CONTAINMENT SYSTEMS

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:

a. With the abnormal degradation indicated by the conditions in Specification 4.6.1.6.1a.4, restore the containment to the required level of integrity or verify that containment integrity is maintained within 72 hours and perform an engineering evaluation of the containment and provide a Special Report to the Commission within 15 days in accordance with Specification 6.9.2 or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

b. With the indicated abnormal degradation of the structural integrity other than ACTION a. at a level below the acceptance criteria of Specification 4.6.1.6, restore the containment to the required level of integrity or verify that containment integrity is maintained within 15 days; perform an engineering evaluation of the containment and provide a Special Report to the Commission within 30 days in accordance with Specification 6.9.2 or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours. The provisions of Specification 3.0.4 are not applicable.

SURVEILLANCE REQUIREMENTS

4.6.1.6. CONTAINMENT PRESTRESSING SYSTEM

The structural integrity of the prestressing tendons of the containment shall be demonstrated at the end of 1, 3, and 5 years following the initial containment vessel structural integrity test and at 5-year intervals thereafter. For combined inspections of two containment in a plant, the inspection schedule ~~shall be as~~ shown in ~~Attachment 1.~~ Figure 3.6-1

4.6.1.6.1 The adequacy of prestressing forces in tendons shall be demonstrated by:

lift-off testing will be performed in accordance with

VOGTLE UNITS - 1 & 2

a. Determining that a random but representative sample of at least 13 tendons (9 hoop and ~~vertical~~ ~~dome~~ 4 inverted U) each have an observed lift-off force within the predicted limits established for each tendon. For each subsequent inspection, one tendon from each group shall be kept unchanged to develop a history and to correlate the observed data. The procedure of inspection and the tendon acceptance criteria shall be as follows:

1. If the measured prestressing force of the selected tendon in a group lies above the prescribed lower limit, the lift-off test is considered to be a positive indication of the sample tendon's acceptability.

2. If the measured prestressing force of the selected tendon in a group 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 prestressing forces. If the prestressing forces of these two tendons are above 95% of the prescribed lower limits for the tendons, all three tendons shall be restored to the required level of integrity, and the tendon group shall be considered as acceptable. If the measured prestressing force of any two tendons falls below 95% of the prescribed lower limits of the tendons, additional lift-off testing shall be done to detect the cause and extent of such occurrence. The conditions shall be considered as an indication of abnormal degradation of the containment structure.

3. If the measured prestressing force of any tendon lies below 90% of the prescribed lower limit, ~~the defective tendon shall be completely detensioned and additional lift-off testing shall be done so as to determine the cause and extent of such occurrence.~~ The condition shall be considered as an indication of abnormal degradation of the containment structure.

INSERT 1

4. If the average of all measured prestressing forces for each group (corrected for average condition) is found to be less than the minimum required prestress level at anchorage location for that group, the condition shall be considered as abnormal degradation of the containment structure.

5. If from consecutive surveillances the measured prestressing forces for the same tendon or tendons in a group indicate a trend of prestress loss larger than expected and the resulting prestressing forces will be less than the minimum required for the group before the next scheduled surveillance, additional lift-off testing shall be done so as to determine the cause and extent of such occurrence. The condition shall be considered as an indication of abnormal degradation of the containment structure.

6. Unless there is abnormal degradation of the containment vessel during the first three inspections, the sample population for subsequent inspections shall include at least 7 tendons (4 hoop, and ~~vertical~~, ~~dome~~, 3 inverted U).

b. [For Unit 1 only,] Performing tendon detensioning, inspections, and material tests on a previously stressed tendon from each group. A randomly selected tendon from each group shall be completely detensioned in order to identify broken or damaged wires and determining that over the entire length of the removed wire sample (which should include the broken wire if so identified) that:

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

2. A minimum tensile strength of 270,000 psi (guaranteed ultimate strength of the tendon material) exists for at least three wire samples (one from each end and one at mid-length) cut from each removed wire.

Failure to meet the requirements of 4.6.1.6.1.b shall be considered as an indication of abnormal degradation of the containment structure.

c. ~~Performing tendon retensioning of those tendons detensioned for inspection to at least force level recorded prior to detensioning or the predicted value, whichever is greater, with the tolerance within minus zero to plus six percent (6%), but not to exceed 70% of the guaranteed ultimate tensile strength of the tendons.~~ [INSERT 2] During retensioning of these tendons, the changes in load and elongation should be measured simultaneously at a minimum of three approximately equally spaced levels of force between zero and the seating force. If the elongation corresponding to a specific load differs by more than 10% from that recorded during the installation, an investigation should be made to ensure that the difference is not related to wire failures or slip of wires in anchorages. This condition shall be considered as an indication of abnormal degradation of the containment structure.

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

1. There are no [does not] changes in the presence or physical appearance of the sheathing filler-grease including the presence of free water.
2. Amount of grease replaced exceeds 5% of the net duct volume, when injected at ~~±10% of the specified installation pressure.~~ [INSERT 3]
3. Minimum grease coverage exists for the different parts of the anchorage system.
4. During general visual examination of the containment exterior surface, ~~dome~~ grease leakage that could affect containment integrity is not present., and

5. The chemical properties of the filler material are within the tolerance limits specified as follows:

Water Content	0-10% (by dry wt.)
Chlorides	0 - 10 ppm
Nitrates	0 - 10 ppm
Sulfides	0 - 10 ppm
Reserved Alkalinity (Base Numbers)	> 50% of the installed value; ~~>0 ...5 (for older grease)~~

Failure to meet requirement of 4.6.1.6.1d shall be considered as an indication of abnormal degradation of the containment structure.

INSERT 4

4.6.1.6.2 End Anchorages and Adjacent ~~Concrete~~ Surfaces ~~As an assurance of the structural integrity of the containment vessel, tendon anchorage assembly hardware (such as bearing plates, stressing washers, wedges, and buttonheads) of all tendons selected for inspection shall be visually examined. During combined inspection (see Attachment 1), for the containment vessel, not having full inspection, only visual inspection need to be performed. Tendon anchorages selected for inspection shall be visually examined to the extent practical without dismantling the load bearing components of the anchorages. Bottom grease caps of all vertical tendons shall be visually inspected to detect grease leakage or grease cap deformations. The surrounding concrete should also be checked visually for indication of any abnormal condition.~~

Significant grease leakage, grease cap deformation or abnormal concrete/steel plating condition shall be considered as an indication of abnormal degradation of containment structure.

4.6.1.6.3 Containment ~~Vessel~~ Surfaces The exterior surface of the containment should be visually examined to detect areas of large spall, severe scaling, D-cracking ~~in an area of 25 sq. ft. or more~~, other surface deterioration or disintegration, or grease leakage, each of which can be considered as evidence of abnormal degradation of structural integrity of the containment ~~This inspection shall be performed prior to the Type A containment leakage rate test.~~

significant

INSERT 1

an engineering investigation will be performed to determ ne the cause and extent of the occurrence.

INSERT 2

For Unit 1 only, performing tendon retensioning of detensioned tendons as close as possible to their observed or predicted lift-off force, whichever is greater but not to exceed a stress level of 70% of the guaranteed ultimate tensile strength (GUTS) for the tendon material.

INSERT 3

a pressure not to exceed the designers specifications.

INSERT 4

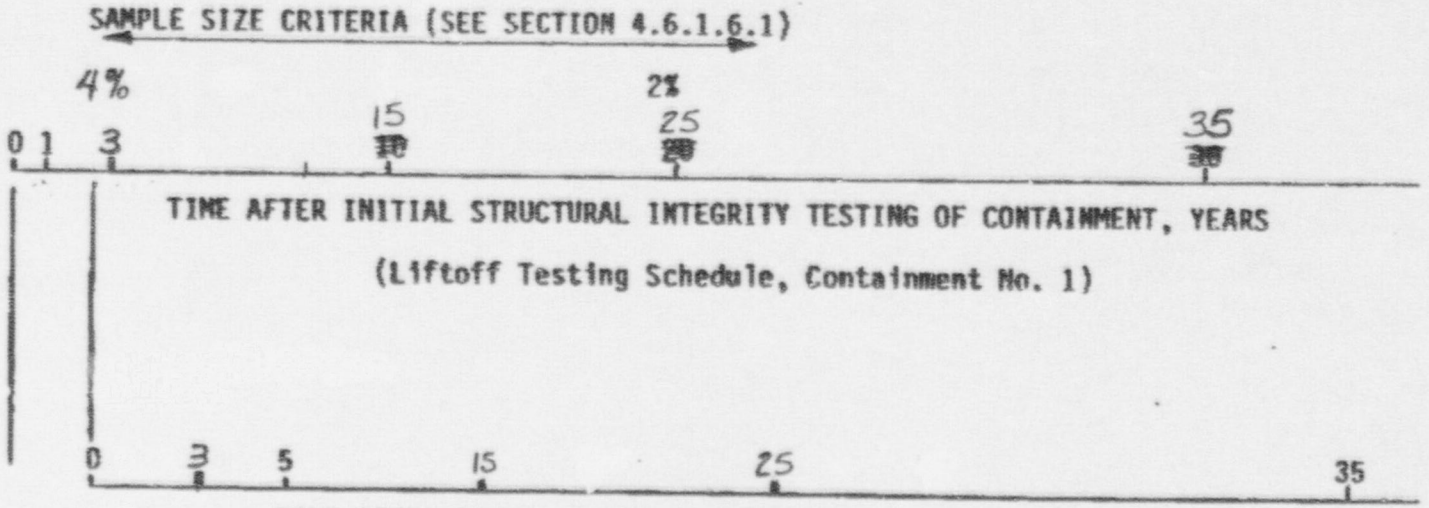
The structural integrity of the end anchorages of all tendons inspected pursuant to Specification 4.6.1.6.1 and the adjacent surfaces shall be demonstrated by determining through visual inspection that no apparent changes have occurred.

a. All end anchorages including anchor blocks, wedges, shims and bearing plates: inspect for moisture, corrosion and cracks and for warping of bearing plates.

b. Concrete surfaces adjacent to hoop tendon anchorages: inspect for moisture, corrosion, distortion and cracking.

c. Steel plating surrounding the inverted-U tendon anchorages: inspect for moisture, corrosion, distortion and cracking.

VOGTLE UNITS 1&2



Schedule to be used provided:

a. The containments are identical in all aspects such as size, tendon system, design, materials of construction, and method of construction. ← INSERT 5

b. ~~Their tests are performed within two years of each other~~. ← INSERT 6

c. There is no unique situation that may subject either containment to a different potential for structural or tendon deterioration.

Fig. 3.6-1 Schedule of Liftoff Testing for Two Containments at a Site

INSERT 5

The tendon system for Unit 2 does not provide for detensioning. Detensioning can be performed only on the Unit 1 tendon system.

INSERT 6

The 1 year inspection for Unit 2 will consist of a visual inspection only. No lift-off testing will be performed on Unit 2 until the 3 year inspection.

3/4.6.1.5 AIR TEMPERATURE

The limitations on containment average air temperature ensure that the overall containment average air temperature does not exceed the initial temperature condition assumed in the safety analysis for a steam line break accident. Measurements shall be made at all listed locations, whether by fixed or portable instruments, prior to determining the average air temperature.

3/4.6.1.6 CONTAINMENT STRUCTURAL INTEGRITY

This limitation ensures that the structural integrity of the containment will be maintained comparable to the original design standards for the life of the facility. Structural integrity is required to ensure that the containment will withstand the maximum pressure of 41.9 psig in the event of a steam line break accident. The measurement of containment tendon lift-off force, the tensile tests of the tendon strands for Unit 1, the visual examination of tendons, anchorages and exposed interior and exterior surfaces of the containment and the Type A leakage test for both units are sufficient to demonstrate this capability. (The tendon strand samples will also be subjected to stress cycling tests and to accelerated corrosion tests to simulate the tendon's operating conditions and environment.) ~~Unit 1 and Unit 2 containments satisfy the recommendations of Regulatory Guide 1.35, Revision 2, Position C.1.3. Therefore, Unit 2 containment is subject to visual inspection only.~~

INSERT 7

~~The Surveillance Requirements for demonstrating the structural integrity of each containment is in compliance with the recommendations of Revision 2 of Regulatory Guide 1.35, "Inservice Surveillance of Ungrouted Tendons in Prestressed Concrete Containment Structures," and proposed Regulatory Guide 1.35.1, "Determining Prestressing Forces for Inspection of Prestressed Concrete Containments," April 1979.~~

Replace with Insert 8

The required Special Reports from any engineering evaluation of containment abnormalities shall include a description of the tendon condition, the condition of the concrete (especially at tendon anchorages), the inspection procedures, the tolerances on cracking, the results of the engineering evaluation, and the corrective actions taken, *or proposed*

3/4.6.1.7 CONTAINMENT VENTILATION SYSTEM

The 24-inch containment purge supply and exhaust isolation valves are required to be sealed closed during plant operations since these valves have not been demonstrated capable of closing during a LOCA or steam line break accident. Maintaining these valves sealed closed during plant operation ensures that excessive quantities of radioactive materials will not be released via the Containment Purge System. To provide assurance that these containment valves cannot be inadvertently opened, the valves are sealed closed in accordance with Standard Review Plan 6.2.4. Sealed closed isolation valves are isolation valves under administrative control to assure that they cannot be inadvertently opened. Administrative control includes mechanical devices to seal or lock the valve closed, the use of blind flanges, or removal of power to the valve operator.

INSERT 7

With regard to D-cracking, the acceptance criteria for the visual inspection of the containment concrete is that the area comprising D-cracking should not exceed 25 sq.ft.

INSERT 8

The conditions referenced by Action statement 3.6.1.6.b do not define abnormal containment degradation. These conditions are indications of potential abnormal degradation and their existence requires an appropriate engineering evaluation and a Special Report in accordance with Specification 6.9.2.

CONTAINMENT SYSTEMS

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:

a. With the abnormal degradation indicated by the conditions in Specification 4.6.1.6.1a.4, restore the containment to the required level of integrity or verify that containment integrity is maintained within 72 hours and perform an engineering evaluation of the containment and provide a Special Report to the Commission within 15 days in accordance with Specification 6.9.2 or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

b. With the indicated abnormal degradation of the structural integrity other than ACTION a. at a level below the acceptance criteria of Specification 4.6.1.6, restore the containment to the required level of integrity or verify that containment integrity is maintained within 15 days; perform an engineering evaluation of the containment and provide a Special Report to the Commission within 30 days in accordance with Specification 6.9.2 or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours. The provisions of Specification 3.0.4 are not applicable.

SURVEILLANCE REQUIREMENTS

4.6.1.6 CONTAINMENT PRESTRESSING SYSTEM

The structural integrity of the prestressing tendons of the containment shall be demonstrated at the end of 1, 3, and 5 years following the initial containment vessel structural integrity test and at 5-year intervals thereafter. For combined inspections of two containments in a plant, lift-off testing will be performed in accordance with the inspection schedule shown in Figure 3.6-1.

4.6.1.6.1 The adequacy of prestressing forces in tendons shall be demonstrated by:

a. Determining that a random but representative sample of at least 13 tendons (9 hoop and 4 inverted-U) each have an observed lift-off

force within the predicted limits established for each tendon. For each subsequent inspection, one tendon from each group shall be kept unchanged to develop a history and to correlate the observed data. The procedure of inspection and the tendon acceptance criteria shall be as follows:

1) If the measured prestressing force of the selected tendon in a group lies above the prescribed lower limit, the lift-off test is considered to be a positive indication of the sample tendon's acceptability.

2) If the measured prestressing force of the selected tendon in a group 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 prestressing forces. If the prestressing forces of these two tendons are above 95% of the prescribed lower limits for the tendons, all three tendons shall be restored to the required level of integrity, and the tendon group shall be considered as acceptable. If the measured prestressing force of any two tendons falls below 95% of the prescribed lower limits of the tendons, additional lift-off testing shall be done to detect the cause and extent of such occurrence. The conditions shall be considered as an indication of abnormal degradation of the containment structure.

3) If the measured prestressing force of any tendon lies below 90% of the prescribed lower limit, an engineering investigation will be performed to determine the cause and extent of the occurrence. The condition shall be considered as an indication of abnormal degradation of the containment structure.

4) If the average of all measured prestressing forces for each group (corrected for average condition) is found to be less than the minimum required prestress level at anchorage location for that group, the condition shall be considered as abnormal degradation of the containment structure.

5) If from consecutive surveillances the measured prestressing forces for the same tendon or tendons in a group indicate a trend of prestress loss larger than expected and the resulting prestressing forces will be less than the minimum required for the group before the next scheduled surveillance, additional lift-off testing shall be done so as to determine the cause and extent of such occurrence. The condition shall be considered as an indication of abnormal degradation of the containment structure.

6) Unless there is abnormal degradation of the containment vessel during the first three inspections, the sample population for subsequent inspections shall include at least 7 tendons (4 hoop, and 3 inverted-U).

b. For Unit 1 only, performing tendon detensioning, inspections, and material tests on a previously stressed tendon from each group.

SURVEILLANCE REQUIREMENTS (Continued)

A randomly selected tendon from each group shall be completely detensioned in order to identify broken or damaged wires and determining that over the entire length of the removed wire sample (which should include the broken wire if so identified) that:

1) The tendon wires are free of corrosion, cracks, and damage, and

2) A minimum tensile strength of 270,000 psi (guaranteed ultimate strength of the tendon material) exists for at least three wire samples (one from each end and one at mid-length) cut from each removed wire.

Failure to meet the requirements of 4.6.1.6.1b shall be considered as an indication of abnormal degradation of the containment structure.

c. For Unit 1 only, performing tendon retensioning of detensioned tendons as close as possible to their observed or predicted lift-off force, whichever is greater but not to exceed a stress level of 70% of the guaranteed ultimate tensile strength (GUTS) for the tendon material. During retensioning of these tendons, the changes in load and elongation should be measured simultaneously at a minimum of three approximately equally-spaced levels of force between zero and the seating force. If the elongation corresponding to a specific load differs by more than 10% from that recorded during the installation, an investigation should be made to ensure that the difference is not related to wire failures or slip of wires in anchorages. This condition shall be considered as an indication of abnormal degradation of the containment structure.

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

1) There are no changes in the presence or physical appearance of the sheathing filler-grease including the presence of free water.

2) Amount of grease replaced does not exceed 5% of the net duct volume, when injected at a pressure not to exceed the designer's specifications.

3) Minimum grease coverage exists for the different parts of the anchorage system.

4) During general visual examination of the containment exterior surface. grease leakage that could affect containment integrity is not present, and

5) The chemical properties of the filler material are within the tolerance limits specified as follows:

SURVEILLANCE REQUIREMENTS (Continued)

Water Content	0-10% (by dry wt.)
Chlorides	0-10 ppm
Nitrates	0-10 ppm
Sulfides	0-10 ppm
Reserved Alkalinity (Base Numbers)	>50% of the installed value;

Failure to meet requirement of 4.6.1.6.1d shall be considered as an indication of abnormal degradation of the containment structure.

4.6.1.6.2 End Anchorages and Adjacent Surfaces. The structural integrity of the end anchorages of all tendons inspected pursuant to Specification 4.6.1.6.1 and the adjacent surfaces shall be demonstrated by determining through visual inspection that no apparent changes have occurred.

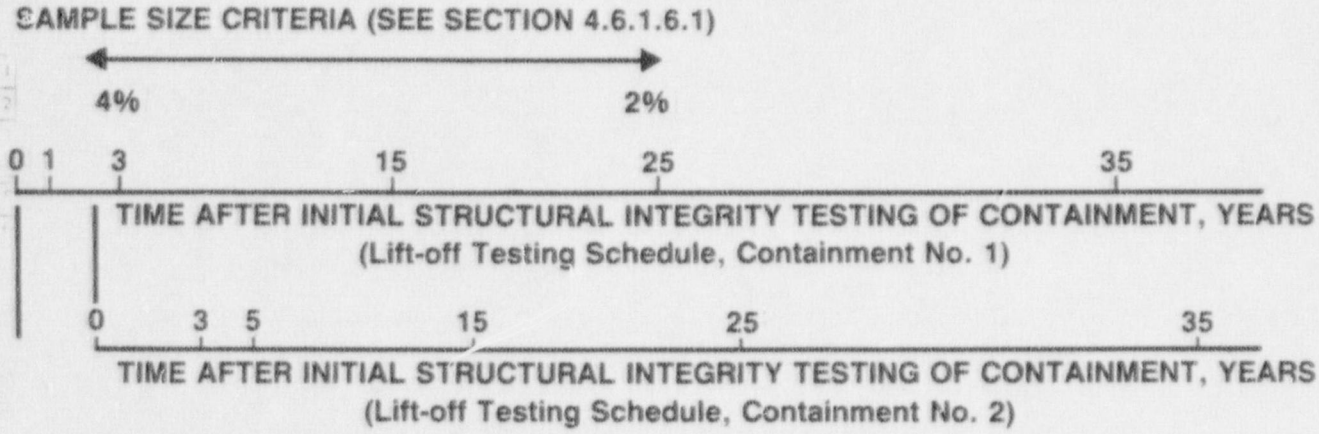
a. All end anchorages including anchor blocks, wedges, shims, and bearing plates: inspect for moisture, corrosion and cracks, and for warping of bearing plates.

b. Concrete surfaces adjacent to hoop tendon anchorages: inspect for moisture, corrosion, distortion, and cracking.

c. Steel plating surrounding the inverted-U tendon anchorages: inspect for moisture, corrosion, distortion, and cracking.

Significant grease leakage, grease cap deformation, or abnormal concrete/steel plating conditions shall be considered as an indication of abnormal degradation of containment structure.

4.6.1.6.3 Containment Surfaces. The exterior surface of the containment should be visually examined to detect areas of large spall, severe scaling, D-cracking, other surface deterioration or disintegration, or significant grease leakage, each of which can be considered as evidence of abnormal degradation of structural integrity of the containment.



Schedule to be used provided:

a. The containments are identical in all aspects such as size, tendon system, design, materials of construction, and method of construction. The tendon system for Unit 2 does not provide for detensioning. Detensioning can be performed only on the Unit 1 tendon system.
b. The 1-year inspection for Unit 2 will consist of a visual inspection only. No lift-off testing will be performed on Unit 2 until the 3-year inspection.
c. There is no unique situation that may subject either containment to a different potential for structural or tendon deterioration.

FIGURE 3.6-1

SCHEDULE OF LIFT-OFF TESTING FOR TWO CONTAINMENTS AT A SITE

3/4.6.1.5 AIR TEMPERATURE

The limitations on containment average air temperature ensure that the overall containment average air temperature does not exceed the initial temperature condition assumed in the safety analysis for a steam line break accident. Measurements shall be made at all listed locations, whether by fixed or portable instruments, prior to determining the average air temperature.

3/4.6.1.6 CONTAINMENT STRUCTURAL INTEGRITY

This limitation ensures that the structural integrity of the containment will be maintained comparable to the original design standards for the life of the facility. Structural integrity is required to ensure that the containment will withstand the maximum pressure of 41.9 psig in the event of a steam line break accident. The measurement of containment tendon lift-off force, the tensile tests of the tendon strands for Unit 1, the visual examination of tendons, anchorages and exposed interior and exterior surfaces of the containment and the Type A leakage test for both units are sufficient to demonstrate this capability. (The tendon strand samples will also be subjected to stress cycling tests and to accelerated corrosion tests to simulate the tendon's operating conditions and environment.) With regard to D-cracking, the acceptance criteria for the visual inspection of the containment concrete is that the area comprising D-cracking should not exceed 25 sq. ft.

The conditions referenced by Action statement 3.6.1.6.b do not define abnormal containment degradation. These conditions are indications of potential abnormal degradation and their existence requires an appropriate engineering evaluation and a Special Report in accordance with Specification 6.9.2.

The required Special Reports from any engineering evaluation of containment abnormalities shall include a description of the tendon condition, the condition of the concrete (especially at tendon anchorages), the inspection procedures, the tolerances on cracking, the results of the engineering evaluation, and the corrective actions taken, or proposed.

3/4.6.1.7 CONTAINMENT VENTILATION SYSTEM

The 24-inch containment purge supply and exhaust isolation valves are required to be sealed closed during plant operations since these valves have not been demonstrated capable of closing during a LOCA or steam line break accident. Maintaining these valves sealed closed during plant operation ensures that excessive quantities of radioactive materials will not be released via the Containment Purge System. To provide assurance that these containment valves cannot be inadvertently opened, the valves are sealed closed in accordance with Standard Review Plan 6.2.4. Sealed closed isolation valves are isolation valves under administrative control to assure that they cannot be inadvertently opened. Administrative control includes mechanical devices to seal or lock the valve closed, the use of blind flanges, or removal of power to the valve operator.