

April 7, 2003

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

10 CFR 50.55a

PALISADES NUCLEAR PLANT
DOCKET 50-255
LICENSE No. DPR-20
CONTAINMENT STRUCTURAL INTEGRITY SURVEILLANCE PROGRAM
30-YEAR TENDON SURVEILLANCE

Nuclear Management Company, LLC (NMC) has recently completed the subject surveillance for the Palisades Plant. The inservice inspection summary report for the 30-year tendon surveillance is attached. The summary report is prepared in accordance with ASME Section XI, 1992 Edition, IWA-6200 and 10 CFR 50.55a (b)(2)(viii). The summary report is being submitted in accordance with Palisades Technical Specification Administrative Controls section 5.6.7, which requires submittal of the report within 90 days after completion of the tests. Surveillance testing activities were completed on January 13, 2003.

SUMMARY OF COMMITMENTS

NMC makes the following new commitment as a result of free water and chemically combined water discovered during inspection of containment dome tendon D1-38:

NMC will inspect containment dome tendon D1-38 and adjacent tendons D1-36 and D1-40 for free water and chemically combined water during the 35-year tendon surveillance.


Douglas E. Cooper
Site Vice-President, Palisades

A047

CC Regional Administrator, USNRC, Region III
Project Manager, USNRC, NRR
NRC Resident Inspector – Palisades

Attachment

ATTACHMENT 1

**NUCLEAR MANAGEMENT COMPANY
PALISADES NUCLEAR PLANT
DOCKET 50-255**

**CONTAINMENT STRUCTURAL INTEGRITY SURVEILLANCE PROGRAM
30-YEAR TENDON SURVEILLANCE**

15 Pages Follow

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30-Year Tendon Surveillance Summary Report

**2003 CONTAINMENT STRUCTURAL INTEGRITY SURVEILLANCE PROGRAM,
ISI SUMMARY**

Submitted in accordance with ASME Boiler and Pressure Vessel Code, Section XI,
Article IWA-6000, 1992 Edition, 92 Addenda

1. Date: August 2002 through January 2003
2. Company Headquarters: Consumers Energy Company, LLC
212 West Michigan Avenue
Jackson, Michigan 49201
3. Plant: Nuclear Management Company, LLC
Palisades Nuclear Plant
27780 Blue Star Memorial Highway
Covert, Michigan 49043
4. Unit No: One
5. Commercial Service Date: December 31, 1971
6. Major Component Inspected:

<u>Component</u>	<u>Manufacturer</u>	<u>Equipment Number</u>
Post-tensioning System	Bechtel	N-54A
7. Completion Date of Examination: January 13, 2003
8. Code Inspector: KLBlake
9. Authorized Inspection Agency: Hartford Steam Boiler of CT.
Hartford, CT.
10. Abstract: See attached report

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1.0 PURPOSE

This report provides a summary of examinations, inspections and corrective actions related to the 30-Year Containment Tendon Surveillance. All activities were performed in accordance with ASME Section XI, Subsection IWL, 1992 Edition, 1992 Addenda as modified by 10CFR50.55a(b)(2)(viii).

In accordance with ASME Section XI, IWA-6240(b), "The inservice inspection summary report shall be submitted within 90 calendar days of the completion of each refueling outage." In accordance with Technical Specification Administrative Controls Section (ADMIN) 5.6.7, reports shall be submitted to the NRC covering prestressing and anchorage tests 90 days after completion of the tests. The 30-Year Tendon Surveillance activities were completed January 13, 2003.

2.0 EXAMINATION AND INSPECTION SCOPE

The examination and inspection scope for the 30-Year Tendon Surveillance is summarized in the following table:

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2.1 Examination Category L-B, Unbonded Post-Tensioning System

Examination Category	Item Number	Parts Examined	Examination	Examination Requirement	Acceptance Standard	Data Sheet Number	Comments
L-B	L2.10	Dome Tendons D2-43 (Common) D1-38 D1-18 D3-20	Tendon Force Measurements	IWL-2522	IWL-3220	A193 through A200	Satisfactory
L-B	L2.10	Vertical Tendons V-334 (Common) V-30 V-116 V-302	Tendon Force Measurements	IWL-2522	IWL-3220	A201 through A206	Satisfactory
L-B	L2.10	Horizontal Tendons H-84DF (Common) H-78CE H-22AE H-23BD (Adjacent) H-24BD H-25BD (Adjacent) H-62BF	Tendon Force Measurements	IWL-2522	IWL-3220	A207 through A221	Satisfactory
L-B	L2.20	Wire D3-20 V-116 H-62BF	Wire or Strand	IWL-2523	IWL-3220	A222 through A237	Satisfactory
L-B	L2.30	Surveilled Tendons	Anchorage Hardware	IWL-2524	IWL-3220	A83 through A122	Satisfactory with Corrective Action CAP031384 & CAP032845
L-B	L2.30	Surveilled Tendons	Surrounding Concrete	IWL-2524	IWL-3220	A123 through A192	Satisfactory
L-B	N/A	Accessible Grease Caps	Grease Caps	Visual	10CFR50.55a(b) (2)(viii)(A)	A287 through A316	Satisfactory

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2.1 Examination Category L-B, Unbonded Post-Tensioning System

Examination Category	Item Number	Parts Examined	Examination	Examination Requirement	Acceptance Standard	Data Sheet Number	Comments
L-B	N/A	Surveilled Tendons	Tendon Force Trend	IWL-2522	10CFR50.55a(b) (2)(viii)(B)	TSSP FT-2	Satisfactory
L-B	N/A	D3-20 V-30 V-116 H-62BF	Tendon Elongation	IWL-2522	10CFR50.55a(b) (2)(viii)(C)	A240 through A247	Satisfactory
L-B	L2.40	Surveilled Tendons	Corrosion Protection Medium	IWL-2525	IWL-3220 and 10CFR50.55a(b) (2)(viii)(D)	B1 through B18	Satisfactory with Corrective Action CAP031258
L-B	L2.40	Surveilled Tendons	Corrosion Protection Medium (Grease Replacement)	IWL-2526	10CFR50.55a(b) (2)(viii)(D)	A248 through A316	Satisfactory with Corrective Action CAP032838
L-B	L2.50	Surveilled Tendons	Free Water	IWL-2524	10CFR50.55a(b) (2)(viii)(D)	A42 through A82	Satisfactory with Corrective Action CAP031258

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3.0 ADDITIONAL CORRECTIVE ACTIONS

In addition to the regularly scheduled surveillance, the following tests and examinations were conducted to address corrective action requirements from previous examinations associated with the post-tensioning system.

Examination Category	Item Number	Parts Examined	Deficiency	Corrective Action Document	Comments
L-A	L1.10	Concrete	Grease leakage at dome tendon D2-40 is a result of a poorly consolidated construction joint.	CPAL9701328	No action taken. Joint does not affect containment structural integrity.
L-A	L1.10	Concrete	Concrete "pop-outs" were discovered in the access tunnel near several tendons.	CAP007614	No action taken. Pop-outs do not affect structural integrity.
L-A	L1.10	Concrete	Grease stains	APAL980121	Grease stains cannot be fully removed.
L-A	L1.10	Concrete	Loose grout	WO 24012793	Loose grout was removed and replaced.
L-B	L2.10	Vertical Tendons V-14 V-16	Grease leakage into East Engineered Safeguards room	APAL980121	All tests and examinations for V14 and V16 were satisfactory except grease loss for V16 was 14.4%.
L-B	L2.10	Grease cans	Oil discovered on containment buttress. Grease leakage discovered in access tunnel near V176 and V306.	CAP007614	Gaskets were replaced for all locations in the test and corrective action scope. Locations were inspected for water and grease coating was verified at 100%

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Examination Category	Item Number	Parts Examined	Deficiency	Corrective Action Document	Comments
L-B	N/A	Grease cans	Anchor rod neoprene gaskets, which are part of containment grease cans located on the dome, are dry-rotted and cracking.	CPAL9701328	Gaskets were replaced for all locations in the test and corrective action scope. Locations were inspected for water and grease coating was verified at 100%.
L-B	N/A	Grease cans	Several grease cans on the containment dome exhibit surface rusting.	WO 24210212	Grease cans were cleaned and painted.

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4.0 EXAMINATION AND INSPECTION RESULTS AND CORRECTIVE ACTIONS

- 4.1 The following items are being reported as required by 10 CFR 50.55a(b)(2)(viii)(D), which states, "The absolute difference between the amount of grease removed and the amount replaced exceeds 10 percent of the tendon net duct volume."

As documented in corrective action document CAP032838, the following tendons exceeded the acceptance criteria for grease replacement:

Dome Tendon D1-38, 18.3 gallons or 32 percent
Vertical Tendon V-16, 11.3 gallons or 14.4 percent
Vertical Tendon V-30, 9.9 gallons or 12.6 percent
Vertical Tendon V-116, 8.8 gallons or 11.2 percent
Vertical Tendon V-330, 8.2 gallons or 10.5 percent

Each tendon met criteria for tendon force measurement, anchorage hardware and surrounding concrete. Tendon wire surfaces were fully covered with a protective grease coating. Therefore, tendons remained fully operable. All locations were refilled by injecting new grease.

As required by 10 CFR 50.55a(b)(2)(viii)(E), Nuclear Management Company, LLC (NMC) has considered the possibility that this condition may exist in inaccessible areas. Based on the results of inspections, it is concluded that the level of leakage in inaccessible areas and the results of leakage are the same as accessible areas. Additionally, it is concluded that the tendons would meet force measurement, wire surface and greasing coating acceptance criteria in a similar manner to that documented for accessible areas.

- 4.2 The following items are being reported as required by 10 CFR 50.55a(b)(2)(viii)(D), which states, "Grease leakage is detected during general visual examination of the containment surface."

As documented in corrective action document CAP031171, grease leakage was discovered at the main gaskets for vertical tendons V-98, V-132, V-134, V-150, V-154, V 178, V-218, V-166, and V-186. All leaks were from the top or "shop" end on the containment dome. It is considered that filling of the grease cans during the steam generator replacement project, which occurred during a cold weather period in 1991, and subsequent heating by the sun and containment internal heating, expanded the grease and pushed it by the main gasket. Main gaskets were replaced and grease leakage from the subject grease cans

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stopped as part of the tendon surveillance project. The quantity of grease replacement is sufficient to cover tendon end anchorage hardware, but an air pocket is being left in the upper portion of the can to allow for grease expansion and contraction. Grease forms a protective layer for tendons and this layer has not been compromised by the small amount of leakage noted.

As required by 10 CFR 50.55a(b)(2)(viii)(E), NMC has considered the possibility that this condition may exist in inaccessible areas. Based on the results of inspections, it is concluded that the level of leakage in inaccessible areas could be the same as accessible areas. However, even if this condition exists in inaccessible areas, it is expected that, tendons would meet performance requirements in a similar manner to that documented for accessible areas.

- 4.3 In accordance with ASME Section XI, 1992 Edition, 1992 Addenda, Subsection IWL, the following items are being reported as conditions failing to meet acceptance criteria IWL-3221.3(c)

As documented in corrective action document CAP031384, surveillance activities discovered three missing button heads on vertical tendon V-30, field end. One of the missing button heads was previously recorded during plant construction. The cause of two additional failed button heads appears to be fabrication flaws inserted during the button heading process, as evidenced by the lack of button heads in the removed grease. The lack of button heads indicates failure occurred prior to the previous installation of the grease can, which for V-30 was during plant construction. There was no visible sign of deterioration at the end of the individual tendon wires. Tendon V-30 met all other applicable test and inspection acceptance criteria.

As documented in corrective action document CAP032845, surveillance activities discovered a single protruding wire at dome tendon D3-22, shop end. A protruding wire may be an indication of tendon wire corrosion or breakage resulting in increased wire length. In the case of D3-22, the protrusion is due to a break somewhere along the length of the wire as evidenced by all buttonheads being in place at the field end. Efforts to remove the wire were unsuccessful making it impossible to determine the cause for failure. There was no visible sign of deterioration at the ends of the wires. Tendon force measurement testing was not performed for D3-22 due to obstructions; however all other test and inspection acceptance criteria were met for grease coating, sampling and loss, inspection for water, anchorage corrosion and concrete inspection ,

As required by 10 CFR 50.55a(b)(2)(viii)(E), NMC has considered the possibility that these conditions may exist in inaccessible areas. Based on the results of

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inspections, it is concluded that the degree of button head or wire failures in inaccessible areas and the results of failures are the same as accessible areas.

It is concluded that, even with the same level of failure, inaccessible tendons would meet performance requirements in a similar manner to that documented for accessible areas.

- 4.4 The following items are being reported as required by 10 CFR 50.55a(b)(2)(viii)(D), which states, "The sampled sheathing filler grease contains chemically combined water exceeding 10 percent by weight or the presence of free water."

Water infiltration has been documented during previous tendon surveillances at Palisades. The cause of water infiltration has been traced to degraded grease can gaskets and migration through concrete cold joints and tendon sheathing. The concern is that water in contact with anchorage components may cause stress corrosion of the anchor head or tendon wire, or hydrogen embrittlement of the anchorage. However, tendon force measurements and visual inspections have been satisfactory for tendons affected by water infiltration.

As documented in corrective action document CAP031258, inspection of tendon D1-38 shop end, discovered 20 ounces of free water. Additionally, the grease sample testing for this tendon indicated chemically combined water at 11 percent at the shop end, only. To fully determine tendon condition, tendon force measure tests and visual exams were performed. Force measurement tests were satisfactory and inspections did not discover any degradation of anchorage components. On the basis of this information, it is concluded that the presence of free water or chemically combined water in the grease is insufficient to cause corrosion or cracking of the anchorage components. Tendon D1-38 was refilled by injecting new grease.

As required by 10 CFR 50.55a(b)(2)(viii)(E), NMC has considered the possibility that this condition may exist in inaccessible areas. Based on the results of inspections and tests, it is concluded that this condition is isolated to tendon D1-38 due to its location and the existence of a horizontal cold joint near this tendon end anchorage. The cold joint and tendon grease sheathing are not water tight, and can allow water infiltration when sufficient void space exists. Even if this condition exists in inaccessible areas, it is expected that, tendons would meet performance requirements in a similar manner to that documented for accessible areas.

In order to monitor this condition, dome tendon D1-38 will be added to the inspection scope for the 35-Year tendon surveillance. Additionally, adjacent

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tendons D1-36 and D1-40 will be inspected for water intrusion during the 35-Year surveillance activities.

5.0 SUMMARY

The Technical Specification ADMIN 5.5.5, Containment Structural Integrity Surveillance Program, demonstrates continued containment operability by providing assurance that the containment is capable of fulfilling designed operating and accident functions. Based on an evaluation of the 30-Year Tendon Surveillance results, and after reviewing the acceptable disposition of non-conforming items, NMC concludes that the containment structure has not experienced abnormal degradation related to the post-tensioning system and continues to be operable.

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6.0 ATTACHMENTS

Attachment 1 , NIS-1 Form, "Owners Data Report for Inservice Inspection"

Attachment 2 , NIS-2 Form, "Owners Report for Repairs and Replacements" None

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Attachment 1 , NIS-1 Form, "Owners Data Report for Inservice Inspection" - To be added at final copy.

FORM NIS-1 (Back)

8. Examination Dates 8/2002 to 1/2003 9. Inspection Interval from 5/12/95 to 12/12/06
10. Abstract of Examinations. Include a list of examinations and a statement concerning status of work required for current interval. See "30-YEAR Tendon Surveillance Summary Report"
11. Abstract of Conditions Noted See Above
12. Abstract of Corrective Measures Recommended and Taken See Above

We certify that the statements made in this report are correct and the examinations and corrective measures taken conform to the rules of the ASME Code, Section XI.

Certificate of Authorization No. (if applicable) N/A Expiration Date N/A
Date 4/7 ²⁰⁰³ Signed Consumers Energy By JH Jantj NMC
Owner

CERTIFICATE OF INSERVICE INSPECTION

I, the undersigned, holding a valid commission issued by the National Board of Boiler and Pressure Vessel Inspectors and the State or Province of Michigan and employed by HSB CT of Connecticut have inspected the components described in this Owner's Report during the period 8/2002 to 1/2003, and state that to the best of my knowledge and belief, the Owner has performed examinations and taken corrective measures described in this Owner's Report in accordance with the requirements of the ASME Code, Section XI.

By signing this certificate neither the Inspector nor his employer makes any warranty, expressed or implied, concerning the examinations and corrective measures described in this Owner's Report. Furthermore, neither the Inspector nor his employer shall be liable in any manner for any personal injury or property damage or a loss of any kind arising from or connected with this inspection.

J Blake Commissions MI 300 762 B, N, I, NS
Inspector's Signature National Board, State, Province, and Endorsements
Date 4/7 ²⁰⁰³

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Attachment 2 , NIS-2 Form, "Owners Report for Repairs and Replacements" - There were no repairs or replacements performed during this inspection. Therefore, no NIS-2 forms were generated