DESCRIPTION OF PROPOSED CHANGES
NPF-10-114 AND NPF-15-114 AND SAFETY ANALYSIS

This is a request to revise Technical Specification 4.6.1.6 "CONTAINMENT TENDONS".

Existing Specifications:

Units 2&3: See Attachments A and B

Proposed Specifications:

Units 2&3: See Attachments C and D

Description

The purpose of these changes is as follows:

1. The change to Paragraph 4.6.1.6 is for Unit 3 only and complies with the surveillance frequency required by Table 4.6-1 for tendon lift off force and tendon detensioning tests.

2. The change to the first sentence of Paragraph 4.6.1.6a clarifies the intent of the surveillance measurements as a means to verify structural integrity and removes an implied surveillance requirement that the lift-off force must be between the minimum and maximum values of the tolerance band. The tolerance band represents the normal range of variability in predictions of long term stress loss in each tendon over the life of the plant. Surveillance requirements are specifically and adequately covered at the end of this paragraph.

3. The remainder of the changes to Paragraph 4.6.1.6a provide clarification that the tolerance band values, particularly the upper one, are not to be treated as minimum and maximum limits but, rather, as surveillance guidelines. Specific actions associated with these guidelines are given at the end of the paragraph.

4. The last sentence of Paragraph 4.6.1.6a has been modified to clarify that Table 4.6-2 specifies the sample population.

5. The proposed change to Part c.3 is to require only the visual inspection of exposed concrete surfaces adjacent to the end anchorages of hoop tendons inspected instead of inspection of concrete surfaces adjacent to all end anchorages of tendons inspected. The existing conditions as shown in Detail 2 of Drawing 23005 do not permit the inspection of the concrete

surfaces adjacent to the U tendon end anchorages. The concrete is covered by 3/8-inch thick plates welded to the end anchorages and steel channels that are embedded in the concrete. The plates and channels were used as forms during construction of the containment base mat. Removal of the plates by such methods as grinding and flame cutting is not desirable because of potential damage to the adjacent concrete surfaces.

Concrete surfaces adjacent to hoop tendon and anchorages will be inspected per Technical Specification requirements. The prestress loads on hoop tendon end anchorages impose compressive and shear stresses on the buttress walls whereas the prestress loads on U tendon end anchorages impose only compressive stresses on the adjacent concrete. This occurs because the buttresses are projecting elements from the containment shell while the U tendon anchorage zone is in the same plane as the containment shell.

Safety Analysis

The proposed change discussed above shall be deemed to involve a significant hazards consideration if positive findings are made in any of the following areas:

1. Will operation of the facility in accordance with this proposed change involve a significant increase in the probability or consequences of an accident previously evaluated?

   Response: No

   The proposed changes to the Technical Specification requirements for tendon surveillance are for the purpose of clarification only and do not physically alter the surveillance program or the level of safety it provides. No physical change is involved to any part of the plant itself.

   For Part c.3 the elimination of visual inspection of concrete surfaces adjacent to U tendon end anchorages will not affect the structural integrity of the Containment Structure or the functions and operations of any equipment and systems. The compressive stresses in the concrete near the U tendon anchorage zone are low as shown in FSAR Table 3.8-2 and the prestress loads would preclude the formation of cracks in the adjacent concrete. All accident probabilities, consequences and scenarios remain bounded by existing analyses.

2. Will operation of the facility in accordance with this proposed change create the possibility of a new or different kind of accident from any accident previously evaluated?

   Response: No

   As previously stated, the proposed change does not alter the physical plant configuration.

3. Will the operation of the facility in accordance with this proposed change involve a significant reduction in a margin of safety?

   Response: No

   As previously stated, no change will occur to the physical plant and associated margin of safety.

48 FR 14870 dated April 6, 1983 provided examples of amendments not likely to involve a significant hazards consideration. This proposed change is considered to be most similar to example (i) in that it involves changes to achieve consistency throughout the technical specifications, changes in nomenclature to clarify the intent of the requirements, and correction of an error in that it is not possible to visually inspect the concrete surfaces adjacent to U tendon anchorages because the concrete is covered by 3/8-inch metal plates welded to the end anchorages and steel channels that are embedded in the concrete.

Safety and Significant Hazards Determination

Based on the Safety Analysis, it is concluded that: (1) the proposed change does not involve a significant hazards consideration as defined by 10CFR50.92; and (2) there is reasonable assurance that the health and safety of the public will not be endangered by the proposed change; and (3) this action will not result in a condition which significantly alters the impact of the Station on the environment as described in the NRC Environmental Statement.

JKYann06a:npy

ATTACHMENT A

Existing Technical Specification

4.6.1.6 Containment Tendons

for

San Onofre Unit 2

CONTAINMENT STRUCTURAL INTEGRITY

LIMITING CONDITION FOR OPERATION

3.6.1.6 The structural integrity of the containment shall be maintained at a level consistent with the acceptance criteria in Specification 4.6.1.6.

APPLICABILITY: MODES 1, 2, 3 and 4.

ACTION:

With the structural integrity of the containment not conforming to the above requirements, perform an engineering evaluation of the containment to demonstrate its structural integrity within 72 hours; otherwise, be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

SURVEILLANCE REQUIREMENTS

4.6.1.6 Containment Tendons The containment's structural integrity shall be demonstrated at the end of one, three and five years after the initial structural integrity test (ISIT) and every five years thereafter with the exception of tendon lift off force and tendon detensioning and material tests and inspections which shall be determined at the end of one, five and ten years following the ISIT and every ten years thereafter in accordance with Table 4.6-1. The structural integrity shall be demonstrated by:

a. Determining that tendons selected in accordance with Table 4.6-1 have a lift off force between the maximum and minimum values listed in Table 4.6-2 at the first year inspection. For subsequent inspections, for tendons and periodicities per Table 4.6-1, the maximum first year lift off forces shall be decreased by the amount X1 log t kips for U tendons and Y1 log t kips for hoop tendons and the minimum lift off forces shall be decreased by the amount X2 log t for U tendons and Y2 log t for hoop tendons where t is the time interval in years from initial tensioning of the tendon to the current testing date and the values X1, X2, Y1 and Y2 are in accordance with the values listed in Table 4.6-2 for the surveillance tendon. This test shall include essentially a complete detensioning of tendons selected in accordance with Table 4.6-1 in which the tendon is detensioned to determine if any wires or strands are broken or damaged. Tendons found acceptable during this test shall be retensioned to obtain a lift off force equal to +0, -5% of the prescribed upper limit. During retensioning of these tendons, the change in load and elongation shall be measured simultaneously at a minimum of three, approximately equally spaced, levels of force between the seating force and zero. If elongation corresponding to a specific load differs by more than 5% from that recorded during installation of tendons, an investigation should

be made to ensure that such difference is not related to wire failures or slip of wires in anchorages. If the lift off force of any one tendon in the total sample population lies between the prescribed lower limit and 90% of the prescribed lower limit, two tendons, one on each side of this tendon shall be checked for their lift off force. If both of these adjacent tendons are found acceptable, the surveillance program may proceed considering the single deficiency as unique and acceptable. The tendon(s) shall be restored to the required level of integrity. More than one tendon below the predicted bounds out of the original sample population or the lift off force of a selected tendon lying below 90% of the prescribed lower limit is evidence of abnormal degradation of the containment structure.

b. Performing tendon detensioning and material tests and inspections of a previously stressed tendon wire or strand from one tendon of each group (hoop and U), and determining over the entire length of the removed wire or strand that:

1. The tendon wires or strands are free of corrosion, cracks and damage.

2. A minimum tensile strength value of 270 ksi (guaranteed ultimate strength of the tendon material) for at least three wire or strand samples (one from each end and one at mid-length) cut from each removed wire or strand. Failure of any one of the wire or strand samples to meet the minimum tensile strength test is evidence of abnormal degradation of the containment structure.

c. Performing a visual inspection of the following:

1. Containment Surfaces - The structural integrity of the exposed accessible interior and exterior surfaces of the containment shall be determined during the shutdown for, and prior to, each Type A containment leakage rate test (Specification 4.6.1.2) by a visual inspection of these surfaces and verifying no apparent changes in appearance or other abnormal degradation (e.g., widespread cracking, spalling and/or grease leakage).

2. End Anchorages - The structural integrity of the end anchorages (e.g., bearing plates, stressing washers, shims, wedges and anchorheads) of all tendons inspected pursuant to Specification 4.6.1.6a shall be demonstrated by inspection that no apparent changes have occurred in the visual appearance of the end anchorage.

3. Concrete Surfaces - The structural integrity of the concrete surfaces adjacent to the end anchorages of tendons inspected

SURVEILLANCE REQUIREMENTS (Continued)

pursuant to Specification 4.6.1.6a shall be demonstrated by visual examination of the crack patterns to verify no abnormal material behavior.

d. Verifying the OPERABILITY of the sheathing filler grease by the following:

1. No significant voids (in excess at 5% of the net duct volume), or the presence of free water, within the grease filler material, taking into account temperature variations.

2. No significant changes have occurred in the physical appearance of the sheathing filler grease.

3. Complete grease coverage exists for the anchorage system.

4. Chemical properties are within the tolerance limits specified by the sheathing filler grease manufacturer.

JUL 1 6 1982

TABLE 4.6-1

TENDON SURVEILLANCE

Years After Initial Structural Integrity Test	TENDON NUMBERS 1		3		5		10		15	
Type of Inspection	H	U	H	U	H	U	H	U	H	U
Visual Inspection of End Anchorages and Adjacent Concrete Surface	20 86 97 53 64	31-121 9-143 66-176 88-154	5 36 79 113 87	13-139 35-117 4-58 78-164	42 86 75 9 108	64-178 9-143 94-148 19-133	20 86 53	66-176 9-143 39-113	50 114 13	12-140 5-57 96-146
Prestress Monitoring Tests	20 86 97 53 64	31-121 9-143 66-176 88-154			42 86 75 9 108	64-178 9-143 94-148 19-133	20 86 53	66-176 9-143 39-113		
Dentensioning and Material Tests	97	88-154			42	19-133	20	66-176		

Years After Initial Structural Integrity Test	TENDON NUMBERS 20		25		30		35		40	
Type of Inspection	H	U	H	U	H	U	H	U	H	U
Visual Inspection of End Anchorages and Adjacent Concrete Surface	75 86 9	86-156 9-143 43-109	12 90 25	24-128 70-172 76-166	86 31 64	9-143 69-178 94-148	81 109 31	41-111 90-152 50-102	97 86 108	9-143 31-121 86-156
Prestress Monitoring Tests	75 86 9	86-156 9-143 43-109			86 31 64	9-143 64-178 94-148			97 86 108	9-143 31-121 86-156
Detensioning and Material Tests	75	43-109			31	64-178			86	9-143

ATTACHMENT B

Existing Technical Specification

4.6.1.6 Containment Tendons

for

San Onofre Unit 3

CONTAINMENT STRUCTURAL INTEGRITY

LIMITING CONDITION FOR OPERATION

3.6.1.6 The structural integrity of the containment shall be maintained at a level consistent with the acceptance criteria in Specification 4.6.1.6.

APPLICABILITY: MODES 1, 2, 3 and 4.

ACTION:

With the structural integrity of the containment not conforming to the above requirements, perform an engineering evaluation of the containment to demonstrate its structural integrity within 72 hours; otherwise, be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

SURVEILLANCE REQUIREMENTS

4.6.1.6 Containment Tendons The containment's structural integrity shall be demonstrated at the end of one, three and five years after the initial structural integrity test (ISIT) and every five years thereafter with the exception of tendon lift off force and tendon detensioning and material tests and inspections which shall be determined at the end of one, five and ten years following the ISIT and every ten years thereafter in accordance with Table 4.6-1. The structural integrity shall be demonstrated by:

a. Determining that tendons selected in accordance with Table 4.6-1 have a lift off force between the maximum and minimum values listed in Table 4.6-2 at the first year inspection. For subsequent inspections, for tendons and periodicities per Table 4.6-1, the maximum first year lift off forces shall be decreased by the amount X1 log t kips for U tendons and Y1 log t kips for hoop tendons and the minimum lift off forces shall be decreased by the amount X2 log t for U tendons and Y2 log t for hoop tendons where t is the time interval in years from initial tensioning of the tendon to the current testing date and the values X1, X2, Y1 and Y2 are in accordance with the values listed in Table 4.6-2 for the surveillance tendon. This test shall include essentially a complete detensioning of tendons selected in accordance with Table 4.6-1 in which the tendon is detensioned to determine if any wires or strands are broken or damaged. Tendons found acceptable during this test shall be retensioned to obtain a lift off force equal to +0, -5% of the prescribed upper limit. During retensioning of these tendons, the change in load and elongation shall be measured simultaneously at a minimum of three, approximately equally spaced, levels of force between the seating force and zero. If elongation corresponding to a specific load differs by more than 5% from that recorded during installation of tendons, an investigation should be made to ensure that such

NOV 15 1982

difference is not related to wire failures or slip of wires in anchorages. If the lift off force of any one tendon in the total sample population lies between the prescribed lower limit and 90% of the prescribed lower limit, two tendons, one on each side of this tendon shall be checked for their lift off force. If both of these adjacent tendons are found acceptable, the surveillance program may proceed considering the single deficiency as unique and acceptable. The tendon(s) shall be restored to the required level of integrity. More than one tendon below the predicted bounds out of the original sample population or the lift off force of a selected tendon lying below 90% of the prescribed lower limit is evidence of abnormal degradation of the containment structure.

b. Performing tendon detensioning and material tests and inspections of a previously stressed tendon wire or strand from one tendon of each group (hoop and U), and determining that over the entire length of the removed wire or strand that:

   1. The tendon wires or strands are free of corrosion, cracks and damage.

   2. A minimum tensile strength value of 270 ksi (guaranteed ultimate strength of the tendon material) for at least three wire or strand samples (one from each end and one at mid-length) cut from each removed wire or strand. Failure of any one of the wire or strand samples to meet the minimum tensile strength test is evidence of abnormal degradation of the containment structure.

c. Performing a visual inspection of the following:

   1. Containment Surfaces - The structural integrity of the exposed accessible interior and exterior surfaces of the containment shall be determined during the shutdown for, and prior to, each Type A containment leakage rate test (Specification 4.6.1.2) by a visual inspection of these surfaces and verifying no apparent changes in appearance or other abnormal degradation (e.g., widespread cracking, spalling and/or grease leakage).

   2. End Anchorages - The structural integrity of the end anchorages (e.g., bearing plates, stressing washers, shims, wedges and anchorheads) of all tendons inspected pursuant to Specification 4.6.1.6a shall be demonstrated by inspection that no apparent changes have occurred in the visual appearance of the end anchorage.

   3. Concrete Surfaces - The structural integrity of the concrete surfaces adjacent to the end anchorages of tendons inspected

NOV 15 1982

SURVEILLANCE REQUIREMENTS (Continued)

pursuant to Specification 4.6.1.6a shall be demonstrated by visual examination of the crack patterns to verify no abnormal material behavior.

d. Verifying the OPERABILITY of the sheathing filler grease by the following:

1. No significant voids (in excess at 5% of the net duct volume), or the presence of free water, within the grease filler material, taking into account temperature variations.

2. No significant changes have occurred in the physical appearance of the sheathing filler grease.

3. Complete grease coverage exists for the anchorage system.

4. Chemical properties are within the tolerance limits specified by the sheathing filler grease manufacturer.

NOV 15 1982

TABLE 4.6-1

TENDON SURVEILLANCE

Years After Initial Structural Integrity Test	TENDON NUMBERS 1		3		5		10		15	
	H	U	H	U	H	U	H	U	H	U
Visual Inspection of End Anchorages and Adjacent Concrete Surface	53 64 9 97 86	66-176 88-154 9-143 39-113	7 38 80 94 85	23-130 47-105 69-173 83-159	31 64 108 75 20	19-133 88-154 31-121 65-177	49 111 2	11-141 7-55 76-166	42 64 97	95-147 88-154 43-109
Prestress Monitoring Tests	53 64 9 97 86	66-176 88-154 9-143 39-113			31 64 108 75 20	19-133 88-154 31-121 65-177			42 64 97	95-147 88-154 43-109
Detensioning and Materials Tests	53	66-176			31	19-133			97	95-147

Years After Initial Structural Integrity Test	TENDON NUMBERS 20		25		30		35		40	
	H	U	H	U	H	U	H	U	H	U
Visual Inspection of End Anchorages and Adjacent Concrete Surface	10 87 4	25-127 71-171 31-121	108 64 9	39-113 88-154 86-156	84 106 24	42-110 91-151 19-133	64 42 86	88-154 31-121 9-143	4 88 32	51-101 97-145 50-102
Prestress Monitoring Tests			108 64 9	39-113 88-154 86-156			64 42 86	88-154 31-121 9-143		
Detensioning and Material Tests			9	39-113			64	88-154		

NOV 15 1982

ATTACHMENT C

Proposed Technical Specification

4.6.1.6 Containment Tendons

for

San Onofre Unit 2

CONTAINMENT STRUCTURAL INTEGRITY

LIMITING CONDITION FOR OPERATION

3.6.1.6 The structural integrity of the containment shall be maintained at a level consistent with the acceptance criteria in Specification 4.6.1.6.

APPLICABILITY: MODES 1, 2, 3 and 4.

ACTION:

With the structural integrity of the containment not conforming to the above requirements, perform an engineering evaluation of the containment to demonstrate its structural integrity within 72 hours; otherwise, be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

SURVEILLANCE REQUIREMENTS

4.6.1.6 Containment Tendons The containment's structural integrity shall be demonstrated at the end of one, three and five years after the initial structural integrity test (ISIT) and every five years thereafter with the exception of tendon lift off force and tendon detensioning and material tests and inspections which shall be determined at the end of one, five and ten years following the ISIT and every ten years thereafter in accordance with Table 4.6-1. The structural integrity shall be demonstrated by:

a. Determining the lift off force of tendons selected in accordance with Table 4.6-1 and comparing this force with the tolerance band values listed in Table 4.6-2 at the first year inspection. For subsequent inspections, for tendons and periodicities per Table 4.6-1, the upper tolerance band value for first year lift off forces shall be decreased by the amount X1 log t kips for U tendons and Y1 log t kips for hoop tendons and the lower tolerance band value for lift off forces shall be decreased by the amount X2 log t for U tendons and Y2 log t for hoop tendons where t is the time interval in years from initial tensioning of the tendon to the current testing date and the values X1, X2, Y1 and Y2 are in accordance with the values listed in Table 4.6-2 for the surveillance tendon. This test shall include essentially a complete detensioning of tendons selected in accordance with Table 4.6-1 in which the tendon is detensioned to determine if any wires or strands are broken or damaged. Tendons found acceptable during this test shall be retensioned to obtain a lift off force equal to +0, -5% of the prescribed upper tolerance band value. During retensioning of these

tendons, the change in the load and elongation shall be measured simultaneously at a minimum of three, approximately equally spaced, levels of force between the seating force and zero. If elongation corresponding to a specific load differs by more than 5% from that recorded during installation of tendons, an investigation should be made to ensure that such difference is not related to wire failures or slip of wires in anchorages. If the lift off force of any one tendon in the total sample population lies between the prescribed lower tolerance band value and 90% of the prescribed lower tolerance band value two tendons, one on each side of this tendon shall be checked for their lift off force. If both of these adjacent tendons are found acceptable, the surveillance program may proceed considering the single deficiency as unique and acceptable. The tendon(s) shall be retensioned such that the lift off force is equal to +0, -5% of the prescribed upper tolerance band value. The following lift off force measurement results are considered to be evidence of abnormal degradation of the containment structure:

1. More than one tendon from Table 4.6-2 or adjacent tendons, below the lower tolerance band value.

2. The lift off force of a selected tendon from Table 4.6-2 lying below 90% of the prescribed lower tolerance band value.

b. Performing tendon detensioning and material tests and inspections of a previously stressed tendon wire or strand from one tendon of each group (hoop and U), and determining over the entire length of the removed wire or strand that:

1. The tendon wires or strands are free of corrosion, cracks and damage.

2. A minimum tensile strength value of 270 ksi (guaranteed ultimate strength of the tendon material) for at least three wire or strand samples (one from each end and one at mid-length) cut from each removed wire or strand. Failure of any one of the wire or strand samples to meet the minimum tensile strength test is evidence of abnormal degradation of the containment structure.

c. Performing a visual inspection of the following:

1. Containment Surfaces - The structural integrity of the exposed accessible interior and exterior surfaces of the containment shall be determined during the shutdown for, and prior to, each Type A containment leakage rate test (Specification 4.6.1.2) by a visual inspection of these surfaces and verifying no apparent changes in appearance or other abnormal degradation (e.g., widespread cracking, spalling and/or grease leakage).

2. End Anchorages - The structural integrity of the end anchorages (e.g., bearing plates, stressing washers, shims, wedges and anchorheads) of all tendons inspected pursuant to Specification 4.6.1.6a shall be demonstrated by inspection that no apparent changes have occurred in the visual appearance of the end anchorage.

3. Concrete Surfaces - The structural integrity of the exposed concrete surfaces adjacent to the end anchorages of hoop tendons inspected pursuant to Specification 4.6.1.6a shall be demonstrated by visual examination of the crack patterns to verify no abnormal material behavior.

d. Verifying the OPERABILITY of the sheathing filler grease by the following:

1. No significant voids (in excess of 5% of the net duct volume) or the presence of free water, within the grease filler material, taking into account temperature variations.

2. No significant changes have occurred in the physical appearance of the sheathing filler grease.

3. Complete grease coverage exists for the anchorage system.

4. Chemical properties are within the tolerance limits specified by the sheathing filler grease manufacturer.

TABLE 4.6-1

TENDON SURVEILLANCE

Years After Initial Structural Integrity Test	TENDON NUMBERS 1		3		5		10		15	
Type of Inspection	H	U	H	U	H	U	H	U	H	U
Visual Inspection of End Anchorages and Adjacent Concrete Surface	20 86 97 53 64	31-121 9-143 66-176 88-154	5 36 79 113 87	13-139 35-117 4-58 78-164	42 86 75 9 108	64-178 9-143 94-148 19-133	20 86 53	66-176 9-143 39-113	50 114 13	12-140 5-57 96-146
Prestress Monitoring Tests	20 86 97 53 64	31-121 9-143 66-176 88-154			42 86 75 9 108	64-178 9-143 94-148 19-133	20 86 53	66-176 9-143 39-113		
Dentensioning and Material Tests	97	88-154			42	19-133	20	66-176		

Years After Initial Structural Integrity Test	TENDON NUMBERS 20		25		30		35		40	
Type of Inspection	H	U	H	U	H	U	H	U	H	U
Visual Inspection of End Anchorages and Adjacent Concrete Surface	75 86 9	86-156 9-143 43-109	12 90 25	24-128 70-172 76-166	86 31 64	9-143 ~~69~~-178 94-148	81 109 31	41-111 90-152 50-102	97 86 108	9-143 31-121 86-156
Prestress Monitoring Tests	75 86 9	86-156 9-143 43-109			86 31 64	9-143 64-178 94-148			97 86 108	9-143 31-121 86-156
Detensioning and Material Tests	75	43-109			31	64-178			86	9-143

64

ATTACHMENT D

Proposed Technical Specification

4.6.1.6 Containment Tendons

for

San Onofre Unit 3

CONTAINMENT STRUCTURAL INTEGRITY

LIMITING CONDITION FOR OPERATION

3.6.1.6 The structural integrity of the containment shall be maintained at a level consistent with the acceptance criteria in Specification 4.6.1.6.

APPLICABILITY: MODES 1, 2, 3 and 4.

ACTION:

With the structural integrity of the containment not conforming to the above requirements, perform an engineering evaluation of the containment to demonstrate its structural integrity within 72 hours; otherwise, be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

SURVEILLANCE REQUIREMENTS

4.6.1.6 Containment Tendons The containment's structural integrity shall be demonstrated at the end of one, three and five years after the initial structural integrity test (ISIT) and every five years thereafter with the exception of tendon lift off force and tendon detensioning and material tests and inspections which shall be determined at the end of one and five years following the ISIT and every ten years thereafter in accordance with Table 4.6-1. The structural integrity shall be demonstrated by:

a. Determining the lift off force of tendons selected in accordance with Table 4.6-1 and comparing this force with the tolerance band values listed in Table 4.6-2 at the first year inspection. For subsequent inspections, for tendons and periodicities per Table 4.6-1, the upper tolerance band value for first year lift off forces shall be decreased by the amount X1 log t kips for U tendons and Y1 log t kips for hoop tendons and the lower tolerance band value for lift off forces shall be decreased by the amount X2 log t for U tendons and Y2 log t for hoop tendons where t is the time interval in years from initial tensioning of the tendon to the current testing date and the values X1, X2, Y1 and Y2 are in accordance with the values listed in Table 4.6-2 for the surveillance tendon. This test shall include essentially a complete detensioning of tendons selected in accordance with Table 4.6-1 in which the tendon is detensioned to determine if any wires or strands are broken or damaged. Tendons found acceptable during this test shall be retensioned to obtain a lift off force equal to +0, -5% of the prescribed upper tolerance band value. During retensioning of these

tendons, the change in the load and elongation shall be measured simultaneously at a minimum of three, approximately equally spaced, levels of force between the seating force and zero. If elongation corresponding to a specific load differs by more than 5% from that recorded during installation of tendons, an investigation should be made to ensure that such difference is not related to wire failures or slip of wires in anchorages. If the lift off force of any one tendon in the total sample population lies between the prescribed lower tolerance band value and 90% of the prescribed lower tolerance band value two tendons, one on each side of this tendon shall be checked for their lift off force. If both of these adjacent tendons are found acceptable, the surveillance program may proceed considering the single deficiency as unique and acceptable. The tendon(s) shall be retensioned such that the lift off force is equal to +0, -5% of the prescribed upper tolerance band value. The following lift off force measurement results are considered to be evidence of abnormal degradation of the containment structure:

1. More than one tendon from Table 4.6-2 or adjacent tendons, below the lower tolerance band value.

2. The lift off force of a selected tendon from Table 4.6-2 lying below 90% of the prescribed lower tolerance band value.

b. Performing tendon detensioning and material tests and inspections of a previously stressed tendon wire or strand from one tendon of each group (hoop and U), and determining over the entire length of the removed wire or strand that:

1. The tendon wires or strands are free of corrosion, cracks and damage.

2. A minimum tensile strength value of 270 ksi (guaranteed ultimate strength of the tendon material) for at least three wire or strand samples (one from each end and one at mid-length) cut from each removed wire or strand. Failure of any one of the wire or strand samples to meet the minimum tensile strength test is evidence of abnormal degradation of the containment structure.

c. Performing a visual inspection of the following:

1. Containment Surfaces - The structural integrity of the exposed accessible interior and exterior surfaces of the containment shall be determined during the shutdown for, and prior to, each Type A containment leakage rate test (Specification 4.6.1.2) by a visual inspection of these surfaces and verifying no apparent changes in appearance or other abnormal degradation (e.g., widespread cracking, spalling and/or grease leakage).

SURVEILLANCE REQUIREMENTS (Continued)

2. End Anchorages - The structural integrity of the end anchorages (e.g., bearing plates, stressing washers, shims, wedges and anchorheads) of all tendons inspected pursuant to Specification 4.6.1.6a shall be demonstrated by inspection that no apparent changes have occurred in the visual appearance of the end anchorage.

3. Concrete Surfaces - The structural integrity of the exposed concrete surfaces adjacent to the end anchorages of hoop tendons inspected pursuant to Specification 4.6.1.6a shall be demonstrated by visual examination of the crack patterns to verify no abnormal material behavior.

d. Verifying the OPERABILITY of the sheathing filler grease by the following:

1. No significant voids (in excess of 5% of the net duct volume) or the presence of free water, within the grease filler material, taking into account temperature variations.

2. No significant changes have occurred in the physical appearance of the sheathing filler grease.

3. Complete grease coverage exists for the anchorage system.

4. Chemical properties are within the tolerance limits specified by the sheathing filler grease manufacturer.

JKYann:npy(yann06c)

TABLE 4.6-1

TENDON SURVEILLANCE

129

Years After Initial Structural Integrity Test	TENDON NUMBERS 1		3		5		10		15	
	H	U	H	U	H	U	H	U	H	U
Visual Inspection of End Anchorages and Adjacent Concrete Surface	53 64 9 97 86	66-176 88-154 9-143 39-113	7 38 80 94 85	23-~~130~~ 47-105 69-173 83-159	31 64 108 75 20	19-133 88-154 31-121 65-177	49 111 2	11-141 7-55 76-166	42 64 97	95-147 88-154 43-109
Prestress Monitoring Tests	53 64 9 97 86	66-176 88-154 9-143 39-113			31 64 108 75 20	19-133 88-154 31-121 65-177			42 64 97	95-147 88-154 43-109
Detensioning and Materials Tests	53	66-176			31	19-133			97	95-147

Years After Initial Structural Integrity Test	TENDON NUMBERS 20		25		30		35		40	
	H	U	H	U	H	U	H	U	H	U
Visual Inspection of End Anchorages and Adjacent Concrete Surface	10 87 4	25-127 71-171 31-121	108 64 9	39-113 88-154 86-156	84 106 24	42-110 91-151 19-133	64 42 86	88-154 31-121 9-143	4 88 32	51-101 97-145 50-102
Prestress Monitoring Tests			108 64 9	39-113 88-154 86-156			64 42 86	88-154 31-121 9-143		
Detensioning and Material Tests			9	39-113			64	88-154		

NOV 15 1982