are located on the same site as Dresden Unit 1 and are currently authorized to operate until December 22, 2029, and January 12, 2031, respectively. However, in Reference 2, Constellation Energy Generation, LLC (CEG) submitted an application to renew the operating licenses for Units 2 and 3 that would extend the operating term by 20 years beyond the current license expiration dates (i.e., to December 22, 2049, and January 12, 2051, for Units 2 and 3, respectively). Approval of the license renewal application would result in Units 2 and 3 being authorized to operate past the Unit 1 decommissioning period currently required by 10 CFR 50.82(a)(3).

The table below details the range of possible Dresden Unit 1 license termination dates based on currently known information.

<b>Units 2 and 3 Shutdown Date (Year)</b>	<b>Unit 1 License Termination Date (Year)</b>	<b>Basis</b>
2029/2031 (current license expiration dates)	2038	Decommissioning would be executed as described in the current Post-Shutdown Decommissioning Activities Report (PSDAR)
Prior to License Expiration	Last unit to shutdown plus 20 years	20 years after Units 2 and 3 permanently shut down
2049/2051 (subsequent license renewal expiration)	2071	20 years after Units 2 and 3 permanently shut down (if the subsequent license renewal application is approved)

Based on this table, the latest year currently projected to complete decommissioning and terminate the license for Unit 1 is 2071. Consequently, CEG is requesting extension of the Unit 1 decommissioning completion and license termination requirement to December 31, 2071.

## ATTACHMENT 1

### Supplemental Information Related to Request for Alternative Decommissioning Schedule

While CEG has not yet developed the plan to achieve license termination for Dresden Unit 1, preliminary decommissioning planning has identified categories of activities necessary to complete the project. The categories of tasks have been grouped into the following areas.

- Organization – Identification and development of the project organization structure and staffing. Implementation is likely to include a phased approach commensurate with the work schedule. A project of decommissioning Dresden Unit 1 may involve contractor support and incorporation into the project organization. The duration for performing these activities is anticipated to be approximately one to four years.
- Planning – Preparation activities to address details necessary to transition from SAFSTOR, through active Decommissioning, and achieve license termination. Evaluations and/or surveys/inspections, for engineering, radiological, and environmental concerns, would be developed to ensure safety and successful project execution. The duration for performing these activities is anticipated to be approximately two to five years.
- Unit 1 Separation – Develop the required engineering changes to support demolition of Dresden Unit 1 structures and maintain the required functions to support operation of Dresden Units 2 and 3. Activities will include isolation of structures to directly support decontamination and demolition. Additional modification and/or relocation of SSCs will be required without an alternative decommissioning schedule for Dresden Unit 1. The duration for performing these activities is anticipated to be approximately two to seven years.
- Decontamination and Demolition (D&D) Preparations – Implementation of any necessary activities to ensure no adverse impact on Dresden Units 2 and 3. Activities to prepare for D&D include tooling design and fabrication, material handling solutions, infrastructure, packaging and processing accommodations, and offsite transportation solutions. The duration for performing these activities is anticipated to be approximately two to six years.
- D&D Execution – Removal of radiological source(s) and residual activity to satisfy the license termination requirements. The duration for performing these activities is anticipated to be approximately three to seven years.
- License Termination Resolution – All final restoration activities necessary to satisfy license termination, including Final Status Survey(s) and site remediation, as necessary. The duration for performing these activities is anticipated to be approximately two to five years.

### NRC Request 3 – Mitigative Measures

The list of combined and interactive support systems in Attachment 1 identifies the systems needed for Dresden Units 2 and 3 but does not mention any contingencies or mitigative measures needed for decommissioning of Dresden Unit 1 in the presence of Dresden Units 2

## ATTACHMENT 1

### Supplemental Information Related to Request for Alternative Decommissioning Schedule

and 3. Please provide the following information related to Dresden Unit 1 decommissioning activities:

For Structures, Systems, and Components (SSCs) not related to safety, discuss the SSC impact to safe operations of the other nuclear facilities during decommissioning. Share what reasonable mitigative measures may be applied to all or any of the components related to the presence of other nuclear facilities that would result in not needing an alternative schedule for the purpose of maintaining public health and safety. Include what type of inadvertent damage would result due to decommissioning is envisioned that could not be reasonably mitigated.

#### **Response**

Decommissioning Dresden Unit 1 on a schedule resulting in license termination by October 2038 increases the risk to maintaining public health and safety due to the site-specific factors discussed in the responses to NRC Requests 1, 2, and 6. In contrast, delaying Dresden Unit 1 decommissioning on an alternative schedule creates negligible additional risk to public health and safety given the extremely low levels of remaining radioactivity and the integrity of existing structures. Further, Dresden Unit 1 is located within the Dresden Units 2 and 3 PA boundary, thus CEG will continue to maintain complete control over activities on that property. Even if Dresden Unit 1 were to be decommissioned by 2038, the property would remain within the Dresden Units 2 and 3 licensed site and PA boundary and again must be dispositioned when Dresden Units 2 and 3 decommissioning commences to support release of the site as a whole. Therefore, decommissioning Dresden Unit 1 by 2038 would not improve public health and safety as envisioned by the Part 50 regulations or NRC's general mission under the Atomic Energy Act of 1954. CEG is committed to conducting all decommissioning activities in a manner that shall not adversely impact public health and safety, regardless of schedule. The request recognizes the impacts associated with Dresden Unit 1 final decommissioning activities as it relates to the overall operations of Dresden Units 2 and 3, and that decommissioning Dresden Unit 1 while Dresden Units 2 and 3 continue to operate will likely result in an increased risk to public health and safety. Implementing the alternate schedule as proposed provides for the risk to public health and safety to be minimized and, therefore, is being pursued in accordance with the guidance in the regulations.

#### **NRC Request 4 – Structures, Systems, and Components (SSCs) Interactions**

Provide an assessment of the physical, functional, and spatial interactions between decommissioning and operating unit SSCs, specifically those identified in the March 14, 2024, request, and why they merit an alternative schedule.

Provide or reference the document(s) that describe the potential risk to health and safety of the public due to decommissioning activities occurring alongside operating units, including potential decommissioning accidents that could affect the safe operation of the other nuclear facilities such as the ability to:

- Control reactor power
- Cool the fuel and
- Maintain containment (defense in depth).

## ATTACHMENT 1

### Supplemental Information Related to Request for Alternative Decommissioning Schedule

#### **Response**

A formal risk assessment of the physical, functional, and spatial interactions has not been completed for Dresden Unit 1 decommissioning and license termination, and its impact on Dresden Units 2 and 3. Formal industry guidance and modeling to support risk assessments related to potential decommissioning accidents, and impact on adjacent operating facilities, is unique, and quantitative analysis tools have not been developed within the industry. Configuration of the Dresden site is unique within the industry and conducting common decommissioning techniques and license termination actions may not be practical or require extensive and unreasonable mitigation actions. The material discussed within this document supports a qualitative conclusion that an increased level of risk to maintaining public health and safety, due to the site-specific factors, would be required to be undertaken while decommissioning Dresden Unit 1 while Dresden Units 2 and 3 remain in operation. The material discussed within this document also demonstrates adequate monitoring of structures and aging management supporting a qualitative conclusion that a negligible level of increased risk to maintaining public health and safety exists while maintaining Dresden Unit 1 in SAFSTOR should the alternate schedule be granted. Decommissioning Dresden Unit 1 on a schedule resulting in license termination by October 2038 increases the risk to maintaining public health and safety due to the site-specific factors discussed in this document. However, CEG is committed to conducting decommissioning activities in a manner that shall not prohibit the maintenance of public health and safety, regardless of schedule. The request recognizes the impacts associated with Dresden Unit 1 final decommissioning activities as it relates to the overall operations of Dresden Units 2 and 3, and that decommissioning Unit 1 while Units 2 and 3 continue to operate will likely result in an increased risk to public health and safety. Implementing the alternate schedule as proposed provides for the risk to public health and safety to be minimized and, therefore, is being pursued in accordance with the guidance in the regulations.

#### **NRC Request 5 – Material Condition of SSCs**

Describe the current structural material condition of and any degradations and/or aging effects on Dresden Unit 1 SSCs that are important to safety. Describe the sources of residual radioactivity including the reactor vessel, reactor coolant system, containment, the spent fuel pool and spent fuel pool building, piping, tanks, and storage containers as applicable and how they would be controlled and contained over the proposed extended period of decommissioning.

Please provide information to support NRC staff's understanding of any maintenance, surveillance, inspection, or aging management performed to ensure the structural integrity of SSCs for Dresden Unit 1. Describe their adequacy to minimize the introduction of residual radioactivity into the site if the decommissioning schedule were extended. Discuss the visual inspections of SSCs of the UFSAR including the frequency, acceptance criteria, any findings of significance, and how findings are addressed.

#### **Response**

Dresden Unit 1 SSCs that are considered important to safety are those which also support operation of Dresden Units 2 and 3. These SSCs are monitored and maintained under the

**ATTACHMENT 1**  
**Supplemental Information Related to Request for Alternative Decommissioning Schedule**

required Dresden Units 2 and 3 programs. Remaining Dresden Unit 1 SSCs are currently in SAFSTOR are monitored as described below.

The Dresden Unit 1 structural material condition is considered acceptable based on the latest structural integrity inspection with majority of deterioration rates found to exhibit no or insignificant degradation. Identified degradations are captured in inspection reports and actions are taken to either ensure the degraded condition is repaired or that it is monitored on a reasonable frequency to ensure failure will not occur. For degraded conditions identified, most of the type of deterioration seen is classified as minor deterioration. These types of conditions include minor concrete cracking that appears inactive with little to no further deterioration since the previous inspections, concrete spalling that is considered structurally insignificant and does not have a major impact on the overall strength of the concrete structure, and surface corrosion that has minimal or no surface loss to steel components. These are expected degradation elements seen with structural materials of this age and environment. Degraded conditions are considered for deterioration rates that could lead to failure within the next inspection frequency, often determined by comparing the previous inspections results with the current in field conditions. Degraded conditions identified as greater than minor deterioration with deterioration rates that could lead to failure within the next inspection frequency are addressed in the Corrective Action Program for resolution.

SSCs containing residual radioactivity have been drained, placed in SAFSTOR conditions, and are contained within Dresden Unit 1 structures. Monitoring and maintaining the structural integrity of Dresden Unit 1 SSCs ensures sources of residual radioactivity are controlled and contained over the proposed extended period of decommissioning. Dresden Unit 1 structural integrity inspections are performed under a preventive maintenance (PM) activity on a 5-year frequency. The following Dresden Unit 1 structures are inspected for structural integrity under designated Unit 1 PM activities: Sphere Supports and Shell, Sphere Internal, Fuel Building, Chemical Cleaning Building, Chemical Cleaning Tunnel, Boiler House, "C" Boiler Room, Radwaste Control Room, Radwaste and Decant Facility, Radwaste Tunnel, Turning Vane Vault, Turbine Building Below Floor, Tanks, and the Crib House/Intake. In addition to those listed, the Unit 1 chimney is inspected every year. The remaining structures in the Unit 1 PSDAR and Defueled Safety Analysis Report (DSAR), which support operation of Dresden Units 2 and 3, are covered under Dresden Units 2 and 3 PM activities under the structures monitoring aging management program.

The governing Dresden Unit 1 inspection procedures provide the written guidance and acceptance criteria for the activity to ensure the structures will not degrade to an unsafe level or collapse and will perform as intended to contain radioactive contaminants. The Dresden Unit 1 procedures are written, reviewed, and authorized in accordance with the PSDAR, DSAR, and Quality Assurance Topical Report.

Inspection activities include visual inspection of the listed structures. Inspection results are categorized into five categories based on condition of the structural component. Each category has associated actions to be taken based on the condition identified. These actions ensure that degraded conditions are evaluated or are entered into the Corrective Action Program for further monitoring requirements and/or repairs.

## ATTACHMENT 1

### Supplemental Information Related to Request for Alternative Decommissioning Schedule

10 CFR 54.21(a)(1)(i) requires an aging management review of containment structures for plants requesting renewal of operating licenses. Since Dresden Unit 1 does not maintain a renewed license and is SAFSTOR, the requirements of 10 CFR 54.21(a)(1)(i) would not apply. As a result, there is no requirement to establish an Aging Management Program specifically for Dresden Unit 1 structures; however, the structural integrity inspections performed, and the acceptance criteria discussed above, are similar to the aging management inspections performed for Dresden Units 2 and 3 structures as required by the Maintenance Rule.

Review of the inspections indicated that identified degradation and the effects of aging are being documented and managed as necessary. The current monitoring program and inspections discussed above, along with the Corrective Action Program, have effectively managed residual radioactivity over the lifespan of the Dresden Unit 1 facility.

Dresden Unit 1 structures and radiological areas are appropriately monitored and maintained to ensure the SAFSTOR condition meets all design and licensing bases. Therefore, it can be concluded that the existing SAFSTOR controls are appropriate and adequate for Dresden Unit 1 and no new hazards are anticipated that would prevent the site from protecting the health and safety of the public from a radioactive release for the extended SAFSTOR period associated with the alternate decommissioning schedule.

#### **NRC Request 6 – Limitations**

Please characterize the limitations based on common decommissioning techniques used in industry today or the ones planned to be use and the degree of increased risk from Dresden Unit 1 decommissioning activities. Indicate whether this increased risk of performing decommissioning prohibit the ability to protect public health and safety.

#### **Response**

Both existing structures and geographic features surround or are contained within the Dresden Unit 1 operating area subject to decommissioning, which physically limit common decommissioning techniques as depicted in Attachment 2. Physical space is limited by the boundaries of the PA with cooling canals and intake structures to the north, Kankakee River to the east, Units 2 and 3 structurally connected to Dresden Unit 1 to the west in combination with Unit 2/3 SBO building, a robust FLEX building, an IRSF building, and various buried power and mechanical systems within the previous operating area of Dresden Unit 1. South and Southeast portions of the Dresden Unit 1 area contain buildings and structures, such as warehouses, the Main Access Facility, the Dresden Unit 1 ISFSI pad, bounded by the PA which support operations of Dresden Units 2 and 3.

Under the current decommissioning strategy, as stated in the current Dresden Unit 1 PSDAR, decommissioning of Dresden Unit 1 would commence upon shutdown of Dresden Units 2 and 3. This would permit the implementation of a 10 CFR 72 and Part 37 site Physical Security Plan where common decommissioning techniques would be utilized. This is currently the most common approach to decommissioning projects to provide for safe and efficient conduct of decommissioning operations. As discussed in Reference 1, Dresden Units 2 and 3 subsequent license renewal (SLR) will result in operation of both units beyond Dresden Unit 1

## ATTACHMENT 1

### Supplemental Information Related to Request for Alternative Decommissioning Schedule

decommissioning completion in 2038. The operation of Dresden Units 2 and 3, and the resulting inability to implement a 10 CFR 72 and Part 37 site Physical Security Plan, will limit the use of common decommissioning techniques to limit the increase in risk of performing decommissioning and increase risk to protect public health and safety. Impacts to the site security plan are further discussed in the response to NRC Request 1 above. Common decommissioning techniques are discussed in the following paragraphs. Those techniques, if utilized unmitigated, would represent an unacceptable increase in risk to Dresden Units 2 and 3. The potential mitigation methods to reduce risk are incorporated along with an assessment of why the level of mitigation does not reduce risk equivalent to use of the associated common decommissioning techniques.

To support major decommissioning activities such as reactor, primary system, and containment removal, the approach is anticipated to include a new suitably sized and located opening in the containment building necessary for dismantlement/disposal of large components. This opening is needed due to limitations (i.e., size/orientation/elevation) associated with original Dresden Unit 1 containment access pathways. It would be expected that adjacent to containment, heavy lifting equipment such as gantry cranes would be installed, a confinement structure would be erected outside and immediately adjacent to containment and the new opening to maintain the necessary radiological controls, including monitoring and engineered features for segmentation, packaging, and transportation preparation activities, as applicable. Similar confinement structures would be installed on the north side of the Turbine Building to support component removal. These installations would be installed in the limited space between the Unit 1 containment structure and the PA boundary. The installation of these structures will require excavation and heavy equipment to support decommissioning operations. The primary increase in risk is due to the location of the underground tunnels and vaults supporting operation of the Dresden Units 2 and 3 SBO equipment. The potential elimination of this risk through modifications is deemed impractical as discussed in the response to NRC Request 2. Mitigation would be required to protect these areas from potential damage due to excavation, heavy equipment travel, and potential accidents involving heavy lifts. Typical mitigation historically utilized would be above grade protection to reduce structural impacts on the underground structures. This mitigation technique, although effective for individual heavy load transfers, would not eliminate risk associated with the magnitude of work being executed over multiple years, and would not be effective when executing subsurface excavation. The potential damage to a SBO cable tunnel could result in loss of the SBO function to one or both units for an extended duration. Although probability can be reduced through mitigation, the consequence of this risk represents an increased risk to protect public health and safety. Loss of the Unit 2 and Unit 3 SBO function would result in reduced defense-in-depth for the mitigation capability of the site during a loss of offsite power transient.

As discussed in response to NRC Request 2, removal of the Dresden Unit 1 Turbine Building is prohibitive due to the Main Control Room locations and various support systems within the Dresden Unit 1 Turbine Building supporting operations of Dresden Units 2 and 3. Common decommissioning techniques such as structure/site wide electrical isolation, structure/site wide support system isolation (e.g., air, water, fire suppression), heavy equipment demolition and heavy equipment excavation could not be executed due the operation of Dresden Units 2 and 3. To mitigate potential effects of demolition activities such as impacting sensitive equipment within proximity of, and inadvertent damage to unisolated electrical or mechanical system, detailed isolation and demolition plans would be required. This would involve assessing the status of

## ATTACHMENT 1

### Supplemental Information Related to Request for Alternative Decommissioning Schedule

each mechanical and electrical component by area to ensure decommissioning activities do not adversely affect operation of Dresden Units 2 and 3, or personal safety of individuals executing decommissioning activities. This is not only inefficient but relies heavily on human performance and accuracy of plant design documents and drawings to ensure each activity is safely executed. This method does provide for mitigation and a reduction in risk. However, the reliance on human performance and historical plant documentation does not eliminate the risk to the extent common decommissioning techniques such as structure/site wide electrical isolation, structure/site wide support system isolation will eliminate risk. Heavy equipment demolition and excavation would be mitigated through smaller scale demolition techniques and vacuum excavation. However, work around active systems which support operation of Dresden Units 2 and 3 could not be avoided without structure/site wide electrical isolation, or structure/site wide support system isolation. Even when mitigated, excavation and demolition activities will present an increase in risk to public health and safety.

Common decommissioning techniques for management of waste would include staging and isolation areas to support surveying, shipping, and release of material. Managing debris would be required to be performed in incremental stages due to the limited area within the PA and to limit impact on the site Physical Security Plan. This risk is further discussed in the response to NRC Request 1.

The remaining radiologically controlled areas of Dresden Unit 1, including the general open operating areas, Fuel Building, Radwaste, Chemical Cleaning, Intake structure and canals, will encounter similar risks to those previously discussed. Although areas not directly adjacent to Dresden Unit 2, or SBO structures do not encounter the risks associated with those specific structures, the risks associated with excavation and demolition as discussed with the Unit 1 Turbine Building above will remain applicable to the remainder of the site. In addition, impacts on the site Physical Security Plan, as discussed in the response to NRC Request 1, will apply. Executing these Dresden Unit 1 decommissioning activities on an alternate schedule, in conjunction with decommissioning of Dresden Units 2 and 3, will permit the use of common decommissioning techniques, eliminating an increase in risk to public health and safety.

#### **NRC Request 7 – Cumulative Damage or Duration**

The request does not cover the cumulative duration of demolition and dismantling activities. Please provide the following information:

- a. Explain why the cumulative duration of demolition and dismantling activities would be less if all three units were decommissioned together.
- b. Explain how the factors stated apply to the criterion in 10 CFR 50.82(a)(3) about the need for an extended decommissioning schedule and would be necessary to protect public health and safety.

#### **Response**

The cumulative duration of decommissioning all three Dresden Units 1, 2, and 3 concurrently would be reduced based on numerous factors, including: 1) mitigative measures due to

## **ATTACHMENT 1**

### **Supplemental Information Related to Request for Alternative Decommissioning Schedule**

operating unit(s) onsite are significantly reduced or eliminated; 2) removal of interferences and system interactions can be performed as needed to perform decommissioning activities without adverse impact on operating units; 3) mobilization and demobilization activities are coordinated for the site; 4) equipment and resource sharing and leveraging supports improved efficiencies in performing tasks; 5) specialized equipment and/or tooling necessary for station decommissioning is shared across the units; 6) waste decontamination, packaging, and transport offsite is coordinated between units and maximized; and 7) optimal transportation methods and routes can be implemented as needed without adverse impact on operating units.

The primary attributes associated with an increased risk to public health and safety items include: 1) mitigative measures due to operating unit(s) onsite are significantly reduced or eliminated; and 2) removal of interferences and system interactions can be performed as needed to perform decommissioning activities without adverse impact on operating units. Details of the increased risk associated with these two attributes applicable to the criterion in 10 CFR 50.82(a)(3), supporting the need for an extended decommissioning schedule to protect public health and safety are provided in the response to NRC Request 6.

In addition to the discussion contained in the response to NRC Request 6, when taking into the account that decommissioning will take place within the common PA as discussed in the response to NRC Request 1, the needed decommissioning will introduce an unmitigable increase in risk through unavoidable disruptions in normal operations that would not be present in the proposed alternate schedule. These interruptions can create distractions within the workforce, competing priorities for space and resources, and impacts to the ability to execute work efficiently without additional mitigation, which ultimately increases the risk of a human performance error. Common decommissioning techniques would implement controls, including physically separated work areas, which support separation of demolition activities from those of the operating portion of the facility. The proximity of the operating units to the unit being decommissioned prevent the implementation of these controls in a manner that will eliminate this risk. Decommissioning of Dresden Units 1, 2, and 3 concurrently not only leads to reducing the cumulative duration of demolition and dismantling activities, but also eliminates the qualitative increase in risk associated with the inability to implement these controls.

#### **NRC Request 8 – Decommissioning Conducted**

Attachment 1 of the request states that Dresden Unit 1 facilities have been integrated into the support infrastructure and are actively utilized by Dresden Units 2 and 3. Please provide information on what decommissioning activities would be conducted and their duration, if the exemption from 10 CFR 50.82(a)(3) to complete decommissioning with an alternative schedule beyond 60 years were granted.

#### **Response**

The PSDAR process and guidance as described in the regulations will ensure activities performed during current and extended SAFSTOR maintain compliance with the regulations.

An updated PSDAR will be developed and utilized as the process to describe and control the associated decommissioning strategy. An extended SAFSTOR condition would be managed

## **ATTACHMENT 1**

### **Supplemental Information Related to Request for Alternative Decommissioning Schedule**

consistently with the current SAFSTOR structure and requirements. Activities related to or in support of future decommissioning planning (e.g., characterization surveys, data collection, etc.) would be evaluated against the updated PSDAR, once submitted, and conducted only within the provisions of the plan and regulations. A discussion of a postulated timeline for an extended decommissioning schedule is provided in the response to NRC Request 2.

#### **NRC Request 9 – Hazards Assessment**

Explain the Dresden Unit 1 strategy to assess hazards of the containment structure for the proposed extended decommissioning schedule to ensure that the radioactive material would remain contained, including underground contamination through the groundwater pathway. Identify whether there would be significant construction hazards during demolition of the radiologically contaminated buildings that require decommissioning due to the physical presence of other nuclear facilities that could not be reasonably mitigated.

#### **Response**

Dresden Unit 1 containment structure(s) surrounding the residual radioactive material remains structurally sound to protect the health and safety of the public. The Dresden Unit 1 containment structure monitoring program and structural status is further discussed in the response to NRC Request 5. The current condition of the Dresden Unit 1 containment structure, in conjunction with monitoring and aging management programs, ensures the radioactive material would remain contained under SAFSTOR plant conditions for the proposed extended decommissioning schedule.

The response to NRC Request 10 provides additional discussion regarding monitoring of the underground pathways. In addition, the response to NRC Request 6 provides additional discussion regarding radiological decommissioning hazards associated with Dresden Unit 1 demolition.

#### **NRC Request 10 – Environmental**

Upon acceptance of the request, the NRC staff would prepare an environmental assessment (EA) pursuant to 10 CFR 51.21 and 51.30. To support a complete description in the EA of the proposed action, provide written information with the description of activities that would be conducted under the proposed action, such as maintenance, monitoring, and any planned physical changes (e.g., to structures or other features) related to Dresden Unit 1. Include a timeline for the activities from the present to the proposed decommissioning completion date.

- a. Provide a written description of the no action alternative along with a timeline. This includes activities to be conducted if the NRC denies the request for an alternative schedule, including (but not limited to) license termination plan submittal, infrastructure changes (e.g., new roads or structures) to accommodate decommissioning, any intensive decommissioning and demolition techniques, radioactive waste generation and disposal (estimate of rates and quantities), and plans for consultation with the State Historic Preservation Office regarding historic properties.

## ATTACHMENT 1

### Supplemental Information Related to Request for Alternative Decommissioning Schedule

- b. Several factors may change for residual radioactivity in the groundwater system beyond 60 years, including changes to the groundwater system from changes in climatic conditions since the latest license renewal, cessation of pumping, or from partial decommissioning activities that alter surficial characteristics. These changes may lead to changes in flow direction and magnitude that may lead to new or additional mobilization or acceleration of migration of radionuclides offsite. These potential changes may be offset by reductions in groundwater contamination due to radionuclide decay and additional dilution associated with groundwater flushing and dispersion. Describe how climate change might impact erosion and containment of the radioactivity at Dresden Unit 1 over the proposed alternative decommissioning schedule. Describe any effects of potential changes to the groundwater system beyond 60 years and whether those changes may lead to increased magnitude and spreading of groundwater residual radioactivity.

#### **Response**

With approval of the alternate decommissioning schedule, CEG intends to continue to maintain Dresden Unit 1 in SAFSTOR in accordance with the Technical Specifications and Offsite Dose Calculation Manual, including monitoring activities and frequencies. Physical facility changes will be performed as required to address aging management of SSCs. No significant facility changes (e.g. major decommissioning activities) are currently anticipated for the extended SAFSTOR condition.

The current decommissioning plans for Dresden Unit 1 do not include any activities or actions that would have impact on features of historical significance that merit consultation with SHPO. Future evaluation of decommissioning activities will include consideration of SHPO to ensure all appropriate preservation considerations are factored into decommissioning planning.

Details related to Dresden Unit 1 decommissioning activities and associated timeline(s) are provided in the response to NRC Request 2.

Dresden is controlled by a site-wide Radiological Groundwater Protection Program (RGPP) that encompasses the area surrounding Dresden Unit 1. This program meets the objectives of the voluntary Groundwater Protection Initiative as set forth in NEI 07-07, "Industry Groundwater Protection Initiative – Final Guidance Document," which also meets recommendations from our insurers (American Nuclear Insures (ANI)). As part of the RGPP, there are multiple groundwater monitoring wells, surface water monitoring locations, and precipitation water monitoring locations within the Dresden site boundary that are periodically sampled in accordance with site procedures. This program will continue through an extended SAFSTOR period.

Additionally, the Dresden facility predominantly uses surface water so there is little groundwater use at the station. The alternative decommissioning schedule for Dresden Unit 1, to include extended SAFSTOR, is not anticipated to impact the groundwater system. There have been no inadvertent reportable releases of radiological or non-radiological materials from Dresden Unit 1 that impacted soil or groundwater since 2009. The station's RGPP governs and includes the Annual Radiological Environmental Operating Reports (AREORs) which provide the

## ATTACHMENT 1

### Supplemental Information Related to Request for Alternative Decommissioning Schedule

documentation of groundwater monitoring. The AREORs are submitted to the NRC at the required frequency, which will continue through extended SAFSTOR.

#### **NRC Request 11 – Updating Post-Shutdown Decommissioning Activities Report (PSDAR)**

The purpose of the PSDAR is to provide the NRC and the public with a general overview of the licensee's proposed decommissioning activities and to inform the NRC staff of the licensee's expected activities and schedule so that the staff can plan for inspections and make decisions about its oversight activities. The PSDAR is also a mechanism that informs the public of the proposed decommissioning activities before the conduct of those activities. For licensees that submitted a decommissioning plan before August 28, 1996, the NRC considers the decommissioning plan and the associated environmental review to be the PSDAR submittal. Decommissioning plans normally contain sufficient information to satisfy the requirements of the PSDAR. Licensees that have an approved decommissioning plan must submit an update for activities that they had not considered in their decommissioning plans to comply with 10 CFR 50.82(a)(7). The NRC encourages licensees to replace their decommissioning plans with a PSDAR update that uses the format and content specified in this document.

#### **Response**

On September 3, 1993, the NRC approved the Dresden Unit 1 Decommissioning Program Plan and issued an Order setting forth provisions for implementation of that plan. As described in 10 CFR 50.82, the approved Decommissioning Program Plan satisfies the requirements for a PSDAR. A PSDAR, in the format and content consistent with NRC guidance for a PSDAR, was submitted for Dresden Unit 1 on June 1, 1998 (i.e., Reference 3) to update the status of decommissioning activities for Dresden Unit 1. As described in Reference 3, the Decommissioning Program Plan was replaced by the PSDAR and a DSAR. The most recent update to the PSDAR was submitted to the NRC in Reference 4.

#### **References**

1. Letter from M. D. Humphrey (Constellation Energy Generation, LLC) to U.S. NRC, "Request for Alternative Schedule to Complete Decommissioning Beyond 60 Years of Permanent Cessation of Operations," dated March 14, 2024
2. Letter from C. D. Wilson (Constellation Energy Generation, LLC) to U.S. NRC, "Application for Renewed Operating License," dated April 17, 2024
3. Letter from R. P. Tuetken (Commonwealth Edison Company) to U.S. NRC, "Post-shutdown Decommissioning Activities Report," dated June 1, 1998
4. Letter from M. P. Gallagher (Exelon Generation Company, LLC) to U.S. NRC, "Update to Dresden Nuclear Power Station Unit 1 Post-Shutdown Decommissioning Activities Report," dated March 19, 2018