

Docket Burns



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

April 1, 1988

Docket Nos.: 50-482
50-483

LICENSEE: Union Electric Company
Wolf Creek Nuclear Operating Corporation

FACILITY: Callaway Nuclear Plant
Wolf Creek Generating Station

SUBJECT: SUMMARY OF MEETING WITH UNION ELECTRIC COMPANY AND WOLF
CREEK NUCLEAR OPERATING COMPANY TO DISCUSS CONTAINMENT
TENDON TECHNICAL SPECIFICATIONS FOR THE CALLAWAY AND
WOLF CREEK NUCLEAR GENERATING PLANTS

The subject meeting was held on March 16, 1988. A list of attendees is included with Enclosure 1. Enclosure 2 is a copy of the licensees' presentation.

The licensees have submitted requests for changes to the technical specifications. The staff, which has the proposed changes under review, had previously provided a preliminary assessment to the licensees, and requested the meeting. The changes concerned the action statements associated with the various containment tendon surveillances. Specifically, the licensees proposed having three levels of action statements depending upon the results of the particular surveillance. The proposed changes would also eliminate the requirement for less than 5% voids in the sheathing filler grease and replace it with a visual inspection of the containment exterior. Further, it was proposed that the requirement prohibiting mode changes while in an action statement (Section 3.0.4) would not be applicable for the containment surveillance, particularly in view of the fact that the actions involved providing a report to the staff.

With regard to the action statements, the licensees proposed the following:

- 1) Surveillance - lift off force less than 90% of the predicted lower limit (Section 4.6.1.6.1a)

Action "a" - restore the forces within 15 days or be in hot standby within 6 hours and cold shutdown within the following 30 hours. (No change from current TS)

- 2) Surveillance - visual inspection of detensioned tendon; determine tensile strength of wire samples; observe elongation upon retensioning; and assure observed liftoff forces exceed the average minimum design value (Section 4.6.1.6.c, & d).

Action "b" - The results are considered to be indications of secondary significance. The action would entail providing a report to the staff within 30 days or be in hot standby within 6 hours (Section 4.6.1.6.1 e).

3) Surveillance - operability of sheathing filler grease

Action "c" - provide a report to the staff within 30 days and an engineering evaluation within 90 days or be in hot standby within 6 hours.

The TS presently require restoration within 72 hours and a report within 15 days or be within hot standby within 6 hours for surveillance items 2 and 3 above.

During the discussion, the staff indicated that it had no philosophical concerns with the proposed changes in the action statements. However, a few of the proposed changes were not completely acceptable. After a caucus, the licensees proposed the following changes to the proposed technical specification.

- o Action statement "a" would apply to 4.6.1.6.1 d (observed lift off stresses)
- o The TS would retain the requirement for less than 5% voids in sheathing filler grease although it will be covered under Action "c"

The staff proposed:

- o That it will consult with other staff groups regarding the proposal to prohibit mode changes (Section 3.0.4) while in the action statements
- o That the licensee provide other examples where Section 3.0.4 is not applicable for specific action statements.

It appears that the other changes as modified are acceptable.

The staff also offered comments on the performance of surveillance procedures after reviewing previously submitted Special Reports on Tendon Surveillances. The comments were:

- 1) licensee engineering staff should use a checklist for visual inspections (the contractors already use one)

- 2) in order to more completely monitor the voids in the grease, it was suggested that when sheaths with high voids are refilled, some of the same tendons also be included in subsequent surveillances. It will then give an indication of whether the sheaths were completely filled initially or the grease leaked out.

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George F. Dick, Jr., Project Manager
Project Directorate - IV
Division of Reactor Projects - III,
IV, V and Special Projects

Enclosures:
As stated

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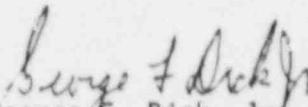
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- 2) in order to more completely monitor the voids in the grease, it was suggested that when sheaths with high voids are refilled, some of the same tendons also be included in subsequent surveillances. It will then give an indication of whether the sheaths were completely filled initially or the grease leaked out.


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Enclosures:
As stated

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MEETING ATTENDEESUnion Electric/WCNOC
Containment Tendon Meeting

<u>NAME</u>	<u>AFFILIATION</u>
George Dick	NRC - PM
Randy Hall	- PM
Dave Shafer	Union Electric-Lic.
Scott Liebel	Union Electric-Engr.
Pramod K. Gupta	WCNOC-Wolf Creek
Harold K. Chernoff	WCNOC-Licensing
Maurice E. Dingler	WCNOC-Engineering
R. C. Siovic	Bechtel-Engineering
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C. P. Tan	NRR/ESGB
Hans Ashar	NRR/ESGB
David C. Jeng	NRR/ESGB

SUBJECT:

TECHNICAL SPECIFICATION SECTION 3/4.6.1.6 - CONTAINMENT VESSEL
STRUCTURAL INTEGRITY (POST TENSIONING SYSTEM SURVEILLANCE).

PRIMARY ISSUE:

PLANT SHUTDOWN DUE TO A "POSSIBLE ABNORMAL DEGRADATION" BEFORE ADEQUATE
EVALUATION

EXCEPT FOR VERY MINOR ITEMS, THERE IS NO DISAGREEMENT ON THE SURVEILLANCE
PROGRAM OR ON THE SURVEILLANCE CRITERIA.

PROPOSED AMENDMENT PHILOSOPHY

- Submittals

ULNRC-1173 dated 8/18/85

KMLNRC-85-264 dated
12/6/85

- Spec has been Restructured-

3 Levels of non-compliance with appropriate action times

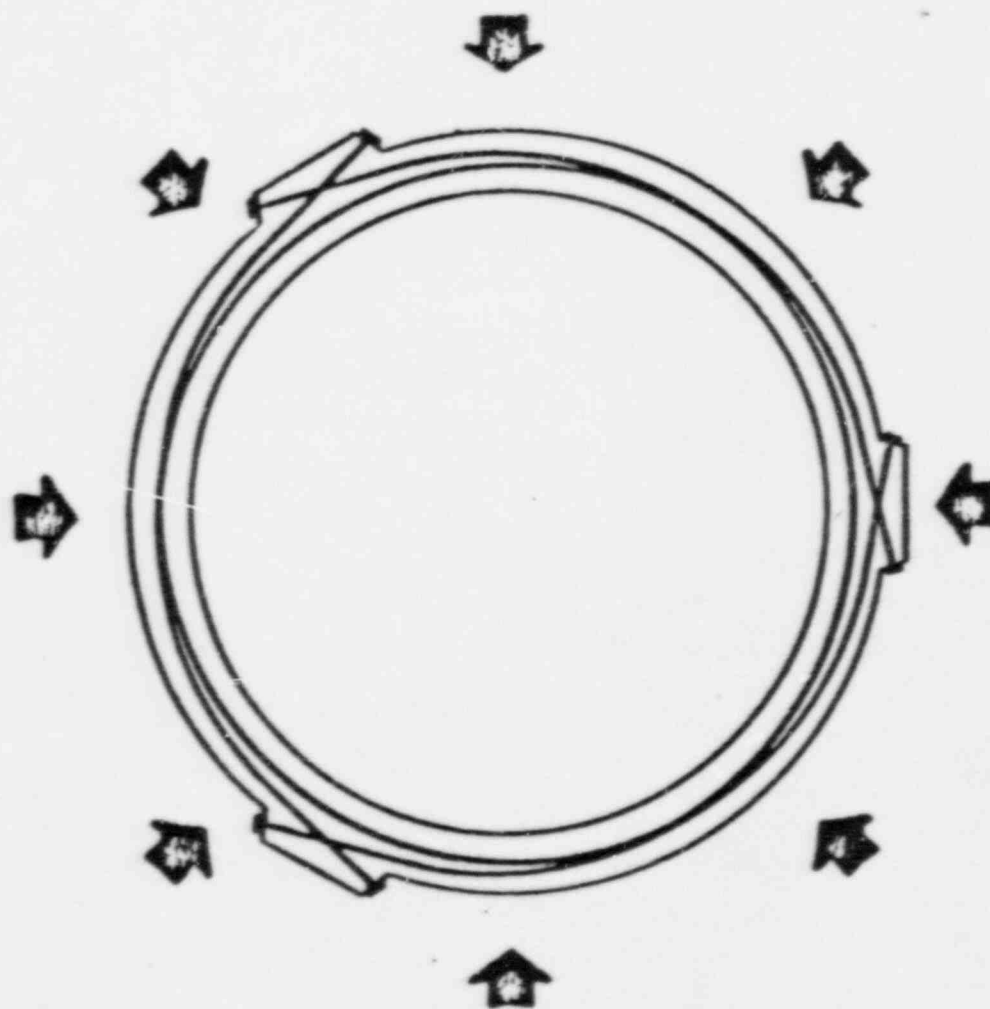
- 1) Provides appropriate actions in the event containment structural integrity is questionable.
- 2) Provides prompt attention and corrective action to assure acceptable design margins are maintained if certain parameters are degraded.

3) Provides engineering evaluation for parameters which are indicators of future degradation, but not indicative of an inoperable containment structure.

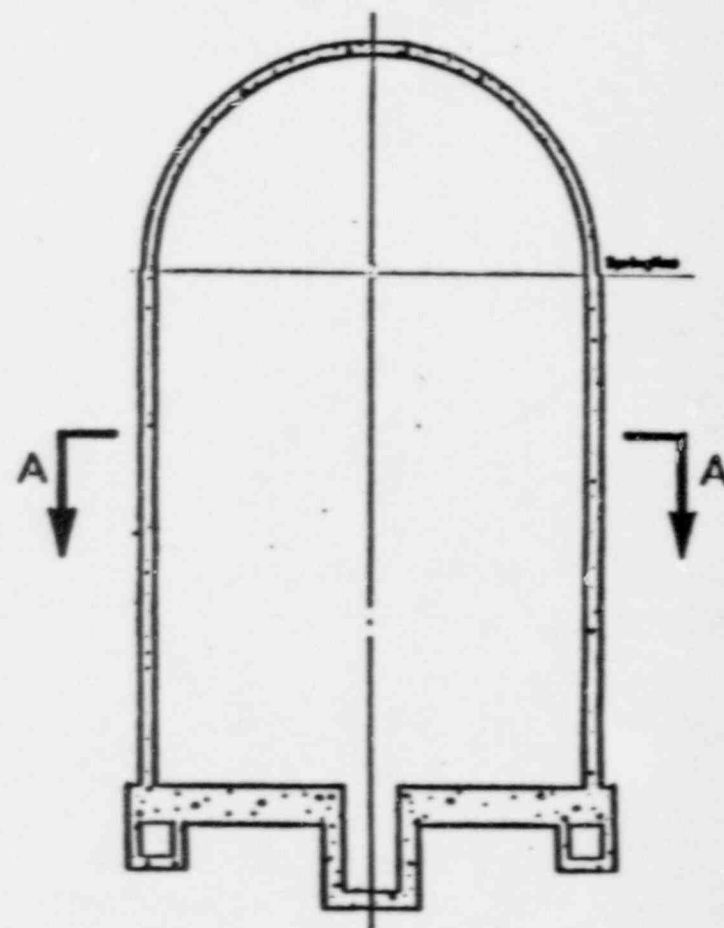
- Removes the requirement to verify grease voids are less than 5% but rather requires verification of no widespread grease leakage.
- Details of changes to be discussed later in the presentation.

DESCRIPTION OF POST TENSIONING SYSTEM

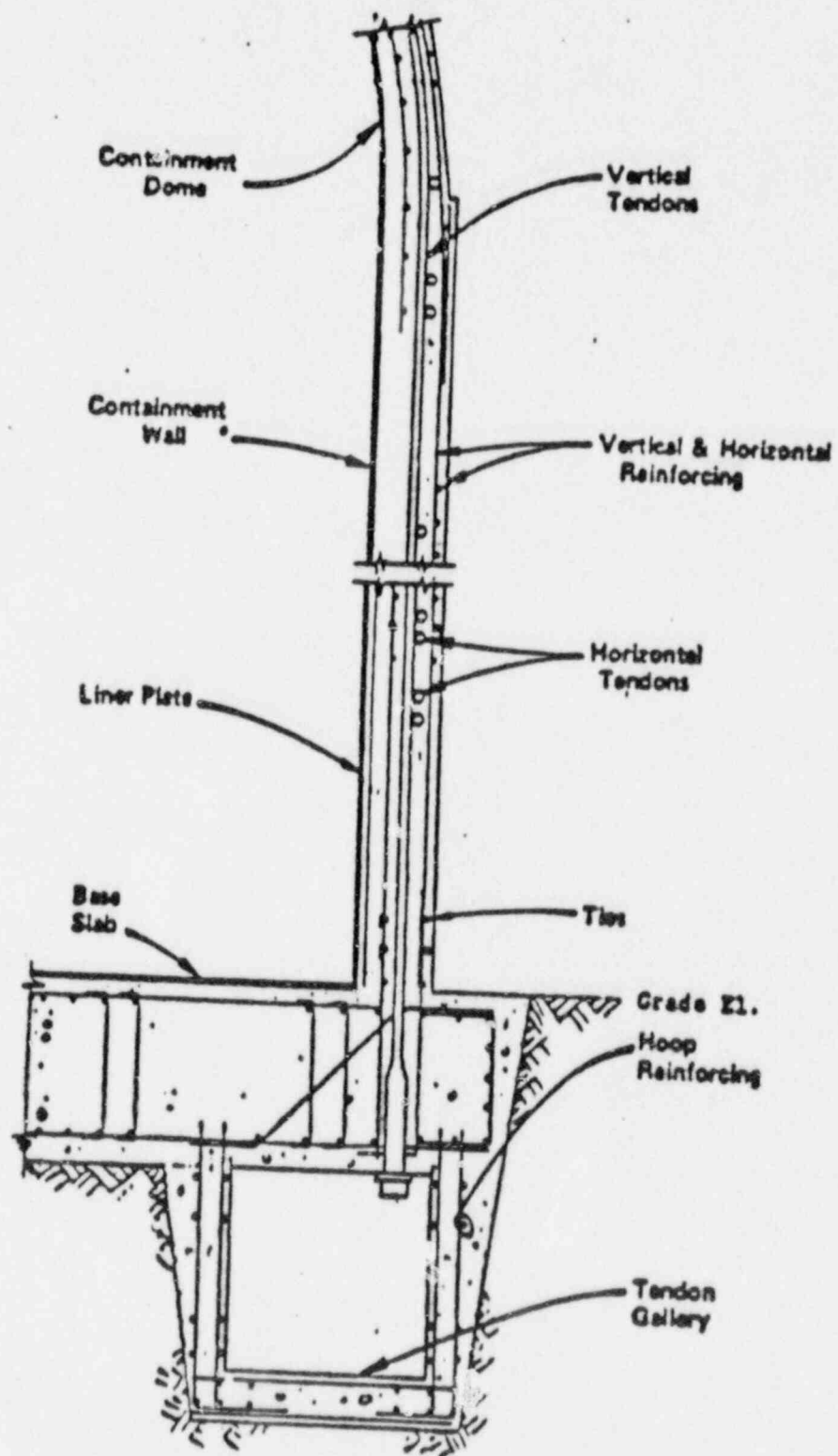
- A. CONSISTS OF TENDONS, ANCHORAGES, DUCTS AND GREASE FILLER
- B. USED IN CONTAINMENT STRUCTURE
- C. STRESSED, GREASED AND SEALED PRIOR TO PLANT OPERATION
- D. COMPLETELY PASSIVE SYSTEM



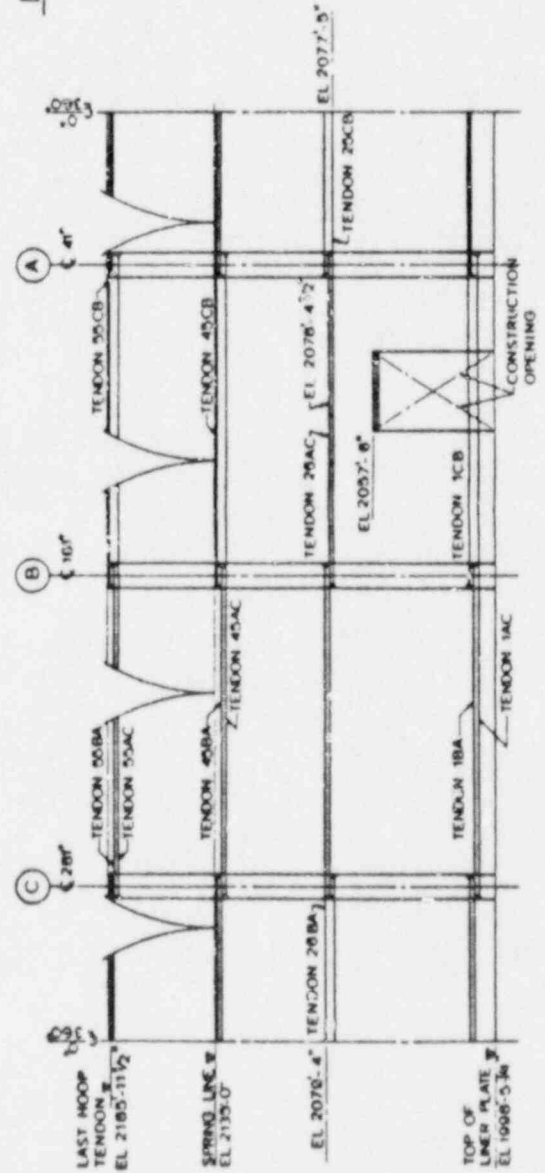
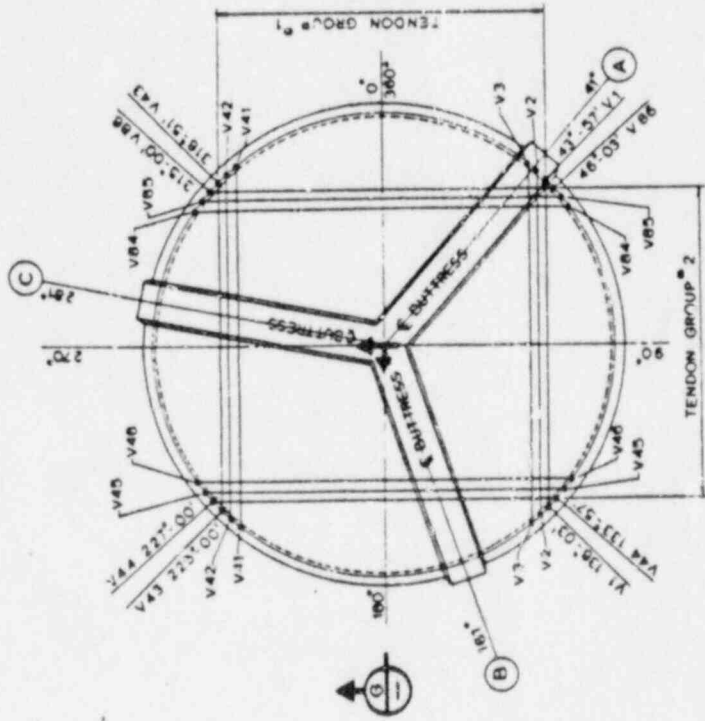
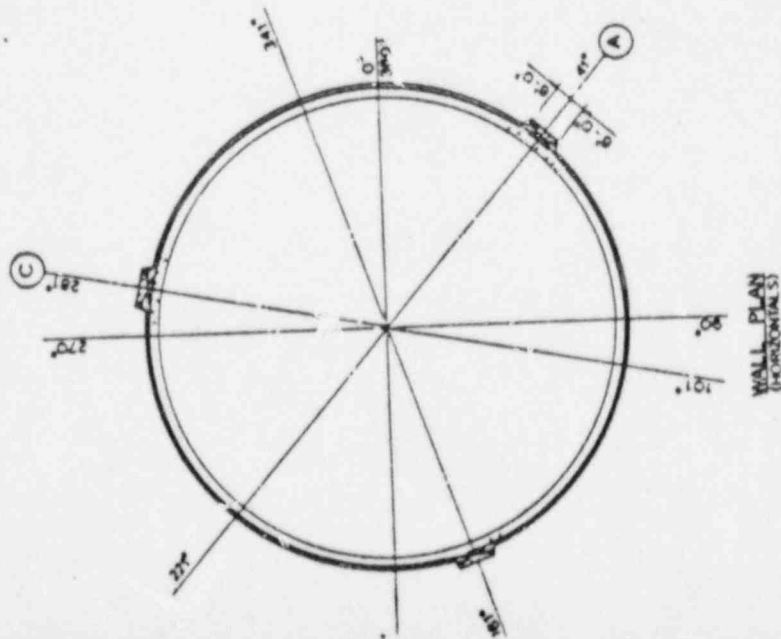
SECTION A - A



CROSS SECTION
REACTOR BLDG

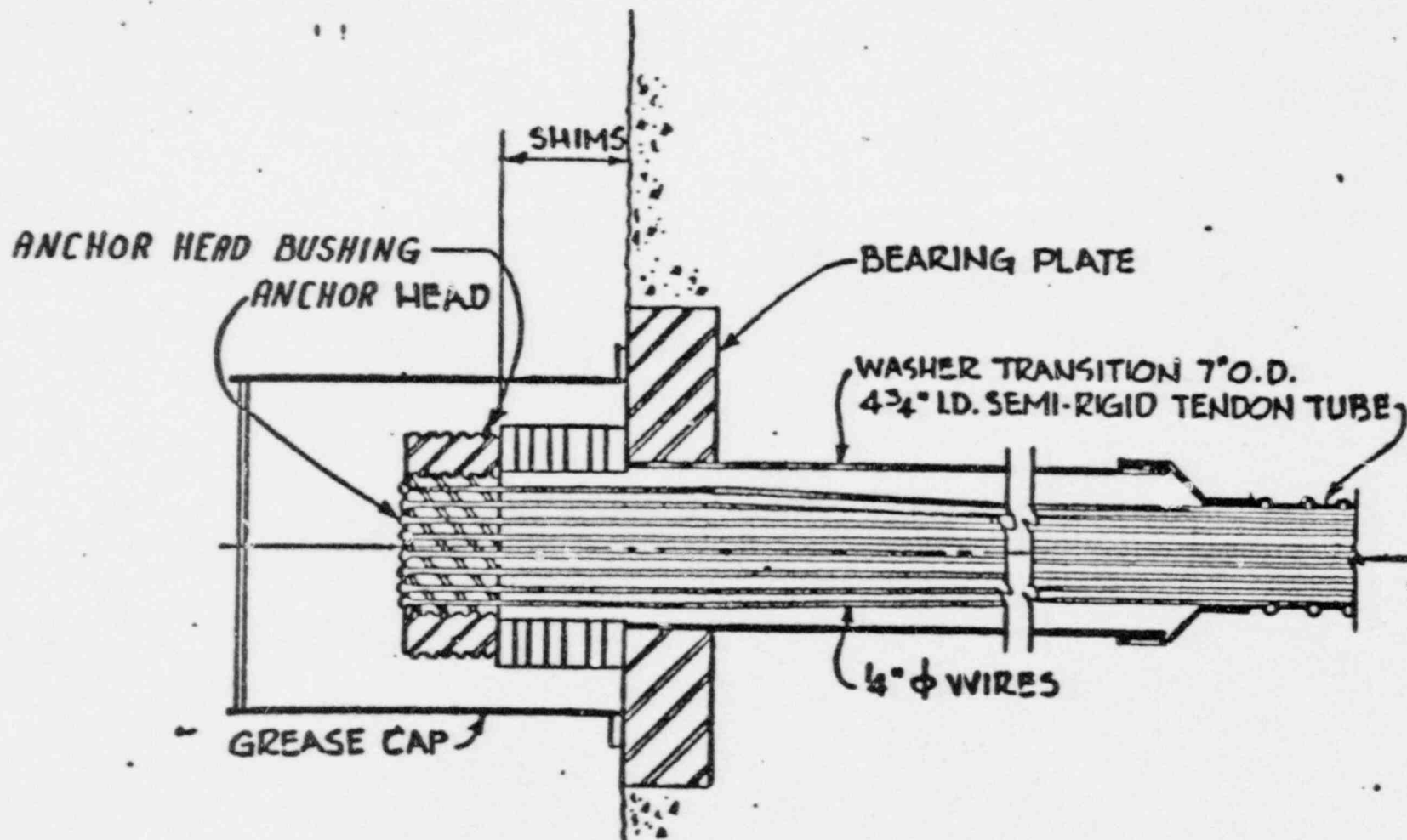


CONTAINMENT ELEVATION



Rev. 018
6/86

CALLAWAY PLANT
FIGURE 3.8-16
REACTOR BUILDING
TENDON AND BUTTRESS ARRANGEMENT



TENDON ANCHORAGE SYSTEM

DESIGN FEATURES OF PRESTRESSED CONTAINMENT

- A. IMPOSES A CONSTANT INWARD LOAD ON CONTAINMENT SO THAT PRESSURE LOADS FROM LOCA EFFECTIVELY UNLOADS THE STRUCTURE.
- B. PASSIVE SYSTEM (NO ACTION IS REQUIRED FOR THE SYSTEM TO RESPOND TO AN ACCIDENT CONDITION).
- C. DESIGN CONSIDERATIONS
 - 1. PEAK ACCIDENT PRESSURE IS LESS THAN 50 PSI.
 - 2. DESIGN PRESSURE IS 60 PSI.
 - 3. TESTED TO 69 PSI.
 - 4. PRESTRESS CREATES AN EFFECTIVE COUNTER PRESSURE OF 72 PSI.
 - 5. DESIGN LOAD FACTORS ASSURE ELASTIC BEHAVIOR (SMALL DEFLECTIONS) TO 90 PSI.
 - 6. STUDIES ON OTHER SIMILAR CONTAINMENTS SUGGEST ULTIMATE CAPACITY IS IN EXCESS OF 120 PSI.
 - 7. TENDON STRESSES ARE GREATEST AT TIME OF STRESSING

PRESSURE PSIG

96

72

60

48

0

PRESSURE LEVEL PROVIDED BY TENDONS

1.2 DESIGN ACCIDENT PRESSURE

DESIGN ACCIDENT PRESSURE

ACTUAL ACCIDENT PRESSURE

1.2 Pa

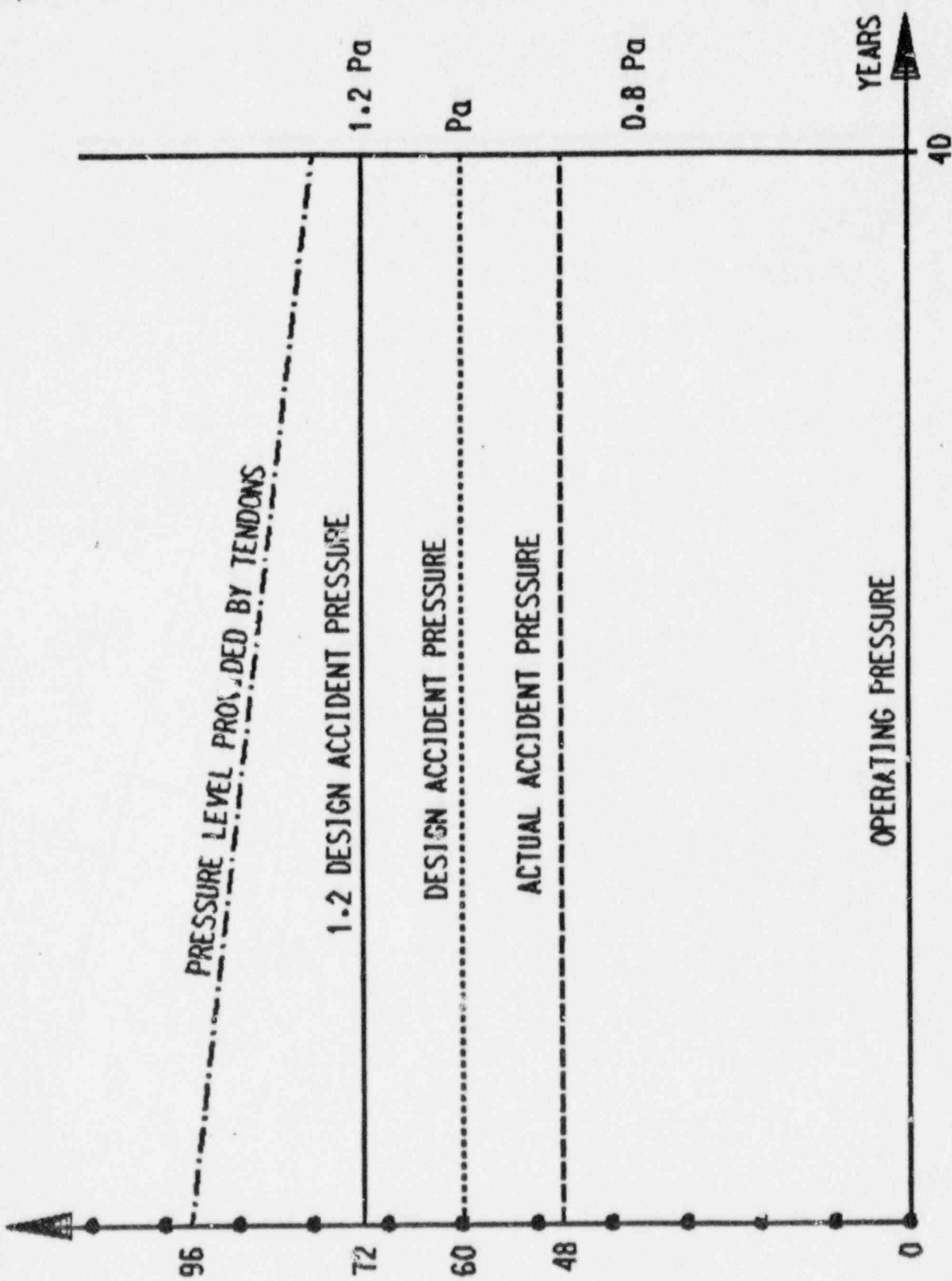
Pa

0.8 Pa

YEARS

40

OPERATING PRESSURE



INSERVICE INSPECTION & SURVEILLANCE REQUIREMENTS

-- TECH. SPECS.

SECTIONS 3/4.6.1.6

LIFT-OFF MEASUREMENTS WITHIN THE PREDICTED LIMITS

- Failure requires restoration within 15 days and report to commission in 30 days or, Mode 3 in 6 hours, Mode 5 in 36 hours

DETENSION TENDON FOR INSPECTION

- Wires free of corrosion, cracks, damage
- No changes in grease
- Wire tensile strength min 240 ksi
- Failure requires restoration within 72 hours and report to commission in 15 days or, Mode 3 in 6 hours, Mode 5 in 36 hours

ELONGATION OF TENDON WITHIN 5%

- Failure requires restoration within 72 hours and report to commission in 15 days or, Mode 3 in 6 hours, Mode 5 in 36 hours

MIN. LIFT-OFF STRESSES ARE EXCEEDED

- Failure requires restoration within 72 hours and report to commission in 30 days or, Mode 3 in 6 hours, Mode 5 in 36 hours

VERIFY OPERABILITY OF SHEATHING FILLER GREASE BY ASSURING

- No voids in excess of 5%
- Min. grease coverage
- Physical properties are within tolerances for grease
- Failure requires restoration within 72 hours and report to commission in 15 days or, Mode 3 in 6 hours, Mode 5 in 36 hours

-- NRC REG. GUIDES

Reg. Guide 1.35 proposed Rev. 3 -
Inservice Inspection of Ungrouted Tendons in
Prestressed Concrete Containments
Committed to compliance in Appendix 3A of the FSAR

SURVEILLANCE METHODS & DATA LIMITS

- Lift-off measurement
 - Feeler gage method
 - Verify tendon stress is $\geq 90\%$ of the lower tolerance band
- Grease sample testing
 - One quart sample from each tendon end
 - Visual exam to ensure grease coverage
 - Laboratory testing of samples
 - Water $< 10\%$
 - Chlorides < 10 ppm
 - Nitrates < 10 ppm
 - Sulfides < 10 ppm
 - Verify voids $\leq 5\%$ during regreasing
 - Vent through dome vent (vert.) or other end (hor.) until 5 gallons of clean grease exits
- Wire sample testing
 - One wire removed from each detensioned tendon
 - 3-120 inch samples cut from wire, end-middle-end
 - Each sample tested to ASTM A421 to verify ≥ 240 ksi tensile ultimate; 100 inch samples
- Visual examination
 - Anchorage components - corrosion, excessive stress
 - Buttonheads - missing, broken, damaged
 - Concrete - spalling, cracks, grease leakage
 - exterior
 - surrounding tendons

ONE - YEAR PHYSICAL SURVEILLANCE OF THE
CALLAWAY UNIT I CONTAINMENT BUILDING

- TENDON LIFTOFFS

TENDON	END	EFFECTIVE WIRES	JACK NO.	ACTUAL LIFTOFF (PSI, K)			TENDON LIFTOFFS			EXPECTED FORCE	ACCEPTABLE
				PRESSURE	FORCE	AVERAGE FORCE	90% LOWER LIMIT	LOWER LIMIT	UPPER LIMIT		
V-20	SHOP	169	8813	4313	1444.5	1411					
	FIELD	169	8754	4140	1378		1161	1286	1427	1361	YES
V-35	SHOP	169	8813	4176	1398.5	1417					
	FIELD	169	8754	4120	1338		1153	1278	1410	1352	YES *
V-65	SHOP	170	8754	4280	1424	1449.5					
	FIELD	170	8813	4403	1475		1193	1327	1469	1402	YES ..
V-74	SHOP	169	8754	4340	1445	1451					
	FIELD	169	8813	4350	1457		1152	1277	1402	1352	YES *
1-CB	SHOP	170	9364	6456	1382	1371					
	FIELD	170	9363	6480	1361		1110	1235	1369	1310	YES *
9-CB	SHOP	169	9364	6420	1343	1324					
	FIELD	169	9363	6220	1306		1112	1236	1336	1311	YES
9-AC	SHOP	170	9364	6457	1351	1339.5					
	FIELD	170	9363	6320	1328		1110	1235	1369	1310	YES
26-AC	SHOP	170	9364	6420	1355	1339					
	FIELD	170	9363	6300	1323		1110	1235	1369	1310	YES
5-BA	SHOP	170	9363	6600	1387	1357					
	FIELD	170	9364	6346	1327		1127	1252	1385	1318	YES
45-BA	SHOP	168	9364	6140	1264	1312.5					
	FIELD	168	9364	6410	1341		1146	1270	1402	1344	YES
51-BA	SHOP	170	9364	6100	1276	1283.5					
	FIELD	170	9364	6173	1291		1076	1193	1318	1268	YES

ONE - YEAR PHYSICAL SURVEILLANCE OF THE
CALLAWAY UNIT I CONTAINMENT BUILDING

COMPARISON WITH ORIGINAL INSTALLATION

TENDON	END	EFFECTIVE WIRES		LIFTOFF FORCE (K)		LOSS	PERCENTAGE
		ORIGINAL	@ 1 YR SURV	ORIGINAL	@ 1 YR SURV		
V-20	SHOP	169	169	1491	1411	80	5.4
	FIELD	169	169				
V-35	SHOP	169	169	1472	1418	54	3.7
	FIELD	169	169				
V-65	SHOP	170	170	1509	1449.5	59.5	3.9
	FIELD	170	170				
V-74	SHOP	170	169	1503	1451	52	3.4
	FIELD	170	169				
1-CB	SHOP	170	170	1470	1371	99	6.7
	FIELD	170	170				
9-CB	SHOP	169	169	1474	1324	150	10.2
	FIELD	169	169				
9-AC	SHOP	170	170	1491	1339.5	151.5	10.2
	FIELD	170	170				
26-AC	SHOP	170	170	1491	1339	152	10.2
	FIELD	170	170				
5-BA	SHOP	170	170	1482	1357	125	8.4
	FIELD	170	170				
45-BA	SHOP	168	168	1479	1312.5	166.5	11.2
	FIELD	168	168				
51-BA	SHOP	170	170	1388	1283.5	104.5	7.5
	FIELD	170	170				

Average Area at Installation 335.599 sq. in. Constant K = -19.611

SUMMARY OF LIFT-OFF FORCES

CALLAWAY UNIT 1

TENDON NUMBER	END DESIGNATION	ALLOWABLE LIFT-OFF STRESS (KSI.)		SURVEILLANCE LIFT-OFF STRESS (KSI.)	
		MAXIMUM	MINIMUM		
1	END A	165.0	148.6	174.57	Avg.
1	END B	165.0	148.6	164.0	> 169.3*
18	END A	175.0	157.8	173.3	
18	END B	175.0	157.8	174.5	> 173.9
47	END A	173.3	156.7	168.9	
47	END B	173.3	156.7	165.9	> 167.4
65	END A	175.0	158.0	175.54	
65	END B	175.0	158.0	171.0	> 173.27
5	BUTTRESS A	161.1	145.0	154.0	
5	BUTTRESS C	161.1	145.0	162.3	> 158.15
11	BUTTRESS B	170.0	153.0	156.0	
11	BUTTRESS C	170.0	153.0	161.2	> 158.6
14	BUTTRESS A	167.0	150.0	171.0	
14	BUTTRESS B	167.0	150.0	162.0	> 166.5
18	BUTTRESS A	165.0	149.0	169.0	
18	BUTTRESS B	165.0	149.0	162.1	> 165.6*
35	BUTTRESS A	167.0	151.0	166.9	
35	BUTTRESS B	167.0	151.0	158.0	> 162.5
45	BUTTRESS A	169.0	153.0	165.7	
45	BUTTRESS B	169.0	153.0	158.7	> 162.2
47	BUTTRESS A	158.0	142.0	158.4	
47	BUTTRESS B	158.0	142.0	150.0	> 154.2

UNIT 1 TENDON SURVEILLANCE
CALLAWAY THIRD YEAR LOSSES

TENDON	END	INITIAL STRESS KSI	ACTUAL LIFT-OFF STRESS KSI	AVERAGE LIFT-OFF STRESS KSI	PERCENT CHANGE AVERAGE
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HORIZONTAL TENDONS

5	A		154.0		
5	C	176.35	162.3	158.2	10.29
11	B		156.0		
11	C	184.60	161.2	158.6	14.08
14	A		171.0		
14	B	177.94	162.0	166.5	6.26
18	A		169.0		
18	B	177.20	162.1	165.5	6.60
35	A		174.0		
35	B	179.78	166.5	*170.3	5.27
45	A		165.7		
45	B	180.59	158.7	162.2	10.18
47	A		158.4		
47	B	170.24	150.0	154.2	9.42

AVERAGE HORIZONTAL LOSS= 0.910

* 169 WIRES

UNIT 1 TENDON SURVEILLANCE
CALLAWAY THIRD YEAR LOSSES

TENDON	END	INITIAL STRESS KSI	ACTUAL LIFT-OFF STRESS KSI	AVERAGE LIFT-OFF STRESS KSI	PERCENT CHANGE AVERAGE
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VERTICAL TENDONS

1	A		173.6		
1	B	178.31	173.0	*173.3	2.80
18	A		173.3		
18	B	185.92	174.5	174.0	6.41
47	A		168.9		
47	B	183.72	165.9	167.4	8.88
65	A		171.0		
65	B	185.92	175.54	173.3	6.78

AVERAGE VERTICAL LOSS= 0.937

*169 WIRES

FIRST - YEAR PHYSICAL SURVEILLANCE OF THE
WOLF CREEK UNIT I CONTAINMENT BUILDING

TABLE VIII.a: SUMMARY OF DATA SHEET 9.0
- TENDON LIFTOFFS (Revised As Per ECR F-009)

TENDON	END	EFFECTIVE WIRES	JACK NO.	ACTUAL LIFTOFF (PSI.K)			TENDON LIFTOFFS				ACCEPTABLE
				PRESSURE	FORCE	AVERAGE FORCE	90% LOWER LIMIT	LOWER LIMIT	UPPER LIMIT	EXPECTED FORCE	
V-20	SHOP	170	8813	4347	1456	1400	1127	1252	1394	1335	YES*
	FIELD	170	8754	4020	1345						
V-15	SHOP	170	8813	4043	1352	1339	1093	1218	1360	1302	YES
	FIELD	170	6754	3963	1326						
V-45	SHOP	170	8754	4227	1412	1432	1118	1243	1394	1327	YES*
	FIELD	170	8813	4340	1452						
V-74	SHOP	170	8754	4183	1400	1404	1143	1268	1410	1352	YES
	FIELD	170	8813	4207	1407						
1-CB	SHOP	170**	9362	6957	1674	1422	1087	1203	1344	1278	YES *
	FIELD	170**	9365	6470	1370						
9-CB	SHOP	170	9362	6943	1471	1387	1068	1185	1327	1268	YES*
	FIELD	170	9365	6150	1302						
9-AC	SHOP	170	9366	6530	1382	1358	1068	1185	1318	1260	YES*
	FIELD	170	9365	6297	1333						
26-AC	SHOP	169	9366	6547	1386	1359	1087	1211	1352	1294	YES*
	FIELD	169	9365	6290	1332						
5-BA	SHOP	169***	9362	6337	1342	1381	1105	1229	1377	1303	YES*
	FIELD	169***	9366	6710	1421						
45-BA	SHOP	170	9362	6630	1407	1409	1085	1203	1352	1285	YES*
	FIELD	170	9366	6670	1412						
51-BA	SHOP	170	9362	6257	1325	1348	1035	1152	1293	1227	YES*
	FIELD	170	9366	6480	1372						

* Tendons Force exceeded Upper Limit. Section 2, Part V for a detailed discussion.

** Installation Records show 169 effective wires in tendon.

*** Installation Records show 168 effective wires in tendon.

**FIRST - YEAR PHYSICAL SURVEILLANCE OF THE
WOLF CREEK UNIT I CONTAINMENT BUILDING**

**TABLE XII.a: COMPARISON WITH ORIGINAL INSTALLATION
(Revised as per NCR F-009)**

TENDON	EFFECTIVE WIRES		LIFTOFF FORCE (K)			PERCENTAGE
	ORIGINAL	@ 1 YR SURV	ORIGINAL**	@ 1 YR SURV	LOSS	
V-20	170	170	1493	1400	93	6.2
V-35	170	170	1487	1339	148	10.0
V-65	170	170	1500	1432	68	4.5
V-74	170	169	1545	1404	141	9.1
1-CB***	169	170	1480	1422	58	3.9
9-CB	170	170	1492	1367	105	7.0
9-AC	170	170	1489	1358	131	8.8
26-AC	169	168	1518	1359	159	10.4
5-BA***	163	169	1511	1381	130	8.6
45-BA	170	170	1458	1409	49	3.4
51-BA*	170	170	1405	1348	56	4.0

* Wire tendon with Net Forces equal to 162 wire tendon.

** Based upon the Stress Values given in Specification CAA997206, Rev. 1 and number of effective wires.

*** Stressing Record indicates one less wire at original installation than found during surveillance. See Section 2, Article III.

NOTE: For Tendons V20, V65, V74, 26AC and 51BA double button headed and split wires noted at original installation were considered effective since they are still retaining the required force at the time of surveillance and are meeting the requirements of ASTM A421.

SUMMARY OF LIFT-OFF FORCES

TABLE 1

PRELIMINARY

Wolf Creek Generating Station, Unit 1

Tendon Number	End Designation	Allowable Lift-off Force (kips)		Surveillance Lift-off Force (kips)
		Maximum	Minimum	
*V1	End A	1397	1272	1406
*V1	End B	1397	1272	1365
V18	End A	1411	1285	1483
V18	End B	1411	1285	1391
V47	End A	1408	1282	1383
V47	End B	1408	1282	1495
V65	End A	1421	1293	1403
V65	End B	1421	1293	1495
H5AC	Buttress A	1383	1254	1399
H5AC	Buttress B	1383	1254	1392
H11CB	Buttress B	1397	1267	1388
H11CB	Buttress C	1397	1267	1392
H14BA	Buttress A	1369	1243	1387
H14BA	Buttress B	1369	1243	1399
H18BA	Buttress A	1394	1265	1416
H18BA	Buttress B	1394	1265	1425
H35BA	Buttress A	1397	1268	1432
H35BA	Buttress B	1397	1268	1425
H45BA	Buttress A	1390	1261	1435
H45BA	Buttress B	1390	1261	1385
H47BA	Buttress A	1322	1199	1252
H47BA	Buttress B	1322	1199	1359

*169 wires

See WCR Numbers: WC-1, 3,4,5,6,7,8,9,10,13,14,15,16

TENDON SURVEILLANCE

Table 5

PRELIMINARY

Wolf Creek Generating Station, Unit 1

Tendon Number	End Butts	Initial Force	Actual Lift-Off Force	Average Lift-Off Force	Percent Change Average	Percent of Initial Average
H5	A C	1449.10	1398.52 1391.76	1395.14	3.73	0.962
H11	B C	1453.80	1388.20 1382.76	1385.50	4.70	0.953
H14	A B	1441.20	1306.50 1399.24	1392.90	3.35	0.966
H18	A B	1440.50	1415.80 1425.27	1420.50	1.39	0.986
H35	A B	1433.60	1431.50 1384.88	1408.20	1.77	0.982
H45	A B	1414.90	1434.52 1425.27	1429.90	1.06	1.010
H47	A B	1351.50	1251.50 1358.85	1305.20	3.42	0.965
V1	A B	1486.77	1405.97 1364.80	1385.40	7.44	0.925
V13	A B	1483.87	1482.94 1391.00	1436.97	3.16	0.968
V47	A B	1476.23	1383.00 1494.83	1438.90	2.53	0.975
V65	A B	1501.07	1403.00 1432.27	1417.60	5.56	0.944

Average Horizontal Loss = 0.975

Average Vertical Loss = 0.953

JUSTIFICATION FOR SNUPPS PROPOSAL

A. NONE OF THE "POSSIBLE ABNORMAL DEGRADATIONS" ADDRESSED BY SURVEILLANCE PROGRAM WILL RESULT IN IMMEDIATE DANGER CONTAINMENT INTEGRITY. RATHER, IT PROVIDES AN EARLY WARNING OF CONDITIONS WHICH MAY REQUIRE TIMELY ATTENTION.

1. SYSTEM IS PASSIVE AND SEALED

- * CHANGES IN SYSTEM (IS LOAD LOSS AND/OR CORROSION) ARE BOTH CONTROLLED AND EXTREMELY SLOW.
- * TIMING OF SURVEILLANCES SUFFICIENT TO PROVIDE EARLY WARNING OF DEGRADATION LONG BEFORE IT BECOMES A SAFETY HAZARD.
- * PRESERVATION OF SYSTEM CONFIRMED BY HISTORICAL PERFORMANCE.

2. SUBSTANTIAL SAFETY MARGINS EXIST IN DESIGN EVEN IF LOSSES ARE GREATER THAN EXPECTED (INDICATES NO IMMEDIATE DANGER EXISTS).

- * PRESTRESSING AT END OF 40 YEARS CREATES AN EFFECTIVE COUNTER PRESSURE APPROXIMATELY 1.5 TIMES MAXIMUM ACCIDENT PRESSURE.
- * EVEN GREATER AMOUNTS OF PRESTRESSING EXIST DURING EARLIER LIFE OF PLANT (LOWER LIMIT MAY SUBSTANTIALLY EXCEED REQUIRED PRESTRESSING LEVEL).
- * ULTIMATE CAPACITY OF CONTAINMENT IN EXCESS OF TWICE THE DESIGN PRESSURE.
- * CONTAINMENT PERFORMANCE ESTABLISHED BY A PRESSURE TEST.

3. MONITORING OF PRESTRESS

Monitoring the prestress levels in a containment constitutes the primary source of information from which the containment is evaluated. Each tendon in the sample is subjected to a lift-off test using a calibrated jack to determine the tension. Tendon elongation measurements are also taken to provide verification that no gross errors are made in the tension measurements and to verify tendon integrity. The actual monitoring of the prestress level is composed of several parts: (1) a definition of lift-off; (2) the interpretation of the results and, consequently, the acceptability of the results; (3) measurements of elongation; (4) detensioning; and (5) retensioning. Only the definition of lift-off and the interpretation and acceptability of the results will be considered in this chapter. Retensioning and elongation are considered in Chap. 5.

Excerpt from NUREG-CR-2719.

PROPOSED AMENDMENT

- Action a
 - Remains unchanged - assures present containment integrity, or shutdown
- Action b
 - Replaced by proposed Actions b, c, & d
- Proposed Action b
 - non conforming parameter that does not degrade integrity.
 - Applies to wire & grease condition, retensioning and lift off stresses
 - Provides for 30-day Engineering Evaluation, and 30-day Report to NRC, or shutdown

- Proposed Action c
 - non conforming parameter which may allow future degradation
 - Applies to leaking grease, grease coverage or chemical properties and anchorages and containment surfaces
 - Provides for 90-day Engineering Evaluation, and 30-day Report to NRC
- Proposed Action d
 - Reduces the impact on plant operation consistent with the allowable times in Action a, b and c.
- Surveillance e.1
 - deletes requirement to verify grease void
 - Provides visual exam to assure no widespread grease leakage