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Palisades Nuclear Plant
Operated by Nuclear Management Company, LLC

July 25, 2005 10 CFR 54

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

Palisades Nuclear Plant
Docket 50-255
License No. DPR-20

NMC Response to NRC Requests for Additional Information Dated June 22, 2005 Relating to License Renewal for the Palisades Nuclear Plant

In letters dated June 22, 2005 (ML051730291, ML051730577, and ML051730597), the Nuclear Regulatory Commission (NRC) transmitted Requests for Additional Information (RAIs) regarding the License Renewal Application for the Palisades Nuclear Plant. This letter responds to those requests.

Enclosures 1, 2, and 3 provide the text of, and the NMC response to, each NRC request.

Please contact Mr. Darrel Turner, License Renewal Project Manager, at 269-764-2412, or Mr. Robert Vincent, License Renewal Licensing Lead, at 269-764-2559, if you require additional information.

Summary of Commitments

This letter contains three new commitments, as follows:

> NMC will enhance the preventive maintenance program to periodically inspect, and replace as necessary, the expansion joints/flexible connections in the portions of the Heating, Ventilation and Air Conditioning System, and the Service Water System, that are in-scope for license renewal.

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NMC will identify specific methods of inspection for individual components as part of the System Monitoring Program implementation procedure development. Industry documents such as EPRI 1009743 , EPRI GS-7086, and API 575 will be used as source documents to define tank testing and inspection requirements.

NMC will have an analysis performed to project the expected containment tendon pre-stressing forces out to 60 years, utilizing, to the extent practical with available surveillance data, the procedures recommended in NUREG 1801, Generic Aging Lessons Learned (GALL) Report, Program X.S1, and Regulatory Guide 1.99, Radiation Embrittlement of Reactor Vessel Materials. The results of the analysis will be submitted to NRC when available.

I declare under penalty of perjury that the foregoing is true and correct. Executed on July 25, 2005.

Paul A. Harden
Site Vice President, Palisades Nuclear Plant
Nuclear Management Company, LLC

Enclosures (4)

CC Administrator, Region III, USNRC
Project Manager, Palisades, USNRC
Resident Inspector, Palisades, USNRC
License Renewal Project Manager, Palisades, USNRC

ENCLOSURE 1

NMC Responses to NRC Requests for Additional Information (ML051730291)
Dated June 22, 2005

(10 pages)

RAI B2.1.20-1(a)

NUREG-1801 XI.M29 states that the plant walk-downs cover the entire outer surface of the tank up to its surface in contact with soil or concrete. The applicant is requested to clarify if the entire exposed external surface of the above ground steel tanks are included within scope of the Systems Monitoring Program.

NMC Response to NRC RAI B2.1.20-1(a)

The System Monitoring Program is designed to cover the entire accessible exposed surfaces of above ground steel tanks down to its surface contact with soil or concrete. The program will not rely on sampling of locations when completing inspections. The entire accessible exposed surface is that which can normally be accessed by an individual taking advantage of installed plant walkways, ladders and platforms.

RAI B2.1.20-1(b)

The LRA AMR Tables credit the Systems Monitoring Program for managing external surfaces of elastomers, but elastomers are not specifically addressed in the Systems Monitoring program. The applicant is requested to clarify if elastomers are within scope of the Systems Monitoring Program and, if so, consider the unique aging degradation characteristics of elastomers in the specified environment and include a discussion of elastomers within each element of the program.

NMC Response to NRC RAI B2.1.20-1(b)

As discussed in the response to RAI B2.1.20-1(c) Palisades has determined that there are no elastomers in mechanical systems that are required to be managed by an Aging Management Program. Therefore, there are no elastomers managed by the System Monitoring Program.

RAI B2.1.20-1(c)

Considering the limited shelf life and service life of elastomers for the specified environment, the applicant is requested to clarify if elastomers meet the definition of long-lived components within scope of license renewal.

NMC Response to NRC RAI B2.1.20-1(c)

NMC has determined that the elastomers listed in the Heating, Ventilation and air Conditioning (HVAC) System, and the Service Water System AMR tables of the LRA are not long lived components that require aging management. Therefore, there are no elastomers in mechanical systems that are required to be managed by an Aging Management Program (AMP), and the line items for elastomers in Tables 2.3.3-9, 3.3.2-9 and 3.3.2-12, and Sections 3.3.2.1-9 and 3.3.2.1-12 should be deleted.

Based on this determination, NMC will enhance the preventive maintenance program to periodically inspect, and replace as necessary, the expansion joints/flexible connections in the portions of the Heating, Ventilation and Air Conditioning System, and the Service Water System, that are in-scope for license renewal.

RAI B2.1.20-2(a)

NUREG-1800 Item 4 indicates that the justification, including codes and standards, that the technique and frequency are adequate to detect the aging effects before a loss of SC intended function. Industry documents such as EPRI 1009743 (Aging Identification and Assessment Checklist), EPRI GS-7086 (Testing, Monitoring, and Maintenance of Aboveground Storage Tanks) and API 575 (Inspection of Atmospheric and Low-Pressure Storage Tanks) include inspection and testing practices for mechanical systems and components. The applicant is requested to clarify what codes and standards or manufacturer's recommendations are applied to determine that the technique and frequency are adequate to detect degradation before the loss of intended component function.

NMC Response to NRC RAI B2.1.20-2(a)

NMC will identify specific methods of inspection for individual components as part of the System Monitoring Program implementation procedure development. NMC will begin working on implementation later in 2005 and plans to complete draft aging management programs and procedures in 2006. The System Monitoring Program will be included in this effort. Palisades' System Monitoring Program will adopt recommendations for inspection techniques and frequencies from applicable codes, industry standards, and/or manufacturers' recommendations. Industry documents such as EPRI 1009743 , EPRI GS-7086, and API 575 will be used as source documents to define the tank testing and inspection requirements.

RAI B2.1.20-2(b)

LRA AMR Tables credit the Systems Monitoring Program for managing change in material properties and cracking for elastomers used inside/outside containment. The applicant is requested to clarify how visual inspections are performed to detect changes in material properties and identify if other methods such as hardness testing or physical manipulation in combination with visual inspections are appropriate.

NMC Response to NRC RAI B2.1.20-2(b)

As identified in the response to RAI B2.1.20-1(c) Palisades has determined that there are no elastomers in mechanical systems that are required to be managed by an Aging Management Program. Therefore, there are no elastomers managed by the System Monitoring Program.

RAI B2.1.20-2(c)

The applicant is requested to clarify if sampling is applied to inspect a group of SCs or clarify if the entire surfaces of all accessible components are inspected.

NMC Response to NRC RAI B2.1.20-2(c)

The system monitoring program is designed to inspect the entire accessible exposed surface of components included within the scope of the program. The program will not rely on sampling of locations when completing inspections. The entire accessible exposed surface is that which can normally be accessed by an individual taking advantage of installed plant walkways, ladders and platforms.

RAI B2.1.20-2(d)

For those surfaces that are insulated, the applicant is requested to clarify if insulation will be removed to provide access for inspections. Where insulation is not removed, the applicant is requested to justify the basis that any potential degradation will be detected.

NMC Response to NRC RAI B2.1.20-2(d)

NMC will not remove insulation solely for the inspections performed by the System Monitoring Program. Removal of insulation is not considered necessary to identify likely locations of potential degradation. The condition of the insulation (e.g., discoloration, evidence of wetting, etc.), in itself, provides a good indirect indicator of the conditions beneath. If the insulation condition indicates that a potential problem exists beneath the insulation, this condition would be documented and corrective action, (e.g., isolation, insulation removal, further inspection, repairs) would be initiated.

The Palisades system walk downs will look for evidence of degradation where pipe insulation is not removed in a manner similar to the ASME Code for safety-related piping and components. The inspections of insulated non-Class 1 pipe and closure joints, performed under the Palisades System Monitoring Program, will be similar to the visual examinations, VT-2, prescribed by the ASME Code for insulated Class 1 piping and pressure retaining bolted connections. ASME Section XI, Paragraph IWA-5242, Insulated Components, states, (a) For systems borated for the purpose of controlling reactivity, insulation shall be removed from pressure retaining bolted connections for visual examination VT-2. For other components, visual examination VT-2 may be conducted without the removal of insulation by examining the accessible and exposed surfaces and joints of the insulation. Essentially vertical surfaces of insulation need only be examined at the lowest elevation where leakage may be detected. Essentially horizontal surfaces of insulation shall be examined at each insulation joint. (b) When examining insulated components, the examination of surrounding area (including floor areas or equipment surfaces located underneath the components) for evidence of leakage, or other areas to which such leakage may be channeled, shall be required. (c) Discoloration or residue on surfaces examined shall be given particular attention to detect evidence of boric acid accumulation from borated reactor coolant leakage.

RAI B2.1.20-2(e)

For bolted connections, the applicant is requested to clarify how evidence of corrosion and wear will be detected where the threaded surfaces are not normally visible.

NMC Response to NRC RAI B2.1.20-2(e)

Although Bolting is not specifically discussed in the LRA description of the System Monitoring Program, bolting is a component that will be inspected during system walkdowns. The intent of the System Monitoring Program is to inspect all accessible external exposed surfaces of various component types (e.g., pump casings, valve bodies, piping, and expansion joints), which would include the bolted connections.

As discussed in the response to RAI B2.1.20-2(d), NMC will not remove insulation solely for the inspections performed by the System Monitoring Program. Removal of insulation is not considered necessary to identify likely locations of potential degradation. The condition of the insulation (e.g., discoloration, evidence of wetting, etc.), in itself, provides a good indirect indicator of the conditions beneath. If the insulation condition indicates that a potential problem exists beneath the insulation, this condition would be documented and corrective action , (e.g., isolation, insulation removal, further inspection, repairs) would be initiated.

The Palisades system walk downs will look for evidence of degradation where pipe insulation is not removed in a manner similar to the ASME Code for safety-related piping and components. The inspections of insulated non-Class 1 pipe and closure joints, performed under the Palisades System Monitoring Program, will be similar to the visual examinations, VT-2, prescribed by the ASME Code for insulated Class 1 piping and pressure retaining bolted connections. ASME Section XI, Paragraph IWA-5242, Insulated Components, states, (a) For systems borated for the purpose of controlling reactivity, insulation shall be removed from pressure retaining bolted connections for visual examination VT-2. For other components, visual examination VT-2 may be conducted without the removal of insulation by examining the accessible and exposed surfaces and joints of the insulation. Essentially vertical surfaces of insulation need only be examined at the lowest elevation where leakage may be detected. Essentially horizontal surfaces of insulation shall be examined at each insulation joint. (b) When examining insulated components, the examination of surrounding area (including floor areas or equipment surfaces located underneath the components) for evidence of leakage, or other areas to which such leakage may be channeled, shall be required. (c) Discoloration or residue on surfaces examined shall be given particular attention to detect evidence of boric acid accumulation from borated reactor coolant leakage.

Specific management of loss of bolting pre-load is addressed by maintenance alignment and installation procedures. A corrosive environment is precluded through use of proper

lubricants, proper bolt torquing practices, and the absence of moisture. Should leakage occur, the evidence of the leak would be discovered, investigated and resolved prior to a loss of intended function.

Note that Palisades does not manage Loss of Material - Wear, of bolting material with the System Monitoring Program.

RAI B2.1.20-3

NUREG-1800 Section A.1.2.3.6 Item 4 states that qualitative inspections should be performed to the same predetermined criteria as quantitative inspections by personnel in accordance with ASME Code and through approved site specific programs. The applicant is requested to identify the inspection criteria such as ASME Code VT-1 examination, or other industry standards and identify the qualifications of personnel performing the inspections.

NMC Response to NRC RAI B2.1.20-3

Specific inspection criteria and individual inspector qualifications for the System Monitoring Program will be determined as part of the implementation phase of the license renewal project. NMC will begin working on implementation later in 2005 and plans to complete draft aging management programs and their associated implementing procedures in 2006.

ENCLOSURE 2

NMC Responses to NRC Requests for Additional Information (ML051730577)
Dated June 22, 2005

(3 pages)

RAI 4.5-1

In Section 5.8.5.3.1 of the final safety analysis report (FSAR), the applicant provides the final pre-stress (Ff) as 140.6, 138, and 143 ksi for the dome, hoop, and the vertical tendons, respectively. The applicant appears to have used these values as the minimum required values (MRVs). As these values are not at the anchorages, these values should not be used as MRVs without modifying them for appropriate friction losses. The applicant is requested to provide the MRVs in terms of force per tendon.

NMC Response to NRC RAI 4.5-1

FSAR Section 5.8.5.3.1 provides the initial estimate of the final wire prestress for the containment tendons. The calculated forces in this section of the FSAR do not represent the minimum required values (MRV) for the containment tendons. FSAR Section 5.8.8.3.4 lists the acceptance criteria of the lift-off force per tendon as no less than 584 KIPs per tendon for dome tendons and no less than 615 KIPs per tendon for hoop and vertical tendons

RAI 4.5-2

In describing the scope of the program related to NUREG-1801 AMP X.S1, in AMP B2.1.7, the applicant states: "The pre-stressing force in the common tendon is measured during each surveillance and is used to establish the trend of pre-stressing loss of the group." This practice is not consistent with AMP X.S1 and NRC's Information Notice (IN) 99-10, "Degradation of Pre-stressing Tendon Systems in Pre-stressed Concrete Containments." The information notice recommends the use of all available measured pre-stressing forces for developing trend lines for each group of tendons. As Palisades started using random sampling of tendons since 15th year surveillance of tendons (FSAR Section 5.8.8.3.3), the applicant has at least three sets of measured pre-stressing forces for performing regression analyses and developing trend lines. The applicant is requested to provide trend lines for each group of tendons for comparison with the predicted lower limits (PLLs) and the minimum required values (MRVs). The applicant is also requested to provide a tabulation of the measured pre-stressing forces (not individual wire forces) used in the corrected regression analyses.

NMC Response to NRC RAI 4.5-2

Regression analysis results are contained within Precision Surveillance Corporation (PSC) report entitled, "30th Year Physical Tendon Surveillance of Palisades Nuclear Plant, 2002." The discussion is contained in Section VIII, "Comparison with Original Installation Data" (attached to this letter as Enclosure 4).

RAI 4.5-3

In order for the staff to arrive at the reasonable assurance conclusion regarding the adequacy of the TLAA, at a point and time (i.e. during the LRA review), the applicant is requested to provide a tabulated comparison of the minimum required values (MRVs) for each group of tendons, and the projected pre-stressing forces at 40 and 60 years based on the regression analyses performed, utilizing the procedure recommended in NUREG-1801, AMP X.S1, and in IN 99-10.

NMC Response to NRC RAI 4.5-3

Based on the discussion contained in FSAR Chapter 5.8, and specifically 5.8.5.3, "Prestressing System", the Palisades containment tendons are expected to remain above minimum required force levels beyond the 40-year plant life. FSAR 5.8.5.3 states the following conclusion; "At the conclusion of the Twentieth and Twenty-Fifth year tendon surveillances, regression analyses were performed utilizing the surveillance data (References 36, 37, 44, and 45). The results consistently indicated that the effective group tendon forces, dome/hoop/vertical, were significantly higher than predicted values beyond the 40-year time period." This conclusion is also supported by the report extract discussed in the response to RAI 4.5-2, and provided as Enclosure 4 to this letter. By inspection of the graphs provided in this report, when the current trend curves are extrapolated, it is apparent that tendon forces will satisfy their minimum required values, with margin, beyond 60 years.

The Palisades Tendon surveillance Program is designed to maintain the Tendon force above minimum analysis requirements on a continuous basis from surveillance to surveillance. This is accomplished during each surveillance by performing tendon force measurements, comparing the results against expected levels for tendon force, and assuring that expected relaxation will remain above minimum requirements beyond the next surveillance. It does not rely solely on the projection of forces out to the end of plant life. Therefore, a formal calculation to extrapolate the regression analysis to 60 years is not currently available.

NMC will have an analysis performed to project the expected containment tendon pre-stressing forces out to 60 years, utilizing, to the extent practical with available surveillance data, the procedures recommended in NUREG 1801, Generic Aging Lessons Learned (GALL) Report, Program X.S1, and Regulatory Guide 1.99, Radiation Embrittlement of Reactor Vessel Materials. The results of the analysis will be submitted to NRC when available.

ENCLOSURE 3

NMC Responses to NRC Requests for Additional Information (ML051730597) dated June 22, 2005

(2 pages)

RAI 4.7.1-1(a)

The LRA does not characterize the estimated number of lifts for the Polar Crane. LRA Section A4.5.1 indicates that separate evaluations have been performed of polar crane planned engineering lifts (over-rated capacity) and that lifts have been evaluated and approved up to 140 T, less than 4 percent over the 135 T rating. NUREG-1744, A Survey of Crane Operating Experience at U.S. Nuclear Power Plants from 1968 through 2002, identifies that the maximum load weight for the Palisades reactor building crane was exceeded twice (greater than 125%) when lifting the reactor vessel head with additional lead shielding intact. For the Polar Crane, the applicant is requested to identify the number of lifts considered in the fatigue evaluation and clarify how the over-rated capacity lifts have been considered in combination with the other lifts for the fatigue evaluation.

NMC Response to NRC RAI 4.7.1-1(a)

The NUREG-1774 characterization of the Planned Engineered Lift (PEL) for Palisades is incorrect. A review of operating experience indicated no loads, including test loads, that have exceeded 125% of the rated capacity of the crane. The containment polar crane was designed to Electric Overhead Crane Institute specification EOCI-61. EOCI-61 does not address fatigue limits. The subsequent NUREG-0612 heavy loads evaluation of the polar crane was performed to Crane Manufacturers Association of America Specification CMAA-70, "Specification for Electric Overhead Traveling Cranes," 1975 Edition. The Service Classification of the crane under CMAA-70 is Service Level A. The effective crane design life for fatigue, or allowed number of rated lifts, depends on this classification, which assumes 20,000 to 100,000 rated lifts in a design lifetime.

Separate evaluations have been performed of polar crane PELs (over the rated capacity). Some lifts have been evaluated and approved up to 140 Tons, which is less than 4 percent over the 135 Ton rating. The evaluations were done to ANSI/ASME Standard B30.2 (1996). Polar crane rated or near-rated lifts are limited to the reactor head and reactor internals; other heavy loads such as the reactor missile shields and primary coolant pump motors are well below the crane rating.

The majority of the crane operating cycles involve equipment moves with minimal load compared to the crane capacity. On average, there have been fewer than 10 lifts exceeding approximately 50% of the crane's rated capacity performed in each 12 month period. This value includes a limited number of PELs for lifts slightly in excess of the crane capacity. In the future NMC does not anticipate the need for additional PELs. Even if this historical rate (ten lifts in excess of half crane rated capacity per year) were to continue for the entire 60 years of operation, this would result in a combined total of only 600 lifts of this magnitude. 600 lifts is substantially less than the 20,000 full load cycles that would require fatigue analysis in accordance with CMAA 70.

RAI 4.7.1-1(b)

Industry experience in documents such as NUREG-1744 indicates that crane vibrations have occurred during crane operation. The applicant is requested to review plant-specific operating experience and identify if any crane vibrations have occurred during crane operation and, if so, clarify how vibrations are considered in the fatigue evaluation. If crane vibrations are not considered for license renewal, the applicant is requested to provide the technical justification.

NMC Response to NRC RAI 4.7.1-1(b)

Review of plant operating experience did not identify any instances of significant vibration noted during the operation of the overhead cranes. Crane vibration would be indicative of abnormal crane operation that would be identified and evaluated separately on a plant-specific basis under the corrective action process in order to determine its significance with respect to the crane. As discussed above, the cranes were designed to operate at rated load; therefore, because of the low frequency of rated load lifts, CMMA 70 does not require a fatigue analysis.

Enclosure 4
Excerpt from Report Entitled, "30th Year Physical Tendon Surveillance of Palisades Nuclear Plant 2002"

(11 pages)

30TH YEAR TENDON
SURVEILLANCE AT THE
PALISADES NUCLEAR PLANT

VIII. COMPARISON WITH ORIGINAL INSTALLATION DATA

A comparison of the liftoff forces from this surveillance to the original installation lock-off forces is made in an effort to detect any evidence of system degradation. The lock-off forces are compared in order to detect any abnormal force loss which would possibly indicate an underestimation of the creep, shrinkage and/or elastic shortening effects in the Containment Building.

The losses for the tendon groups were found to be 15.76% for the dome tendons, 11.75% for the vertical tendons and 16.27% for the horizontal tendons. Based upon a comparison with the results from other facilities, these losses are less than has been experienced at younger containments and does not indicate any degradation of the system.

A regression analysis was conducted on each of the tendon groups and the graphs are shown on the following pages along with the input data for force, test dates and age (time stressed). All three analysis show each group remaining above the minimum requirements well beyond the next surveillance period. Projections to 40 years after installation (38 years of plant life) show a dome projection of 643 kips with a minimum requirement of 584 kips, vertical value of 666 kips against a minimum requirement of 615 kips and a horizontal projection of 647 kips against a minimum of 615 kips. As a result of the generator change and the retensioning of a large number of vertical tendons these must now be excluded from this analysis. This results in only two data points each for the Twentieth and Twenty-fifth year surveillances leading to a somewhat erratic forecast profile. With only two points to plot the projection does not have enough points to provide extensive indications of trend at this time. However, a review of losses for the vertical group do not give any indication of group deterioration and there is little doubt that the group will remain above minimum values throughout the next surveillance interval. Dome and horizontal tendons show forecast curves consistant with imput from a larger field of data and will also remain above minimum levels beyond the next surveillance.

A review of previous surveillance data indicated that the current common tendons used during this surveillance were in fact detensioned during the first surveillance and new tendons should be selected from a pool of tendons where only liftoffs were performed (fifteenth year surveillance onwards). In addition, earlier surveillances used the hammer method for evaluating the liftoff point although this should have a minimal effect on the regression analysis due to the reduced weighting of older data.

30TH YEAR TENDON
SURVEILLANCE AT THE
PALISADES NUCLEAR PLANT

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TABLE XII: COMPARISON OF ORIGINAL LOCKOFF FORCES TO AS FOUND FORCES

TENDON	LIFTOFF FORCE		LOSS	PERCENTAGE	AVERAGE
	ORIGINAL	@ 30 YEARS	(kips)	%	PERCENTAGE
D1-18	780.0	657.2	122.8	15.74	
D1-38	783.8	675.9	Detensioned first surveillance		
D2-43	776.25	654.8	121.45	15.65	15.76
D3-20	783.75	659.25	124.5	15.89	
V-14	776.25	695	81.25	10.47	
V-16	750.0	677.8	72.2	9.63	
V-30	780.0	664.7	115.3	14.78	11.75
V-116	776.0	740.4	Retensioned at Generator Change		
V-302	761.25	669.1	92.15	12.11	
V-334	781	682.9	Detensioned first surveillance		
H-22AE	765.0	650.7	114.3	14.94	
H-23BD	780.0	629.0	151.0	19.36	
H-24BD	750.0	610.3	139.7	18.63	
H-25BD	780.0	638.6	141.4	18.13	16.27
H-62BF	780.0	660.8	119.2	15.28	
H-78CE	783.75	695.5	88.25	11.26	
H-84DF	772.5	662.5	Detensioned first surveillance		

Enclosure 4
Excerpt from Report Entitled, "30th Year Physical Tendon surveillance of Palisades Nuclear Plant 2002"

30TH YEAR TENDON
SURVEILLANCE AT THE
PALISADES NUCLEAR PLANT

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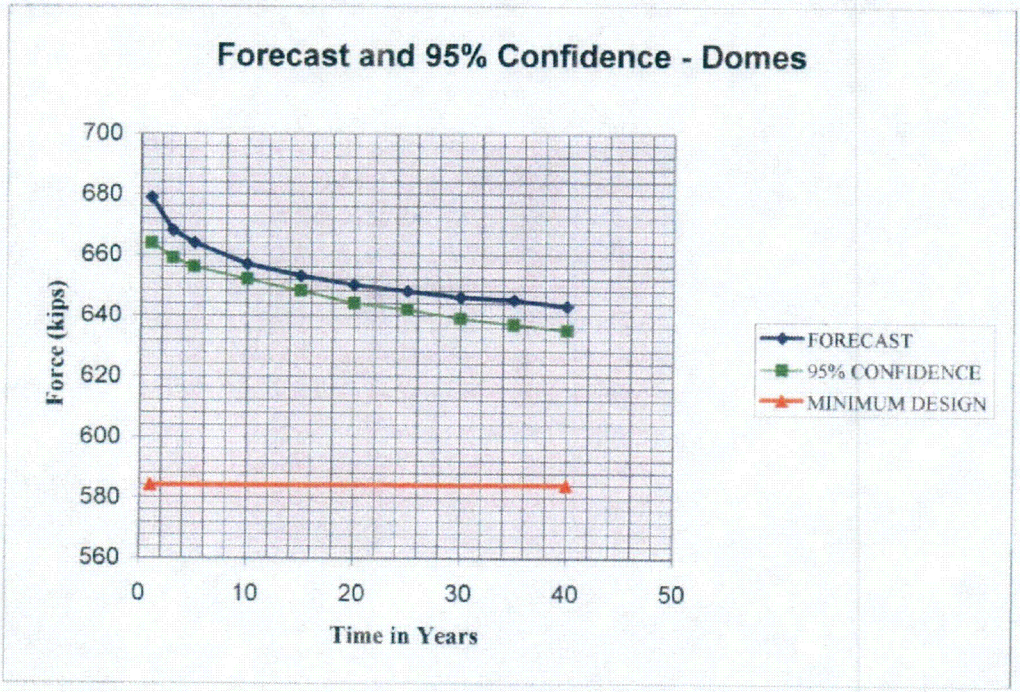

YEARS	FORECAST (kips)	95% CONFIDENCE
1	679	664
3	668	659
5	664	656
10	657	652
15	653	648
20	650	644
25	648	642
30	646	639
35	645	637
40	643	635

42

C01

30TH YEAR TENDON
SURVEILLANCE AT THE
PALISADES NUCLEAR PLANT

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REGRESSION ANALYSIS DATA

TENDON NUMBER	TENDON FORCE	TEST DATE	ORIGINAL STRESS	AGE (TIME STRESSED)
D1-38	669	—	—	2.00
D2-53	687	—	—	2.00
D3-11	690	—	—	2.00
D1-33	656	10-23-75	6-13-69	6.36
D1-51	674	10-28-75	6-23-69	6.35
D2-21	657	10-22-75	6-17-69	6.35
D2-49	640	10-21-75	6-18-69	6.34
D3-40	666	10-16-75	6-10-69	6.35
D3-49	662	10-14-75	6-20-69	6.32
D1-32	656	6-25-81	6-10-69	12.04
D2-45	624	6-15-81	6-24-69	11.98
D3-35	636	6-3-81	6-16-69	11.96
D1-09	631	9-25-87	6-20-69	18.26
D1-38	EXCLUDED	9-29-87	6-24-69	18.26
D2-3	640	10-17-87	6-23-69	18.32
D3-18	661	10-20-87	6-25-69	18.32

30TH YEAR TENDON SURVEILLANCE AT THE PALISADES NUCLEAR PLANT

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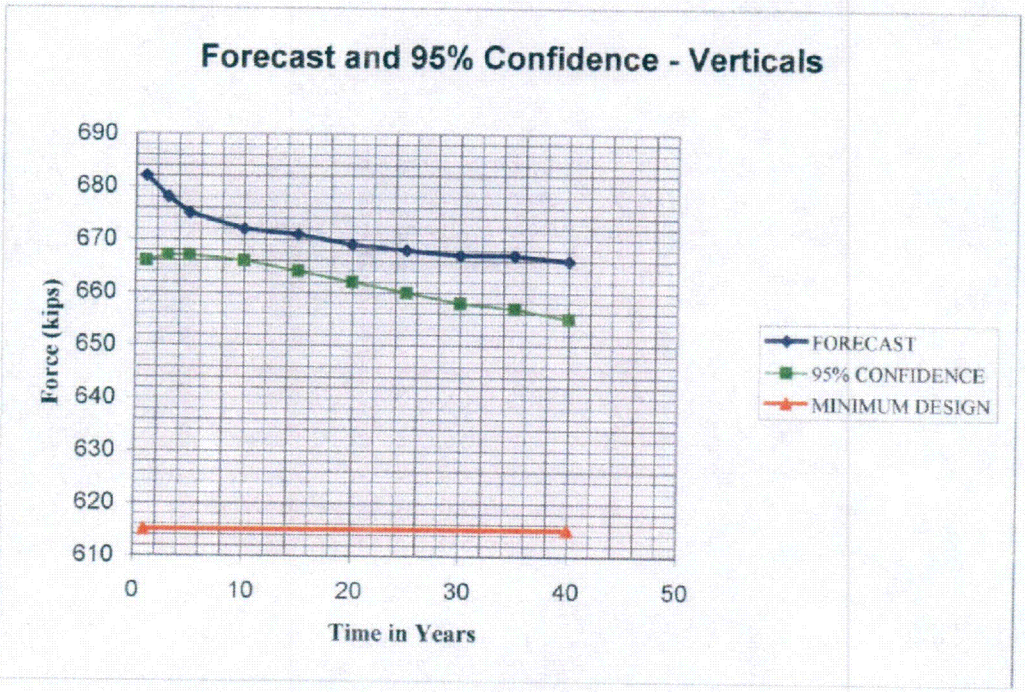
REGRESSION ANALYSIS DATA

TENDON NUMBER	TENDON FORCE	TEST DATE	ORIGINAL STRESS	AGE (TIME STRESSED)
D1-42	654	3-16-92	6-24-69	22.73
D2-19	632	3-3-92	6-17-69	22.71
D2-23	637	2-27-92	6-17-69	22.70
D3-52	671	3-16-92	6-13-69	22.76
D1-29	648	9-3-97	6-17-69	28.21
D2-47	634	9-12-97	6-18-69	28.23
D3-42	673	9-9-97	6-24-69	28.21
D3-51	652	9-8-97	6-20-69	28.22
D1-18	658	9-17-02	6-27-69	33.22
D1-38	EXCLUDED	9-20-02	6-24-69	33.21
D2-43	655	8-28-02	6-24-69	33.18
D3-20	659	9-25-02	6-9-69	33.29

Enclosure 4
Excerpt from Report Entitled, "30th Year Physical Tendon surveillance of Palisades Nuclear Plant 2002"

30TH YEAR TENDON
SURVEILLANCE AT THE
PALISADES NUCLEAR PLANT



YEARS	FORECAST (kips)	95% CONFIDENCE
1	682	666
3	678	667
5	675	667
10	672	666
15	671	664
20	669	662
25	668	660
30	667	658
35	667	657
40	666	655

45

C02

30TH YEAR TENDON
SURVEILLANCE AT THE
PALISADES NUCLEAR PLANT

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REGRESSION ANALYSIS DATA

TENDON NUMBER	TENDON FORCE	TEST DATE	ORIGINAL STRESS	AGE (TIME STRESSED)
V84	700	—	—	2.00
V104	640	—	—	2.00
V200	685	—	—	2.00
V204	484	—	—	2.00
V324	700	—	—	2.00
V36	684	9-29-75	9-9-69	6.06
V86	683	10-1-75	9-3-69	6.08
V154	682	10-2-75	9-4-69	6.08
V202	651	—	9-5-69	6.08
V280	671	10-7-75	9-5-69	6.09
V50	657	6-22-81	9-2-69	11.81
V176	652	7-8-81	9-3-69	11.85
V306	679	7-7-81	9-9-69	11.83
V14	681	9-22-87	9-5-69	18.05
V124	657	10-15-87	9-9-69	18.10
V230	676	10-1-87	9-3-69	18.08
V250	682	10-5-87	9-5-69	18.08

30TH YEAR TENDON
SURVEILLANCE AT THE
PALISADES NUCLEAR PLANT

NMC
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REGRESSION ANALYSIS DATA

TENDON NUMBER	TENDON FORCE	TEST DATE	ORIGINAL STRESS	AGE (TIME STRESSED)
V20	659	2-21-92	9-5-69	22.47
V72	728 *	3-9-92	9-9-69	—
V128	680 *	2-21-92	9-3-69	—
V218	631	3-16-92	9-3-69	22.53
V26	691	9-15-97	9-2-69	28.04
V126	745 *	7-31-97	9-9-69	—
V248	665	9-8-97	9-5-69	28.01
V334	EXCLUDED	8-1-97	9-4-69	—
V14	695	8-21-02	9-5-69	32.96
V16	678	8-21-02	9-4-69	32.96
V30	665	8-20-02	9-9-69	32.95
V116	740 *	9-20-02	9-3-69	33.05
V302	669	9-20-02	9-3-69	33.05
V334	EXCLUDED	8-21-02	9-4-69	32.96

* RETENSIONED AFTER GENERATOR CHANGOUT THEREFORE EXCLUDED.

Enclosure 4
Excerpt from Report Entitled, "30th Year Physical Tendon surveillance of Palisades Nuclear Plant 2002"

30TH YEAR TENDON SURVEILLANCE AT THE PALISADES NUCLEAR PLANT

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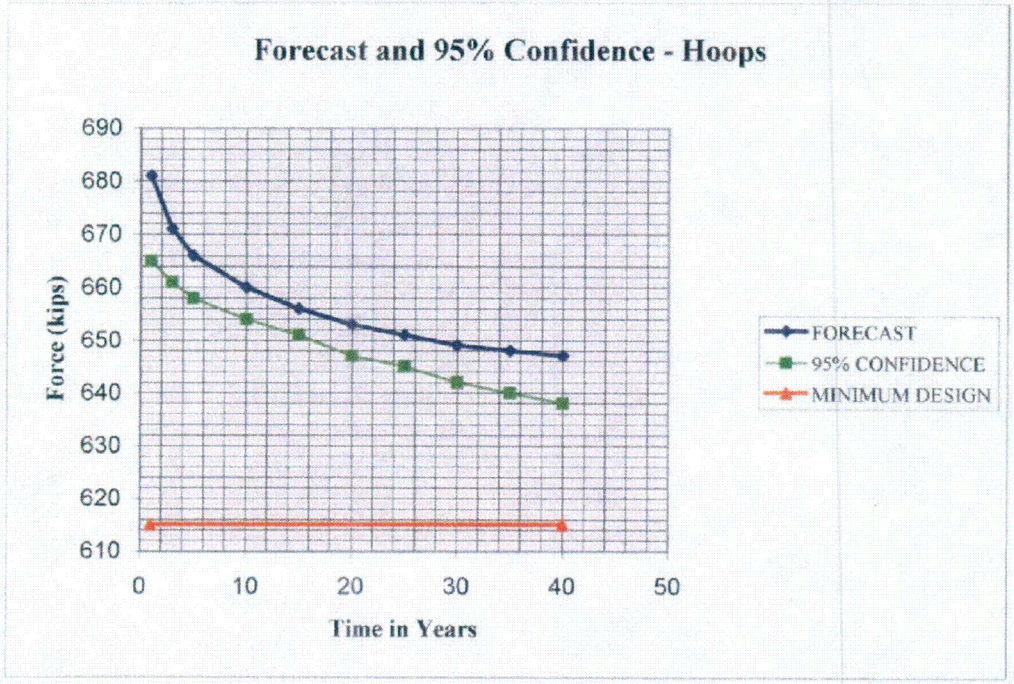

YEARS	FORECAST (kips)	95% CONFIDENCE
1	681	665
3	671	661
5	666	658
10	660	654
15	656	651
20	653	647
25	651	645
30	649	642
35	648	640
40	647	638

48

C03

30TH YEAR TENDON
SURVEILLANCE AT THE
PALISADES NUCLEAR PLANT

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REGRESSION ANALYSIS DATA

TENDON NUMBER	TENDON FORCE	TEST DATE	ORIGINAL STRESS	AGE (TIME STRESSED)
22BD	661	—	—	2.00
65BF	694	—	—	2.00
84DF	679	—	—	2.00
49AE	670	12-2-75	5-26-69	6.52
59BD	642	11-17-75	6-3-69	6.46
63BD	686	11-18-75	9-22-69	6.16
80BD	638	11-19-75	9-23-69	6.16
66BF	670	11-24-75	9-22-69	6.17
71BF	669	11-25-75	9-22-69	6.17
79BF	661	11-26-75	9-23-69	6.18
56DF	675	10-30-75	6-5-69	6.40
68DF	671	11-4-75	9-22-69	6.12
76DF	651	11-5-75	9-23-69	6.12
67BD	682	6-18-81	9-22-69	11.74
67BF	643	6-12-81	9-22-69	11.72
73DF	652	7-1-81	9-22-69	11.77
59AC	638	10-12-87	5-21-69	18.39
77AC	663	10-8-87	5-29-69	18.36
65BF	EXCLUDED	10-28-87	9-22-69	18.1
74BF	633	10-28-87	9-22-69	18.1
42DF	646	10-14-87	9-12-69	18.09

30TH YEAR TENDON SURVEILLANCE AT THE PALISADES NUCLEAR PLANT

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REGRESSION ANALYSIS DATA

TENDON NUMBER	TENDON FORCE	TEST DATE	ORIGINAL STRESS	AGE (TIME STRESSED)
29AE	625	3-12-92	8-22-69	22.56
48AE	702 *	3-11-92	5-27-69	22.79
52AE	669 *	3-11-92	5-26-69	22.79
46BD	653	3-4-92	9-11-69	22.48
77BF	640	2-25-92	9-23-69	22.43
70DF	672	2-24-92	9-22-69	22.43
68AC	646	8-27-97	5-19-69	28.27
69AE	653	8-19-97	5-16-69	28.26
26BD	658	8-22-97	9-15-69	27.93
72BF	654	8-7-97	9-22-69	27.87
28DF	674	8-5-97	9-15-69	27.89
22AE	651	9-8-02	8-25-69	33.04
23BD	629	9-23-02	9-16-69	33.02
24BD	610	9-8-02	9-15-69	32.98
25BD	639	9-23-02	9-15-69	33.02
62BF	661	10-16-02	6-2-69	33.37
78CE	696	10-20-02	9-24-69	33.07
84DF	663	9-6-02	9-23-69	32.95

* RETENSIONED DURING GENERATOR CHANGOUT THEREFORE EXCLUDED