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10 CFR 50.55a

RS-23-066

May 3, 2023

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

LaSalle County Station, Units 1 and 2  
Renewed Facility Operating License Nos. NPF-11 and NPF-18  
NRC Docket Nos. 50-373 and 50-374

Subject: Relief Request I4R-14 for Alternative Frequency to Containment Unbonded Post-Tensioning System Inservice Inspection

In accordance with 10 CFR 50.55a, "Codes and standards," paragraph (z)(1), Constellation Energy Generation, LLC (CEG) requests NRC approval of proposed Inservice Inspection alternative request I4R-14 for LaSalle County Station (LSCS), Units 1 and 2.

The American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel (BPV) Code, Section XI, Subsection IWL requires periodic visual examination of Containment concrete as well as visual examination and physical testing of post-tensioning systems. The examination and testing to date have indicated that the post-tensioning system is expected to maintain its safety-related function through the period of extended operation for LSCS, Units 1 and 2. CEG proposes extending the interval for post-tensioning system examinations and testing and detailed visual examination of concrete adjacent to tendon bearing plates from 5 years to 10 years. CEG also proposes eliminating the requirement for de-tensioning/re-tensioning of tendons, wire removal and wire sample testing, as well as limiting the number of corrosion protection medium (CPM) laboratory tests.

The LSCS, Units 1 and 2 third interval Containment Inservice Inspection (CISI) program complies with the ASME Section XI Code, 2007 Edition through the 2008 Addenda. The LSCS, Units 1 and 2 third CISI interval began on October 1, 2017 and is currently scheduled to end September 30, 2027.

The proposed alternative request is provided in the Attachment to this letter. The Enclosure attached with this submittal provides a detailed discussion of the historical basis for examination and testing of post-tensioning systems.

There are no regulatory commitments contained within this letter.

CEG requests approval of this request by June 1, 2024.

Should you have any questions concerning this letter, please contact Mr. Jason Taken at (630) 657-3660.

Sincerely,

Kevin Lueshen  
Sr. Manager – Licensing  
Constellation Energy Generation, LLC

Attachment: Request for Relief I4R-14 for Alternative Frequency to Containment  
Unbonded Post-Tensioning System Inservice Inspection in Accordance with 10  
CFR 50.55a(z)(1)

Enclosure: LASALLE COUNTY GENERATING STATION UNITS 1 AND 2, CONTAINMENT  
POST-TENSIONING SYSTEM INSERVICE INSPECTION, TECHNICAL  
REPORT BASIS FOR PROPOSED EXTENSION OF EXAMINATION INTERVAL

cc: USNRC Region III, Regional Administrator  
USNRC Senior Resident Inspector, LSCS  
USNRC Project Manager, LSCS  
Illinois Emergency Management Agency – Division of Nuclear Safety

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### Request for Relief I4R-14 for Alternative Frequency to Containment Unbonded Post-Tensioning System Inservice Inspection in Accordance with 10 CFR 50.55a(z)(1)

#### 1. ASME Code Component(s) Affected

Code Class:	CC
Reference:	IWL-2421, IWL-2520, Table IWL-2500-1
Examination Category:	Table IWL-2500-1, Examination Category L-B
Item Number:	L2.10, L2.20, L2.30, L2.40, and L2.50
Description:	Examination of Concrete Containment Unbonded Post-Tensioning System Components
Component Number:	LaSalle County Station, Units 1 and 2 (LSCS) Concrete Containment

#### 2. Applicable Code Edition and Addenda

The third Containment Inservice Inspection Inservice Inspection (CISI) program is based on the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel (BPV) Code, Section XI, 2007 Edition through the 2008 Addenda. The third CISI interval began on October 1, 2017 and is currently scheduled to end September 30, 2027.

#### 3. Applicable Code Requirement

IWL-2421(b) states that when the conditions of IWL-2421(a) are met, the inspection dates and examination requirements may be as follows:

1. For the containment with the first Structural Integrity Test, all examinations required by IWL-2500 shall be performed at 1, 3, and 10 years and every 10 years thereafter. Only the examinations required by IWL-2524 and IWL-2525 need be performed at 5 and 15 years and every 10 years thereafter.
2. For each subsequent containment constructed at the site, all examinations required by IWL-2500 shall be performed at 1, 5, and 15 years and every 10 years thereafter. Only the examinations required by IWL-2524 and IWL-2525 need be performed at 3 and 10 years and every 10 years thereafter.

In accordance with IWL-2420(c), the 10-year and subsequent examinations shall commence not more than 1 year prior to the specified dates and shall be completed not more than 1 year after such dates. If plant operating conditions are such that examination of portions of the post-tensioning system cannot be completed within this stated time interval, examination of those portions may be deferred until the next regularly scheduled plant outage.

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LSCS, Units 1 and 2 are currently required to examine the post-tensioning system every 5 years with certain aspects such as tendon force measurements and tendon wire sampling performed on an offset rotating 10-year frequency on each unit.

IWL-2500 requires examinations of the unbonded post-tensioning system be performed in accordance with the requirements of Table IWL-2500-1 (L-B), "Examination Category L-B, Unbonded Post-Tensioning System," which includes the following requirements:

- Table IWL-2500-1 (L-B), Item Number L2.10 requires that selected tendon force and elongation be measured in accordance with IWL-2522.
- Table IWL-2500-1 (L-B), Item Number L2.20 requires that tendon single wire samples be removed and examined for corrosion and mechanical damage as well as tested to obtain yield strength, ultimate tensile strength, and elongation on each removed wire in accordance with IWL-2523. The selected tendons are subsequently re-tensioned as required per IWL-2523.3 because wire removal requires de-tensioning in order to safely obtain wire samples.
- Table IWL-2500-1 (L-B), Item Number L2.30 requires that a detailed visual examination be performed on selected tendon anchorage hardware and adjacent concrete extending 2 feet from the edge of the bearing plate in accordance with IWL-2524. The quantity of free water released from the anchorage end cap as well as any that drains from the tendon during examination shall be documented.
- Table IWL-2500-1 (L-B), Item Numbers L2.40 and L2.50 require that samples of selected tendon corrosion protection medium (CPM) and free water be obtained and analyzed in accordance with IWL-2525 and IWL-2526.

#### 4. Reason for Request

ASME Section XI requires periodic visual examination of Containment concrete as well as visual examination and physical testing of post-tensioning systems. The examination and testing to date has indicated that the post-tensioning system is expected to maintain its safety-related function through the period of extended operation. This relief request proposes to perform visual examination only of the concrete Containment and accessible steel hardware visible without tendon cover removal during the 45<sup>th</sup> year surveillance for Unit 1 and the 40<sup>th</sup> year surveillance for Unit 2. Physical testing would be performed only if visual examination results indicate a need for such testing as determined by the Responsible Engineer (IWL-2330). The 45<sup>th</sup> year surveillance (Unit 1) and 40<sup>th</sup> year surveillance (Unit 2) are required to be completed no later than June 30<sup>th</sup>, 2024. The 50<sup>th</sup> year surveillance (Unit 1) and 40<sup>th</sup> year surveillance (Unit 2) would be due June 30, 2028 plus or minus 1 year. The proposed deferral of the physical testing of the post-tensioning system will continue to provide an acceptable level of quality and safety based on projected performance and implementation of physical testing should visual examination results indicate a need for such testing.

A summary of the proposed CISI program changes can be found in Section 2 of the Enclosure. Extending the interval between post-tensioning system examinations and tests from 5 years to 10 years will continue to provide an acceptable level of quality and safety based on projected

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performance and implementation of physical testing, should visual examination results indicate a need for such testing.

While this relief request is based on maintaining an acceptable level of quality and safety, there are additional benefits to extending the frequency of visual examination and physical testing of unbonded post-tensioning systems. Physical testing requires exposing the involved personnel to industrial safety hazards. Removing the tendon end caps and load testing or detensioning/tensioning the tendons also unnecessarily cycles the tendons and exposes the system to an unsealed environment during testing. Below are specific hazards and undesirable conditions that would be eliminated by this proposed relief request:

1. Most tendons are located at heights well above ground level that requires working at heights and the inherent risks associated with such work.
2. Some areas are located in difficult to reach locations that have only one small access point (confined space program application).
3. Requires working with high pressure hydraulics.
4. Requires working in the vicinity of high energy plant systems.
5. Requires working with solvents and hot petroleum products and associated fumes.
6. Requires working with containers and pressurized lines filled with heated corrosion protection medium (grease).
7. Requires working in the vicinity of high levels of stored elastic energy (>1 million foot-pounds) in the tendons. Sudden rotation during force measurement has resulted in high speed shim ejection.
8. Handling of heavy loads (test equipment) that also exposes plant equipment to hazards as well as the involved personnel to hazards.
9. Tendons are tested in areas that involve radiation fields.

Performing examination/testing on a reduced frequency reduces the repetitive loading required for force measurement or de-tensioning and re-tensioning. Reducing the population of tendon end caps removed will minimize tendon hardware exposure to environmental conditions and will reduce environmental waste (e.g., solvents, used grease, other consumables).

#### 5. **Proposed Alternative and Basis for Use**

##### Proposed Alternative

In accordance with 10 CFR 50.55a(z)(1), LSCS, Units 1 and 2 are proposing alternative examination requirements on the basis that these alternative actions will provide an acceptable level of quality and safety.

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The proposed alternative from applicable ASME Section XI, Subsection IWL requirements are as follows:

- Extend the interval between post-tensioning system examinations and tests and detailed visual examination of concrete adjacent to tendon bearing plates from 5 years to 10 years as shown in schedule below.
- Extend the interval for Unit 1 and Unit 2 post-tensioning system examinations that include tendon force measurement from 10 years to the 10 year alternating program as shown in schedule below.

<b>Proposed Tendon Surveillance Schedule (includes the four most recent Unit 1 and Unit 2 surveillances for reference)</b>			
Year	Units 1 & 2		
	Visual Examination, CPM Sampling & Testing and Free Water Collection & Testing Unit 1 and Unit 2	Tendon Force Measurement	
		Unit 1	Unit 2
2003	Performed	Performed	Performed
2008	Performed	N/A	Performed
2013-14	Performed	Performed	N/A
2019	Performed	N/A	Performed
2028 <sup>a</sup>	Perform	Perform	N/A
2038 <sup>a</sup>	Perform	N/A	Perform
2048 <sup>a</sup>	Perform	Perform	N/A
2058 <sup>a</sup>	Perform	N/A	Perform

Note a: For scheduling purposes, each future surveillance is considered to be due at mid-year and must be performed between 30 June of the year prior to the year shown and 30 June of the year following the year shown

- Eliminate requirement for sample wire removal and testing and the associated need for tendon de-tensioning/re-tensioning.
- Limit initial corrosion protection medium laboratory tests to that which determines absorbed water content; perform the corrosive ion and reserve alkalinity tests only on those samples that have a water content above the acceptance limit, are collected at an anchorage where free water and / or corrosion is found or if specified by the Subsection IWL Responsible Engineer (RE).

The above proposed alternatives relate only to the post-tensioning system and the associated examinations that require close-in access to tendon end anchorage areas (Examination Category

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L-B). Visual examination of the exposed areas of the Containment concrete surface, exposed areas of the tendon bearing plates, and tendon end caps will continue to be performed at 5-year intervals in accordance with ASME Section XI, Subsection IWL requirements (Examination Category L-A).

The reduced frequency of physical testing of the post-tensioning system will continue to provide an acceptable level of quality and safety based on projected performance and implementation of physical testing should visual examination results indicate a need for such testing.

LSCS, Units 1 and 2 proposes to perform a General Visual examination and Detailed Visual examination (when required) of accessible concrete and exposed steel hardware as required by ASME Section XI, Table IWL-2500-1, Examination Category L-A, Item Numbers L1.11 and L1.12, as modified by 10 CFR 50.55a and Section 1.2 of the Enclosure. The examination and physical testing requirements of ASME Section XI, Table IWL-2500-1, Examination Category L-B, Item Numbers L2.10, L2.20, L2.30, L2.40, and L2.50 will also be performed if the General Visual examination and Detailed Visual examination identify conditions indicative of possible degradation of tendon hardware, as documented by the Responsible Engineer in an engineering evaluation. Example conditions that could require removal of the tendon end cap and further examination per Item Numbers L2.10, L2.20, L2.30, L2.40, and L2.50 are:

- Evidence of possible damage to the enclosed post-tensioning hardware as indicated by conditions such as end cap deformation found during external visual examination. Conditions observed by removal of the end cap would determine the extent of additional examinations per Item Numbers L2.10, L2.20, L2.30, L2.40, or L2.50.
- Active corrosion on a bearing plate or end cap that requires further investigation as determined by the Responsible Engineer in an engineering evaluation.
- Evidence of corrosion protection medium leakage will be evaluated, and a plan developed that requires further investigation and corrective actions as defined in an engineering evaluation documented by the Responsible Engineer. Visual examination and physical testing of post-tensioning systems will be extended from 5 to 10 years as described in the Enclosure.

LSCS, Units 1 and 2 will report any abnormal degradation of the concrete Containment structure in the Inservice Inspection Summary Report of the completed examinations required by the Pre-Stressed Concrete Containment Tendon Surveillance Program in accordance with 10 CFR 50.55a and ASME Section XI as required by Technical Specifications 5.5.6, "Inservice Inspection Program for Post Tensioning Tendons."

#### Subsection IWL Post-Tensioning System Examination and Physical Testing Requirements and Justification for Alternative

The Enclosure to this submittal provides a detailed discussion of the historical basis for examination and testing of post-tensioning systems. The Enclosure also includes the LSCS, Units 1 and 2, specific observations that provide a basis for an alternative from the ASME Section XI examination and testing requirements included in Table IWL-2500-1, Examination Category L-B. In Sections 5.1 and 5.2 of the Enclosure, it was concluded that based on examination/testing results to date,

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combined with implementation of continuing actions, an acceptable level of quality and safety will be maintained.

#### Additional Supporting Actions

The ASME Section XI, Subsection IWL programs at LSCS, Units 1 and 2 are credited for managing degradation of the Containment. The Examination Category L-A visual examinations (every 5 years) being performed are capable of identifying conditions that would allow water intrusion into the tendons and leakage of CPM which would be precursors for providing an environment that could allow corrosion of the tendon wires or inaccessible tendon hardware covered by the tendon end cap. Such conditions would be evaluated by the Responsible Engineer to identify required additional actions to assure no corrosive environmental conditions exist.

The recommendations identified in Section 5.3 of the Enclosure on the basis of the results and conclusions in Sections 5.1 and 5.2 of the Enclosure provide additional safety and related benefits. The recommendations that support this proposed relief request to perform Examination Category L-B examinations/tests on a less frequent basis and offer additional assurance that performing the Examination Category L-B examinations/tests on a less frequent basis will continue to provide an acceptable level of quality and safety.

#### Summary and Conclusions

The results of the 10 post-tensioning system Inservice examinations performed between 1980 and 2019 show that the Unit 1 and Unit 2 systems can be expected to perform their intended function through T = 100 years which is well past the presumed unit maximum operating lifetime of 80 years. Examination Category L-A visual will be adequate to determine if additional physical testing and examination per Examination Category L-B are required.

#### **6. Duration of Proposed Alternative**

This relief request will remain in effect through the remainder of the current third CISI intervals for LSCS, Units 1 and 2, and will continue until the end of the current period of extended operation for each unit or until such time as ASME Section XI requirements are revised to address similar examination scheduling that is approved in 10 CFR 50.55a. If similar ASME Section XI examination scheduling is implemented in later versions of Section XI, this relief request would be retired and the Section XI requirements as amended by 10 CFR 50.55a would be adopted as required during subsequent CISI Interval updates. The expiration of the LSCS extended operating license is April 17, 2042 (Unit 1) and December 16, 2043 (Unit 2).

#### **7. Precedents**

- Letter from M. Markley (U.S. Nuclear Regulatory Commission) to C. Gayheart (Southern Nuclear Operating Co., Inc.), "Vogtle Electric Generating Plant, Units 1 and 2 – Inservice Inspection Alternative VEGP-ISI-ALT-19-01 For Containment Tendon Inservice Inspection Extension (EPID No. L-2019-LLR-0017)," dated July 11, 2019 (ML19182A077)



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- Letter from J. Danna (U.S. Nuclear Regulatory Commission) to B. Hanson (Exelon Generation Company, LLC), "Three Mile Island Nuclear Station, Unit 1 – Relief From the Requirements of the American Society of Mechanical Engineers Code RE: Examination and Testing for Containment Unbonded Post-Tensioning System (EPID L-2018-LLR-0132)," dated September 19, 2019 (ML19226A023)
- Letter from J. Danna (U.S. Nuclear Regulatory Commission) to D. Stoddard (Dominion Energy Nuclear Connecticut, Inc.), "Millstone Power Station, Unit No. 2 – Proposed Alternative RR-05-05 to the Requirements of the ASME Code Re: Containment Unbonded Post-Tensioning System Inservice Inspection Requirements (EPID L-2019-LLR-0120)," dated October 20, 2020 (ML20287A471)
- Letter from N. Salgado (U.S. Nuclear Regulatory Commission) to D. Rhoades (Exelon Generation Company, LLC), "Braidwood Station, Units 1 and 2 and Byron Station, Unit Nos. 1 and 2 – Proposed Alternative to the Requirements of the American Society of Mechanical Engineers Boiler & Pressure Vessel Code (EPIDS L-2020-LLR-0099 and L-2020-LLR-0100)," dated August 3, 2021 (ML21134A006)
- Letter from J. Danna (U.S. Nuclear Regulatory Commission) to D. Rhoades (Exelon Generation Company, LLC), "Calvert Cliffs Nuclear Power Plant, Units 1 and 2 – Alternative to the Requirements of the ASME Section XI, Subsection IWL Concerning Unbound Post-Tensioning Systems (EPID L-2020-LLR-0135)," dated September 2, 2021 (ML21190A004)
- Letter from J. Dixon-Herrity (U.S. Nuclear Regulatory Commission) to M. Lacal (Arizona Public Service Company), "Palo Verde Nuclear Generating Station Units 1, 2, and 3 – Relief Request 67 for an Alternate Frequency to Containment Unbonded Post-Tensioning System Inservice Inspection (EPID L-2021-LLR-0050)," dated May 12, 2022 (ML22124A241)

**ENCLOSURE**

**LASALLE COUNTY GENERATING STATION  
UNITS 1 AND 2**

**CONTAINMENT POST-TENSIONING SYSTEM INSERVICE  
INSPECTION**

**TECHNICAL REPORT**

**BASIS FOR PROPOSED EXTENSION OF EXAMINATION INTERVAL**