Nuclear Operating Company
South Texas Project Electric Generating Station P.O. Box 289 Wadsworth, Texas 77483

August 17, 2023
NOC-AE-23003981
10 CFR 50.55a
STI: 35500333

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

South Texas Project
Units 1 and 2
Docket Nos. STN 50-498 and STN 50-499
Supplement to Proposed Alternate Frequency to Containment Unbonded Post-Tensioning System Inservice Inspection (Relief Request RR-ENG-4-06) (EPID: L-2023-LLR-0004)

References:

1. Letter; C. Georgeson (STP) to Document Control Desk (NRC); "Proposed Alternate Frequency to Containment Unbonded Post-Tensioning System Inservice Inspection (Relief Request RR-ENG-4-06);" February 1, 2023; (NOC-AE-23003940) (ML23032A484).

2. Letter; D. Galvin (NRC) to T. Powell (STP); "South Texas Project, Units 1 and 2 - Supplemental Information Needed for Acceptance of Requested Licensing Action Re: Proposed Alternative to the Requirements of the ASME Code (EPID L-2023-LLR-0004);" March 6, 2023; (AE-NOC-23003363) (ML23061A175).

3. Letter; C. Georgeson (STP) to Document Control Desk (NRC); "Supplement to Proposed Alternate Frequency to Containment Unbonded Post-Tensioning System Inservice Inspection (Relief Request RR-ENG-4-06) (EPID: L-2023-LLR-0004);" March 9, 2023; (NOC-AE-23003947) (ML23068A364).

By Reference 1, STP Nuclear Operating Company (STPNOC) submitted a relief request to propose alternative frequency to the containment unbonded post-tensioning system inservice inspection. Based on discussion with NRC staff and feedback provided in Reference 2, STPNOC provided the revised relief request in Reference 3. An audit plan was proposed by the NRC to gather more information and the following revised relief request was developed. Please replace the Enclosure to Reference 3 in entirety with the Enclosure provided in this submittal. The revised relief request provided in the Enclosure now only requests relief for one 10-year Containment Inservice Inspection (CISI) interval for Units 1 and 2 and includes surveillance result details requested by the NRC.

There are no new commitments in this letter.

If there are any questions regarding this letter, please contact Zachary Dibbern at (361) 972-4336 or me at (361) 972-7806.

C. H. Georgeson Digitally signed by C. H. Georgeson
Date: 2023.08.17 14:24:20 -05'00'
Christopher Georgeson
General Manager, Engineering

Enclosure: Revised Relief Request RR-ENG-4-06, Alternative Frequency to Containment Unbonded Post-Tensioning System Inservice Inspection

cc:
Regional Administrator, Region IV
U.S. Nuclear Regulatory Commission
1600 E. Lamar Boulevard
Arlington, TX 76011-4511

Enclosure

Revised Relief Request RR-ENG-4-06, Alternative Frequency to Containment
Unbonded Post-Tensioning System Inservice Inspection

Revised Relief Request RR-ENG-4-06, Alternative Frequency to Containment Unbonded Post-Tensioning System Inservice Inspection

1. ASME Code Components Affected

Description: Inservice Examination of Concrete Containment Unbonded Post-Tensioning System

Component: Concrete Containments, Units 1 and 2

Code Class: CC

Examination Categories and Code Item Numbers:

Category L-B, Unbonded Post-Tensioning System

Code Item Numbers: L2.10, L2.20, L2.30, L2.40, and L2.50

2. Applicable Code Edition

American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel (BPV) Code, Section XI, Subsection IWL, 2013 edition (Reference 9.1). The 2013 edition is applicable for the fourth 10-year Containment Inservice Inspection Interval (CISI) that began September 9, 2019. (Reference 9.2)

The 2013 code edition is applicable for the current (4th) CISI interval, but it has not yet been used for a surveillance at STP. It will be used for the next surveillances to be performed in 2024. As described in section 6.2, past surveillances were governed by different codes and acceptance criteria. The following table summarizes the codes used for past surveillances.

Unit	Nominal Plant Year	Year Performed	Applicable Code	Remarks
1	1	1988	RG 1.35, April ‘79	
2	1	1989	RG 1.35, April ‘79	
1	3	1990	RG 1.35, April ‘79	
2	3	1992	RG 1.35, April ‘79	
1	5	1992	RG 1.35, April ‘79	
2	5	1993	RG 1.35, April ‘79	
1, 2	10	1998	RG 1.35, April ’79 10 CFR50.55a(b)	“Expedited examination”, per 10 CFR50.55a, as modified by 61 FR 41303 (Aug. 8, 1996)
1, 2	15	2004	ASME, IWL-1992	
1, 2	20	2009	ASME, IWL-1992	
1, 2	25	2014	ASME, IWL-2004	
1, 2	30	2018	ASME, IWL-2004	

Some acceptance criteria, wire and grease, are tied to the design specifications, which implemented the design code of record. The STP design code of record for the containment building is listed in Updated Final Safety Analysis Report (UFSAR) 3.8.1.2.1. It is ACI-ASME 359, 1973 proposed edition.

3. Applicable Code Requirements

3.1 IWL-2420 UNBONDED POST-TENSIONING SYSTEMS

(a) *Unbonded post-tensioning systems shall be examined in accordance with IWL-2520 at 1, 3, and 5 years following the completion of the containment Structural Integrity Test and every 5 years thereafter.*

3.2 IWL-2421 Sites With Multiple Plants

(a) *For sites with multiple plants, the requirements of IWL-2420 may be modified if the containments utilize the same prestressing system and are essentially identical in design, if post-tensioning operations for each subsequent containment constructed at the site were completed not more than 2 years apart, and if the containments are similarly exposed to or protected from the outside environment.*

(b) *When the conditions of (a) are met, the inspection dates and examination requirements may be as follows.*

(1) For the containment with the first Structural Integrity Test, all examinations required by IWL-2520 shall be performed at 1, 3, and 10 years, and every 10 years thereafter. In addition, the examinations required by IWL-2524 and IWL-2525 shall be performed at 5 and 15 years and every 10 years thereafter.

(2) For each subsequent containment constructed at the site, all examinations required by IWL-2520 shall be performed at 1, 5, and 15 years, and every 10 years thereafter. In addition, the examinations required by IWL-2524 and IWL-2525 shall be performed at 3 and 10 years and every 10 years thereafter.

STP completed the 30th year surveillance in 2018. The next scheduled surveillance is the 35th year surveillance. IWL-2421(b)(1) is applicable to Unit 1. IWL-2421(b)(2) is applicable to Unit 2. The next surveillance was due July 29, 2023 in Unit 1 and September 30, 2023 in Unit 2. These nominal dates will be extended up to 1 year per IWL-2420(c), which makes the latest acceptable due dates July 29, 2024 in Unit 1 and September 30, 2024 in Unit 2.

The applicable requirements of IWL-2520 are paraphrased and summarized below.

IWL-2520 Examination of Unbonded Post-Tensioning Systems

- IWL-2521 requires random selection of tendons for surveillance.
- IWL-2522 requires tendon force measurements in selected tendons.
- IWL-2523 requires detensioning of one tendon per group, followed by removal and destructive examination of a single wire prior to retensioning. The removed wire is not replaced.
- IWL-2524 requires examination of anchorages of selected tendons. This requires removal of the end cap.
- IWL-2525 requires laboratory analysis of samples of the corrosion protection medium (grease) taken from each end of each examined tendon.
- IWL-2526 requires replacement of corrosion protection medium and measurement of difference in quantity between removal and replacement to identify potential voids in the duct.

Use of IWL-2421(b) means that the requirements of IWL-2522 (tendon force measurement) and IWL-2523 (detension, wire removal and examination) are applied in alternating units at 5-year intervals (i.e. 10-year intervals between force measurements in a single unit) and all other surveillance requirements are performed in both units at each 5-year surveillance. In subsequent discussion, the unit in which all surveillance requirements are applied is described as “full surveillance” and the unit in which all except IWL-2522 and IWL-2523 are applied is described as “partial surveillance”.

4. Reason for Request

The currently required surveillance presents potential risk of injury to plant personnel and exposes the plant to potential physical damage without sufficient benefit in safety or quality to offset the costs and risks. Potential risks and hazards associated with surveillance are discussed further in Section 6.7. Past surveillance results in years 1, 3, 5, 10, 15, 20, 25, and 30 confirm that the STP post-tensioning system is in excellent condition in both units. The system is performing as designed and trending toward acceptable level of prestress force through 100 years, well beyond the Period of Extended Operation. Therefore, it is appropriate to implement an alternative surveillance schedule that reduces the number of tendon surveillances while maintaining an acceptable level of quality and safety, as allowed by 10 CFR 50.55a(z)(1).

5. Proposed Alternative Surveillance

5.1. The following is proposed as an alternative to IWL-2421(b), with the underlined portions marking the revised Code text:

(1) For Unit 1, all examinations required by IWL-2520 shall be performed at 1, 3, and 10 years, and every 10 years thereafter. In addition, the examinations required by IWL-2524 and IWL-2525 shall be performed at 5, 15, 25, and 40 years and every 10 years thereafter.

(2) For Unit 2, all examinations required by IWL-2520 shall be performed at 1, 5, 15, 25, and 40 years, and every 10 years thereafter. In addition, the examinations required by IWL-2524 and IWL-2525 shall be performed at 3 and 10 years and every 10 years thereafter.

The current surveillance schedule requires surveillance every 5 years, with the two units staggered such that full surveillance is performed in one unit and partial surveillance (exempting IWL-2522 and 2523) is performed in the other unit. The proposed alternative will have the effect of eliminating the IWL-2520 35th year surveillances in both units, and thereafter performing full surveillance in both units every 10 years, beginning at the 40th year. The eliminated 35th year surveillances would be a partial surveillance in Unit 1 and a full surveillance in Unit 2. This relief request will only cover through year 40. Implementation of this plan in years 45 and beyond will require additional relief requests after the 40th year.

In summary, if the NRC approves this proposed alternative for one interval, the future surveillance schedule for the duration of the 4th CISI interval will change from the current schedule to the alternative schedule shown below.

	Current Schedule		Alternative Schedule	
Year	Unit 1	Unit 2	Unit 1	Unit 2
35	P	F	C	C
40	F	P	F	F

F = Full surveillance, P = Partial Surveillance, C = Concrete only (visual)

6. Basis for Conclusion that Proposed Alternative has Acceptable Level of Quality and Safety

6.1 STP Design

STP has 2 PWR units, each having a prestressed concrete containment. The 2 containments are essentially identical and located 600 feet apart. Each containment has the following design parameters:

- Inside radius = 75 feet
- Cylinder walls are 4 feet thick
- Hemispherical dome thickness is 3 feet
- Basemat thickness is 18 feet
- Inside surface (cylinder, dome and basemat) is lined with 3/8-inch carbon steel plate
- Inside height (top of basemat to top of dome) = 241 feet
- There are 3 buttresses, 120 degrees apart
- Each tendon is offset 120 degrees from the adjacent one below, such that every 3rd hoop tendon is anchored in the same buttress.
- Hoop tendons cover the full circumference, starting and ending in the same buttress
- There are 133 hoop tendons (108 in the cylinder wall and 25 in the dome)
- There are 96 Inverted-U tendons that are anchored in a tendon gallery underneath the basemat.
- Each tendon has 186 wires, each 1/4-inch diameter
- Steel wires are ASTM A421-77, type BA
- Wires have Guaranteed Ultimate Tensile Strength (GUTS) = 240 ksi
- Minimum installation prestress force was specified as 70% of GUTS, or 168 ksi

The applicable design requirements include the following:

- Rated pressure capacity, P = 56.5 psig
- One-time Structural Integrity Test performed at 1.15 x P = 65 psig
- Minimum prestress force = 20% greater than required to offset internal pressure
- Design provides 1% additional steel wires to compensate for potential wire breakage

6.2 Regulatory History

Initially, Regulatory Guide (RG) 1.35 Proposed Revision 3, was applicable to STP. The surveillances conducted in years 1, 3, 5, and 10 implemented the requirements of RG 1.35. Per the requirements of the Regulatory Guide, the surveillance schedule was based on years following the Structural Integrity Test. The Unit 1 Structural Integrity Test was completed in March 1987 and the Unit 2 Structural Integrity Test was completed in September 1988. In 1996, the NRC mandated a transition to ASME BPV Code, Section XI, Subsection IWL. (See 61 FR 41303, August 8, 1996.)

The transition mandate included a requirement to perform an “expedited surveillance”, which would be used thereafter (instead of Structural Integrity Test dates) to establish surveillance dates. STP performed the “expedited surveillance” coincident with the scheduled 10th year surveillances in 1998. The completion dates of the expedited surveillances, which thereafter define the due dates for subsequent surveillances, are July 29, 1998 in Unit 1 and September 30, 1998 in Unit 2.

Information Notice (IN) 99-10, “Degradation of Prestressing Tendon Systems in Prestressed Concrete Containments” discussed and highlighted several problems seen throughout the industry. Multiple plants observed liftoff forces that were significantly below predicted values. Also, the variety of methods used by plants to calculate force trends did not meet NRC expectations. The IN clarified the NRC’s position regarding the proper method to be used to calculate tendon force trends.

RG 1.35 was withdrawn in 2015 (80 FR 52067, August 27, 2015).

STP performed the 15th and 20th year surveillances using the 1992 edition of subsection IWL. During review of the License Renewal Application, STP committed to change to the 2004 edition. (See License Renewal Commitment 22, UFSAR Table 19A.4-1.) The Commitment was implemented, and the 2004 edition was used during the 25th and 30th year surveillances.

6.3 Prior STPNOC Relief Request

STPNOC submitted a Relief Request in 2001, seeking an extension (doubling) of surveillance intervals specified in IWL-2421(b). The submittal (Reference 9.3) was revised and resubmitted in 2002 (Reference 9.4). The submittals made use of surveillance data through the 10th-year surveillances completed in 1998. STP made a presentation to the NRC in April 2003 to discuss the revised submittal (Reference 9.14).

During and following the presentation, the NRC provided the following feedback to STP.

- STP had only 10 years of surveillance data, but 10 years of data was not sufficient to establish a trend of excellent performance. The NRC pointed out that Calvert Cliffs (mentioned prominently in IN 99-10) discovered major problems during their 20th year surveillance after having acceptable surveillance results through 10 years.

- The NRC had recently seen a trend of poor performance throughout the industry, as summarized in IN 99-10.

Based on this feedback, STP withdrew the Relief Request (Reference 9.5).

6.4 Significant Developments Since 2003

This Relief Request is substantially similar to the one STP submitted in 2001 and withdrew in 2003. Therefore, it is appropriate to review and consider new information that wasn't available in 2003:

- STP has surveillance data from surveillances conducted at years 15, 20, 25, and 30. The surveillance results confirm the ongoing excellent performance of the post-tensioning system in both units. These results should address the NRC's previous feedback that 10 years of data was insufficient.

- Industry performance has improved in this area and the NRC has approved similar relief requests at multiple other plants, e.g. Three Mile Island (2019), Vogtle (2019), Millstone (2020), Byron and Braidwood (2021), and Palo Verde (2022).

- STP submitted a license renewal application (LRA) in 2010 (Reference 9.6). During the extensive review, the NRC specifically reviewed the post-tensioning system, which is described in Section 4.5 of the LRA, Revision C. The LRA submittal was based on 20th year surveillance data. STP received seven Requests for Additional Information (RAI) focused specifically on the post-tensioning system. As documented in Sections 3.0.3.1.8, 3.0.3.2.23, and 4.5 of the Safety Evaluation Report (SER) that accompanied approval of the license extension, the NRC concurred with STP's conclusion that the prestress force trends were projected to be acceptable for the duration of the Period of Extended Operation. Additionally, STP has data that shows a favorable trend that goes beyond 60 years.

6.5 Surveillance Results (Years 1 – 30)

Anchorage Inspections

Indications such as minor cracking and "level" 2 corrosion of shims that met the Code acceptance criteria have been documented (Reference 9.16 – 9.28). The only findings in either Unit that required further evaluation were occasional missing, malformed, or protruding buttonheads. The acceptance criteria for broken wires is stated in UFSAR 3.8.1.4.2.3. The design includes 1% surplus steel to account for breakage. The acceptance limit is 1% breakage in any three adjacent tendons. Since there are 186 wires per tendon, this means a maximum of five broken wires in any three adjacent tendons.

A few ineffective wires have been identified during surveillances, but no evidence of any ongoing degradation mechanism has been identified other than degradation due to the performance of the surveillances. During each surveillance, two wires (one in a hoop tendon and one in an inverted-U tendon) are removed, visually examined, cut into pieces, and tested. Those wires are not replaced.

Unit 1 has 23 ineffective wires, 14 of which were identified during construction. Among the nine that have been identified as ineffective after construction, eight were deliberately destroyed during the surveillances. The 9th wire was damaged by unknown means during the 1st year surveillance. This wire was found intact at the start of the surveillance, but it was observed to be ineffective following detensioning, wire removal and retensioning.

Unit 2 has 38 ineffective wires, 23 of which were identified during construction. Among the 15 that have been identified as ineffective after construction, eight were deliberately destroyed during surveillance and another four were inadvertently damaged during surveillances (years 15 and 25). There are only three unexplained wire failures that were found during surveillances, one each at years 10, 15, and 20.

In summary, 24 wires have become ineffective after the construction era. Most of them (21 of the total 24; 9 of 9 in Unit 1 and 12 of 15 in Unit 2) were damaged during surveillance, either deliberately or inadvertently. Therefore, performance of surveillance is the primary "degradation mechanism" that has been observed for wires.

Concrete Visual Examinations

IWL 2310(a) requires a general concrete visual examination of concrete surfaces to identify areas of deterioration that require further examination or evaluation. IWL 2310(b) requires detailed visual examinations of any areas of deterioration identified in the general visual examination. At each surveillance in STP history, the general examination supported the conclusion that no detailed examinations were required. Therefore, the detailed examinations specified in IWL-2310(b) have never been performed at STP.

Corrosion Protection Medium (CPM)

The chemical requirements are stated in the design code of record (ACI-ASME 359), Section CC-2442.3.2. Paragraph (c) says, "Each batch of coating material shall be analyzed for the presence of water-soluble chlorides, nitrates, and sulfides. The analysis shall conform to the limits shown in Table CC-2440-1". Those limits are 10 parts per million (ppm) for each of the three chemical types listed. The surveillance acceptance limits given in Table IWL-2525-1 are the same (10 ppm). Table IWL-2525-1 gives two additional limits that are not in the design code, namely water content less than 10% and reserve alkalinity (base number) at least 50% of as-installed value. Those acceptance limits have been met during every surveillance in both Units.

Grease volume discrepancies were identified multiple times during the first 10 years, when the acceptance limit was 5% Net Duct Volume (NDV). See References 9.7 through 9.12. Since switching to IWL at the 15th year and using an acceptance limit of 10% NDV, the limit has been met every time except once (see Reference 9.13). Each time the limit wasn't met, the condition was evaluated and accepted, as documented in References 9.7 - 9.13.

Liftoff Force Testing

The License Renewal Application (LRA), Section 4.5, includes surveillance results through the 20th year. Liftoff testing was performed in Unit 1 during the 20th year surveillance. The most recent liftoff data used in Unit 2 was from the 15th year. Since then, the 25th year surveillance included liftoff testing in Unit 2 and the 30th year surveillance included liftoff testing in Unit 1. The methodology used to perform regression analysis is described in detail in Reference 9.29, pages 4-8, under the section heading "Calculations Method".

The following pages show the trend line figures included in the LRA next to the corresponding updated figure using the most recent data. For each group of tendons, a comparison of the LRA figure to the updated figure shows very little change in trend.

For the inverted-U tendons, the trend line forecast value at year 60 declined by about 1% compared to the trends shown in the LRA figures, while the 60-year forecast for hoop

tendons increased by about the same amount. All trend lines shown used the same calculation method. On each page the bottom plot uses the most recent data (30th year surveillance in Unit 1, 25th year surveillance in Unit 2) and the top plot shows the trends computed during the prior liftoff testing (20th year data in Unit 1, 15th year data in Unit 2).

There are two noteworthy differences in the plots: 1) The older (top) ones are plotted on a semi-log scale and the newer (bottom) plots are plotted on linear scales; and 2) the older (top) plots for hoop tendons include both dome and cylinder tendons together, but the newer plots (bottom) are based on cylinder hoop tendons only. Overall, the figures show stable trends. In all cases, the trend line is substantially above the Minimum Required Value (MRV) for the entire Period of Extended Operation (through 60 years) and beyond.

Liftoff Force Regression Analysis for Unit 1 Hoop Tendons

Figure 6.5.1 is Fig. 4.5-2 in LRA, Revision C. It used data through year 20. Figure 6.5.2 is an updated version that includes 30th year surveillance data. The figures are not directly comparable because the top figure uses a semi-log plot. In Figure 6.5.1, the forecast value at year 60 is 1275 kips. In Figure 6.5.2, the forecast at year 60 has increased slightly to 1283 k, which remains above the minimum required value (1169 k). The trend is essentially stable.

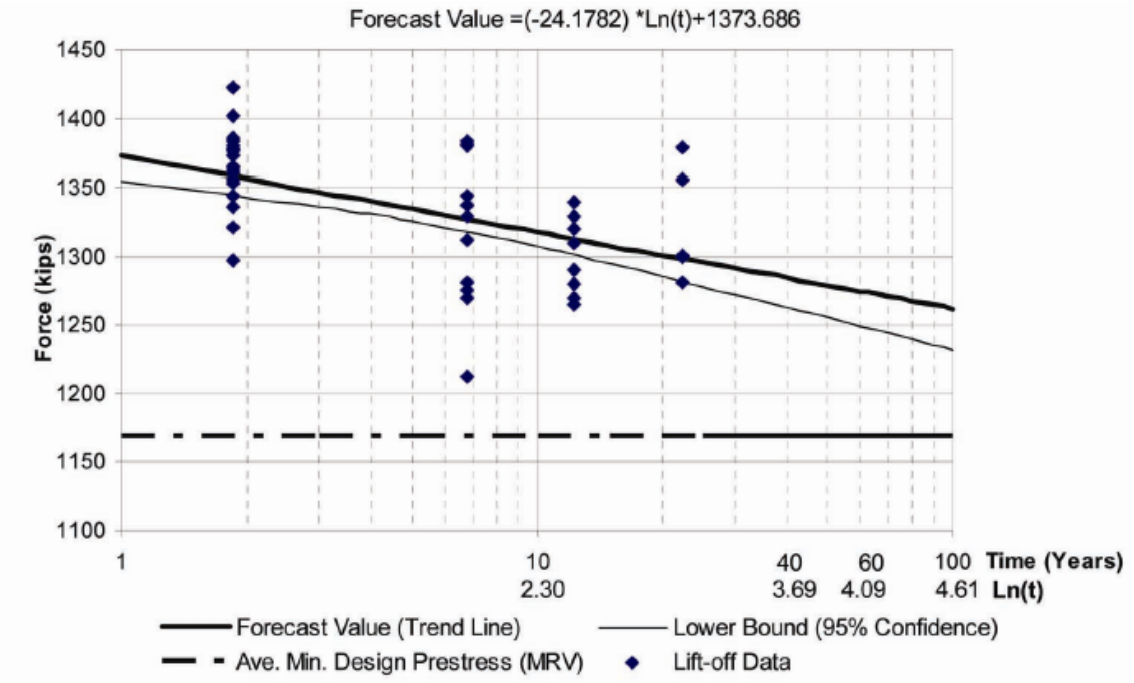

Figure 6.5.1

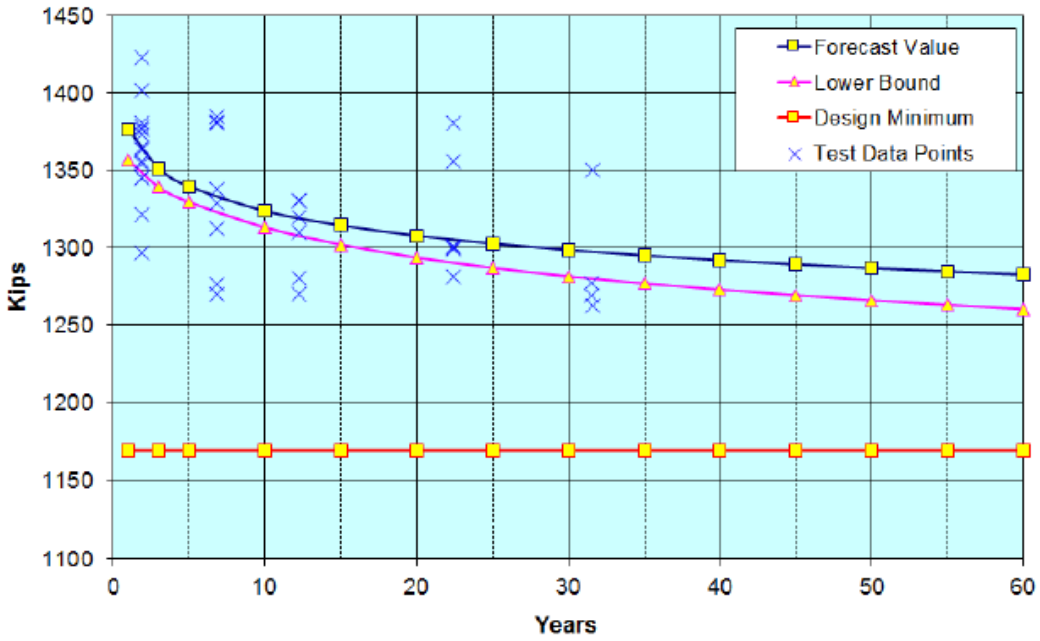

Figure 6.5.2

Liftoff Force Regression Analysis for Unit 2 Hoop Tendons

Figure 6.5.3 is Fig. 4.5-4 in LRA, Revision C. It used data through year 15. Figure 6.5.4 is an updated version that includes 25th year surveillance data. The figures are not directly comparable because the top figure uses a semi-log plot. In Figure 6.5.3, the forecast value at year 60 is 1273 kips. In Figure 6.5.4, the forecast at year 60 has increased slightly to 1283 k (MRV = 1169 k). The trend is essentially stable.

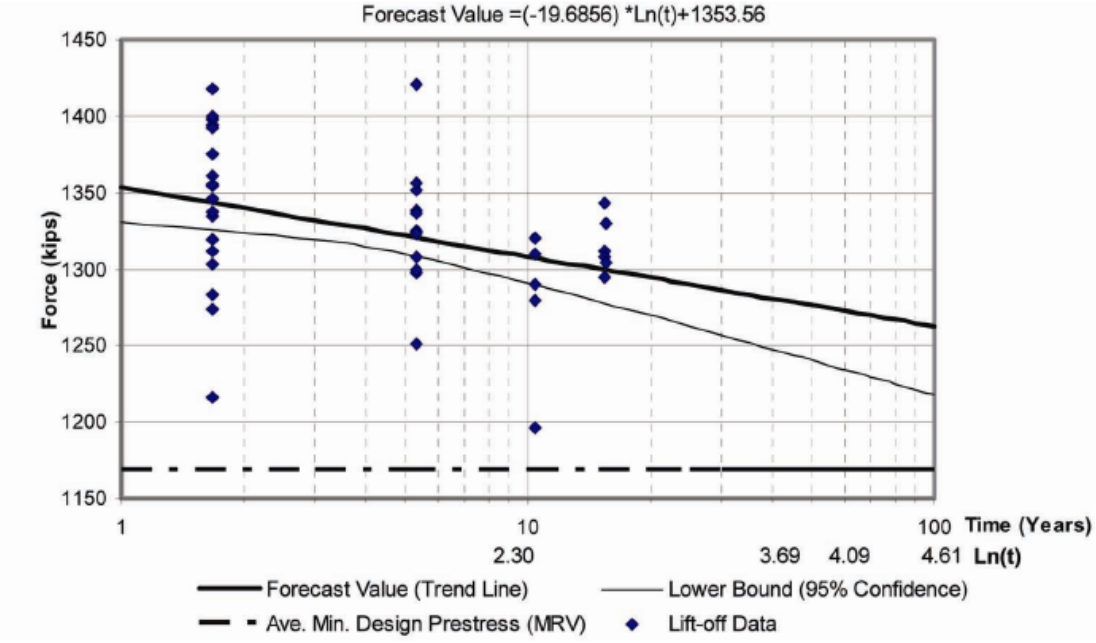

Figure 6.5.3

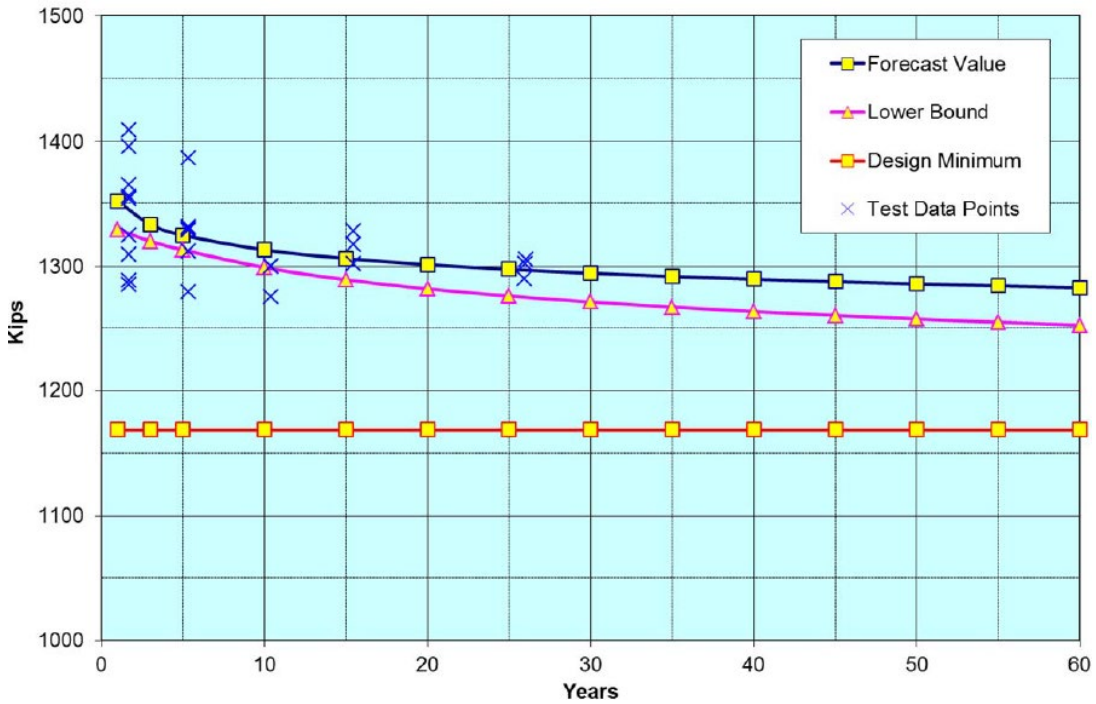

Figure 6.5.4

Liftoff Force Regression Analysis for Unit 1 Inverted-U Tendons

Figure 6.5.5 is Fig. 4.5-2 in LRA, Revision C. It used data through year 20. Figure 6.5.6 is an updated version that includes 30th year surveillance data. The figures are not directly comparable because the top figure uses a semi-log plot. In Figure 6.5.5, the forecast value at year 60 is 1349 kips. In Figure 6.5.6, the forecast at year 60 has declined roughly 1% to 1334 k, but still far above the minimum required value (1150 k). The trend is essentially stable.

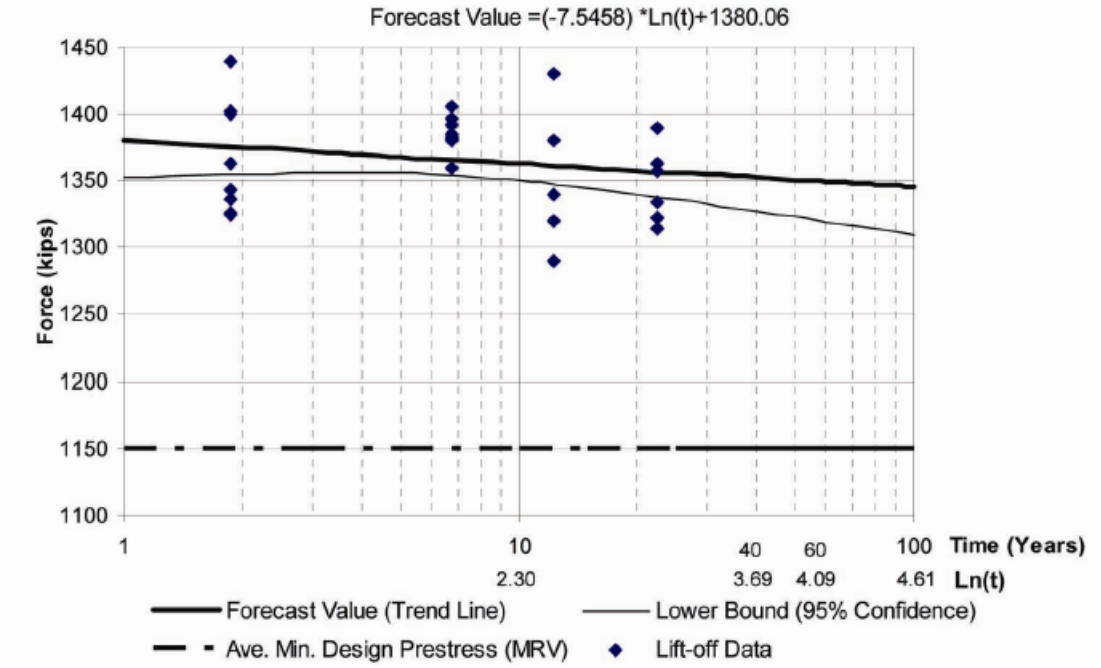

Figure 6.5.5

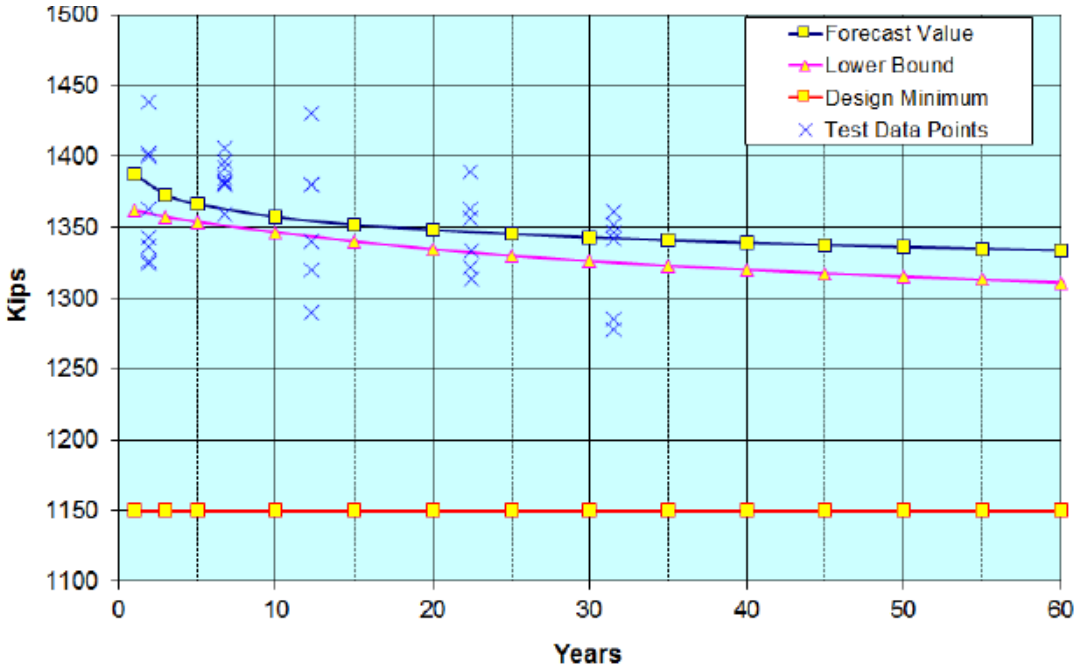

Figure 6.5.6

Liftoff Force Regression Analysis for Unit 2 Inverted-U Tendons

Figure 6.5.7 is Fig. 4.5-4 in LRA, Revision C. It used data through year 15. Figure 6.5.8 is an updated version that includes 25th year surveillance data. The figures are not directly comparable because the top figure uses a semi-log plot. In Figure 6.5.7, the forecast value at year 60 is 1366 kips. In Figure 6.5.8, the forecast at year 60 has declined very slightly to 1362 k, but it is still far above the minimum required value (1150 k). The trend is essentially stable.

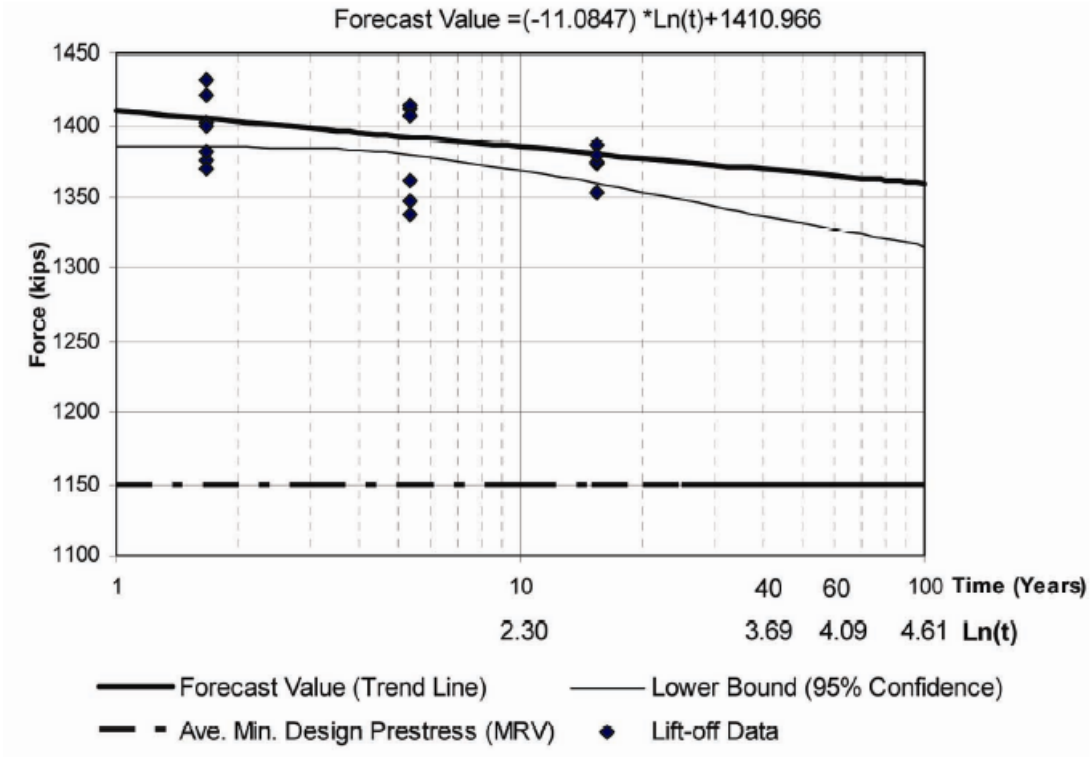

Figure 6.5.7

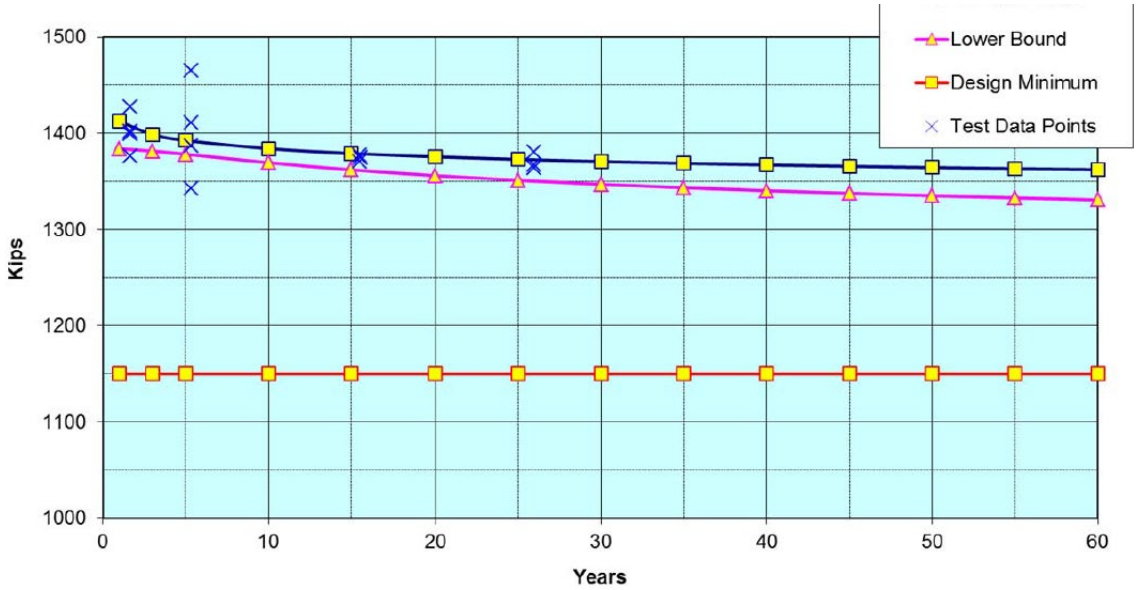

Figure 6.5.8

Liftoff Force History

The following tables summarizes all liftoff testing at STP.

Unit 1 Vertical (Inverted U) Tendons						
Nominal Year	Tendon	End	Tendon Forces (Kips)			
			Installed	Predicted	95% of Predicted	Measured
1	V126	Shop	1598	1376	1307	1402
		Field	1621	1391	1321	1439
1	V144	Shop	1642	1401	1331	1400
		Field	1567	1352	1284	1343
1	V227	Shop	1553	1345	1278	1336
		Field	1556	1346	1279	1325
1	V245	Shop	1591	1366	1298	1363
		Field	1565	1349	1282	1326
5	V126	Shop	1598	1350	1283	1385
		Field	1621	1370	1302	1406
5	V214	Shop	1598	1358	1290	1380
		Field	1631	1378	1309	1392
5	V242	Shop	1603	1363	1295	1381
		Field	1608	1367	1299	1397
5	V248	Shop	1603	1354	1286	1359
		Field	1608	1359	1291	1382
10	V126	Shop	1598	1348	1281	1340
		Field	1621	1362	1294	1380
10	V129	Shop	1533	1286	1221	1290
		Field	1609	1333	1267	1320
10	V230	Shop	1638	1379	1310	1380
		Field	1596	1354	1287	1430
20	V126	Shop	1598	1338	1271	1363
		Field	1621	1351	1283	1389
20	V111	Shop	1557	1295	1230	1334
		Field	1577	1307	1242	1313
20	V133	Shop	1631	1341	1274	1356
		Field	1579	1309	1244	1322
30	V126	Shop	1598	1332	1265	1347
		Field	1621	1345	1278	1361
30	V137	Shop	1558	1291	1226	1286
		Field	1567	1296	1231	1278
30	V222	Shop	1622	1354	1286	1342
		Field	1582	1331	1264	1352

Unit 2 Vertical (Inverted U) Tendons						
Nominal Year	Tendon	End	Tendon Forces (Kips)			
			Installed	Predicted	95% of Predicted	Measured
1	V110	Shop	1605	1380	1311	1421
		Field	1605	1380	1311	1377
1	V120	Shop	1580	1359	1291	1403
		Field	1630	1402	1332	1400
1	V202	Shop	1630	1402	1332	1432
		Field	1640	1410	1340	1422
1	V236	Shop	1605	1396	1326	1382
		Field	1520	1338	1271	1370
5	V110	Shop	1605	1348	1281	1412
		Field	1605	1348	1281	1362
5	V203	Shop	1610	1360	1292	1415
		Field	1620	1361	1293	1407
5	V221	Shop	1580	1351	1283	1479
		Field	1630	1394	1324	1452
5	V233	Shop	1580	1343	1276	1348
		Field	1540	1309	1244	1338
15	V110	Shop	1605	1338	1271	1387
		Field	1605	1338	1271	1354
15	V148	Shop	1640	1359	1291	1374
		Field	1640	1359	1291	1375
15	V240	Shop	1605	1348	1280	1375
		Field	1605	1348	1280	1380
25	V110	Shop	1605	1331	1264	1373
		Field	1605	1331	1264	1361
25	V118	Shop	1590	1325	1259	1359
		Field	1620	1343	1276	1368
25	V144	Shop	1585	1318	1252	1359
		Field	1640	1350	1283	1402

Unit 1 Hoop Tendons						
Nominal Year	Tendon	End	Tendon Forces (Kips)			
			Installed	Predicted	95% of Predicted	Measured
1	1H091	Shop	1550	1326	1260	1380
		Field	1612	1367	1299	1378
1	1H106	Shop	1579	1302	1237	1345
		Field	1607	1321	1255	1354
1	1H130	Shop	1638	1368	1300	1383
		Field	1582	1331	1264	1360
1	2H051	Shop	1539	1259	1196	1297
		Field	1643	1329	1263	1321
1	2H054	Shop	1582	1335	1268	1376
		Field	1589	1340	1273	1363
1	2H078	Shop	1643	1376	1307	1423
		Field	1632	1369	1301	1373
1	2H111	Shop	1607	1338	1271	1386
		Field	1577	1318	1252	1336
1	3H005	Shop	1579	1315	1249	1402
		Field	1562	1304	1239	1356
1	3H032	Shop	1545	1285	1221	1345
		Field	1632	1343	1276	1365
5	1H091	Shop	1550	1310	1245	1312
		Field	1612	1386	1317	1329
5	1H112	Shop	1579	1318	1252	1281
		Field	1542	1280	1216	1270
5	2H036	Shop	1637	1359	1291	1384
		Field	1644	1364	1296	1381
5	2H048	Shop	1643	1364	1296	1380
		Field	1620	1345	1278	1338
5	2H093	Shop	1607	1294	1229	1276
		Field	1589	1302	1237	1270
5	**2H129**	Shop	1558	1293	1228	1345
		Field	**1553**	**1289**	**1225**	**1213**
10	1H091	Shop	1550	1303	1238	1310
		Field	1612	1341	1274	1280
10	1H043	Shop	1634	1356	1288	1330
		Field	1553	1306	1241	1320
10	1H049	Shop	1610	1325	1259	1270
		Field	1567	1298	1233	1330
10	1H127	Shop	1610	1356	1288	1340
		Field	1542	1314	1248	1310
10	1H130	Shop	1638	1345	1277	1330
		Field	1582	1310	1245	1290
10	2H129	Shop	1558	1287	1223	1320
		Field	1553	1284	1220	1265
20	1H091	Shop	1550	1293	1228	1301
		Field	1612	1330	1263	1300
20	1H031	Shop	1634	1345	1277	1356
		Field	1642	1349	1282	1381
20	2H063	Shop	1631	1290	1225	1299
		Field	1624	1286	1221	1280
30	1H091	Shop	1550	1287	1223	1269
		Field	1612	1323	1257	1277
30	2H114	Shop	1643	1354	1286	1346
		Field	1560	1306	1241	1293
30	3H023	Shop	1579	1287	1223	1350
		Field	1550	1270	1207	1262

Unit 2 Hoop Tendons						
Nominal Year	Tendon	End	Tendon Forces (Kips)			
			Installed	Predicted	95% of Predicted	Measured
1	2H075	Shop	1600	1344	1277	1394
		Field	1600	1344	1277	1398
1	1H094	Shop	1535	1289	1225	1283
		Field	1620	1345	1278	1335
1	1H112	Shop	1535	1305	1240	1274
		Field	1580	1343	1276	1303
1	1H124	Shop	1580	1343	1276	1312
		Field	1580	1343	1276	1337
1	**2H033**	**Shop**	**1520**	**1292**	**1227**	**1216**
		Field	1550	1302	1237	1354
1	2H105	Shop	1540	1309	1244	1418
		Field	1580	1327	1261	1400
1	3H005	Shop	1580	1296	1231	1355
		Field	1550	1271	1207	1375
1	3H029	Shop	1585	1300	1235	1392
		Field	1550	1271	1207	1319
1	3H056	Shop	1570	1319	1253	1361
		Field	1580	1311	1245	1346
5	2H075	Shop	1600	1320	1254	1324
		Field	1600	1320	1254	1338
5	1H055	Shop	1550	1310	1244	1325
		Field	1540	1301	1236	1298
5	1H106	Shop	1580	1304	1239	1308
		Field	1570	1295	1230	1251
5	2H018	Shop	1540	1301	1236	1421
		Field	1620	1353	1285	1352
5	2H045	Shop	1540	1278	1214	1356
		Field	1570	1295	1230	1300
5	3H050	Shop	1610	1312	1246	1336
		Field	1630	1337	1270	1323
10	2H030	Shop	1550	1299	1234	1280
		Field	1570	1312	1246	1320
10	2H033	Shop	1520	1258	1195	1196
		Field	1550	1277	1213	1280
10	2H036	Shop	1600	1330	1263	1290
		Field	1570	1311	1245	1310
15	2H075	Shop	1600	1305	1240	1312
		Field	1600	1305	1240	1343
15	3H008	Shop	1610	1303	1238	1304
		Field	1630	1315	1250	1330
15	2H078	Shop	1620	1332	1265	1295
		Field	1600	1320	1254	1308
25	2H075	Shop	1600	1298	1233	1283
		Field	1600	1298	1233	1297
25	1H121	Shop	1540	1292	1227	1313
		Field	1570	1310	1245	1297
25	2H126	Shop	1580	1317	1251	1319
		Field	1540	1293	1228	1285

All but two liftoff tests met the acceptance criteria (measured force at least 95% of predicted force). Those two were hoop tendons 2H033 (1st year, Unit 2) and 2H129 (5th year, Unit 1). They were reported and explained to the NRC in Reference 9.30, and then discussed again in Reference 9.31 (RAI B3.3-2, item 3).

Wire Test Results

At each "full surveillance", two tendons are detensioned (one hoop tendon and one vertical, "inverted U" tendon). One wire is removed from each (2 wires total each surveillance), examined full length, and then cut into pieces for laboratory testing. Ultimate strength and strain (percent elongation) are recorded.

The acceptance criteria is stated in IWL-3221.2(b) as "not less than minimum specified values". The specified values are in the design specification, not the Code. For STP, wires are ASTM A421, type BA. The acceptance limits are 240 ksi minimum tensile strength and 4% minimum elongation. The following table summarizes results from surveillances performed under IWL (plant years 15, 20, 25 and 30).

Summary of Wire Test Results					
Year	**Unit 1**		**Unit 2**		**Source**
	Min. Strength	**Min. Elongation**	**Min. Strength**	**Min. Elongation**	
1	249 ksi	5.6%*	243.4 ksi	4.3%	Ref. 9.16, Table 6 Ref. 9.17, Table 6
5	251.5 ksi	7.8%	246.4 ksi	8.1%	Ref. 9.20, Table 6 Ref. 9.21, Table 6
10	243.3 ksi	5.5%			Ref. 9.22, Table 6
15			260.0 ksi	4.5%	Ref. 9.24, Table IX
20	269.3 ksi	4.6%			Ref. 9.25, Table 8-1
25			250.1 ksi	5.9%	Ref. 9.27, Table 8-1
30	248.1 ksi	5.6%			Ref. 9.28, section 8.5

*As described in Step 5.5.2 of Reference 9.16, two anomalous results (3.1% and 3.9% elongation at failure) were invalidated and the tests were repeated using backup specimens. Reported result (5.6% minimum elongation) was obtained from the backup specimens.

All strength measurements exceeded the specified minimum (240 ksi). Except as noted above, all elongation measurements exceeded the specified minimum (4%). There is no detectable declining trend for either strength or elongation.

Summary of Results

The following tables summarize all anomalous results identified in summary sections of surveillance reports. Many of these met acceptance limits and did not require further evaluation or inspection.

Summary of Unit 1 Surveillance Findings		
Year	**Findings**	**Evaluation/Resolution**
1	• Vertical tendon V245 had 2 tablespoons of free water.*[Ref. 9.16, section 5.3.2]*	• This condition was identified prior to the surveillance. Corrective actions included three separate examinations of this tendon. The examination during the surveillance continued and confirmed a declining trend with less water found during each observation. The conclusion was that the water was trapped during construction and NOT an ongoing leak.
	• Level 2 corrosion observed on shims associated with tendon 1H091. *[Ref. 9.16, section 5.2.2]*	• Level 2 means discoloration with no pitting. Observed on shim stack only. No further evaluation or corrective action.
	• One wire not seated when tendon 2H078 was retensioned. *[Ref. 9.16, section 5.5.3]*	• Acceptable because it met 1% breakage allowance.
3	• All 10 surveillance tendons had grease voids > 5% NDV.*[Ref. 9.7.]*	• This condition was reported to the NRC and evaluated as acceptable.
	• Damaged gasket observed on grease can associated with tendon V248.*[Ref. 9.18, Section 5.5.3]*	• Since only minimal leakage was observed, the only corrective action was to re-examine this tendon at the next scheduled surveillance (5th year).
5	• Damaged threads observed on seven tendons in buttress 3, including two selected for random liftoff testing. *[Ref. 9.20, section 5.2.2]*	• All judged to be damaged during installation, not degradation. Tendons were evaluated as unfit for liftoff testing, but fully functional. Substitute tendons were selected for liftoff testing.
	• Six tendons have grease voids > 5% NDV. *[Ref. 9.20, section 4.7]*	• This condition was reported to the NRC and evaluated as acceptable. See Ref. 9.8.
	• One tendon was observed to have a deformed anchor head (tendon 2H129).*[Ref. 9.20, section 5.2.2]*	• Evaluated as effective and most likely damaged during initial installation.
	• Surface damage (0.006” max) seen at three locations on the wire removed from tendon 2V242.*[Ref. 9.20, Section 6.1]*	• No evidence of corrosion. Linear indications aligned with wire axis judged to be fabrication (drawing) damage.

Summary of Unit 1 Surveillance Findings (cont'd)		
Year	**Findings**	**Evaluation/Resolution**
5	• Tendon 2H129field end liftoff force was 94.1% of predicted, which was below acceptance limit of 95% of predicted. *[LER 98-001, Ref. 9.30]*	• This condition was not identified until the 10th year surveillance. This tendon and 2 adjacent tendons were all tested during 10th year surveillance and all met the acceptance limit. The evaluation and corrective actions were described to the NRC in LER 98-001.
10	• Four horiz. tendons had grease voids > 5% NDV. *[Ref. 9.22, Section 4.7]* • Following retensioning of tendon 1H049, one wire observed protruding about 1/8" (not reseated). *[Ref. 9.22, Section 5.6.2]* • Damaged thread observed on tendon V230 anchor head. *[Ref. 9.22, Section 7.2]*	• This condition was reported to the NRC and evaluated as acceptable. See Reference 9.9. • Wire not broken. Tendon considered effective because it was successfully retensioned. • Repaired by chasing thread.
15	No issues identified in U1 (level 2 anchorage corrosion documented, but met acceptance limit) *[Ref. 9.24]*	• Level 2 is discoloration without pitting.
20	No new issues identified. *[Ref. 9.25]*	
25	No new issues identified. *[Ref. 9.27]*	
30	No new issues identified *[Ref. 9.28]*	

Summary of Unit 2 Surveillance Findings		
Year	**Findings**	**Evaluation/Resolution**
1	• Tendon 2H033 shop end liftoff force was 94.1% of predicted, which was below acceptance limit of 95% of predicted.*[LER 98-001, Ref. 9.30]*	• This condition was not identified until the 10th year surveillance. This tendon and 2 adjacent tendons were all tested during 10th year surveillance and all met the acceptance limit. The evaluation and corrective actions were described to the NRC in LER 98-001.
	• The detensioned/retensioned vertical tendon V202 had elongation 8.6% greater than original installation. Acceptance limit was 5% at the time.*[Ref. 9.17, section 5.6.2]*	• This nonconformance was evaluated and determined to be acceptable following additional inspection of both ends following retensioning.*(Note that current acceptance limit is 10% in 2013 IWL-3221.1(d). This would not be an NCR today.)*
	• All 13 surveillance tendons had replacement grease volume exceed 5% volume limit (5.6% to 15.6% with an average of 11.6%).*[Ref 9.17, section 4.7]*	• This condition was not reported to the NRC because the plant was in Mode 5 at time of discovery. The condition was evaluated as acceptable for the same reasons as similar conditions reported to the NRC in References 9.7 – 9.13.
3	• No open cracks. One closed crack 0.02” to 0.05” width at surface in buttress at tendon 3H110.*[Ref. 9.19, section 4.2]*	• Evaluated as acceptable because it was at surface only with no penetration into concrete.
	• Three improperly formed buttonheads identified. *[Ref. 9.19, section 4.6.]*	• Judged acceptable; buttonhead area was as large as properly formed buttonhead.
	• Eight of 10 tendons had grease voids > 5% NDV. *Ref. 9.19, App. G]*	• This condition was reported to the NRC and evaluated as acceptable. See Ref. 9.10.
5	• Eight of 10 tendons had grease voids > 5% NDV. *[Ref. 9.21, section 4.8.5]*	• This condition was reported to the NRC and evaluated as acceptable. See Ref. 9.11.

Summary of Unit 2 Surveillance Findings (cont'd)		
Year	**Findings**	**Evaluation/Resolution**
5	• Level 2 corrosion (discoloration without pitting) observed on shim plates for two tendons and on bearing plate for one tendon [*Ref. 9.21, section 4.3.5]*	• Level 2 is acceptable (no loss of material).
	• Level 2 corrosion seen on one small area of wire removed from detensioned vertical tendon. *[Ref. 9.21, section 4.6.2]*	• Level 2 is acceptable (no loss of material; discoloration without pitting).
	• Darkened areas of concrete observed on containment walls visible from inside buildings. *[Ref. 9.21, section 4.9.3]*	• Observation was potentially consistent with grease seepage, but no clear evidence of actual leakage. Therefore, condition was judged acceptable. It was documented for comparison at next surveillance.
	• 30 of 192 cans for vertical tendons showed very slight seepage (drops forming but not yet dripping).	• Judged acceptable; documented for follow-up inspection at next surveillance.
10	• Two horizontal tendons had grease voids > 5% NDV . *[Ref. 9.23, Section 4.7]*	• This condition was reported to the NRC and evaluated as acceptable. See Reference 9.12.
	• One missing wire on tendon 1H085. . *[Ref. 9.23, Section 4.6]*	• Installation report noted one deformed buttonhead; assumed deformed buttonhead failed. Meets acceptance criteria, which is 1% breakage (five wires in any three adjacent tendons).
15	• Two vertical tendons had grease voids > 10% NDV *[Ref. 9.24, page 5, item 10]*	• This condition was reported to the NRC and evaluated as acceptable. See Reference 9.13.
	• One missing buttonhead on tendon 1H070 and One protruding wire (after retensioning) on 3H008. *[Ref. 9.24, page 4, item 4]*	• No missing wires in adjacent tendons. Therefore missing buttonhead meets acceptance criteria, which is 1% breakage, i.e. five wires in any three adjacent tendons).

Summary of Unit 2 Surveillance Findings (cont'd)		
Year	**Findings**	**Evaluation/Resolution**
20	• Buttonhead missing on tendon 2H021. *[Ref. 9.25, Section 4.4.2]*	• Including this wire, there are three nonconforming wires in three adjacent tendons. This is within acceptance limit for wire breakage (1%, i.e. five wires in any three adjacent tendons).
22	• (Concrete visual only; inadvertently omitted* from 20th year inspection) No findings. *[Ref. 9.26, section 2.2]*	• All indications were identified as "information only" and were noted in previous inspections (unchanged).
25	• Following retensioning of tendon 2H126, 3 wires observed protruding (not reseated). *[Ref. 9.27, Section 6.2.4]*	• Wires apparently damaged during surveillance and not indicative of degradation. (App. H of Ref. 9.27 says the three were part of an "attempt to perform" wire removal.) These three plus one removed for testing make four ineffective wires in this tendon. All wires were found effective in adjacent tendons. Therefore, this meets the acceptance criteria of five broken wires within three adjacent tendons.
30	No issues identified *[Ref. 9.28]*	

* The concrete exterior surveillance was omitted twice; Unit 1 during the 15th year surveillance and Unit 2 during the 20th year surveillance. Those omissions occurred due to misinterpretation of IWL surveillance interval requirements for multi-unit plants. STP became aware of the problem when Information Notice 2010-14 called attention to it. Corrective action included a concrete exterior inspection of Unit 2 during the 22nd year. There was no similar corrective action inspection in Unit 1 because Unit 1 had been inspected at the 20th year, shortly before the problem was discovered.

6.6 Applicability of IWL-2521(a)

RG 1.35, used during the first 10 years of surveillances, established a schedule for multi-unit plants that allowed liftoff force measurements in alternating units if the Structural Integrity Tests were separated by no more than 2 years. STP complied with that since the SIT tests are separated by 18 months (March 1987 in Unit 1 and September 1988 in Unit 2).

When the NRC mandated a transition to IWL, STP noted that IWL-2521(a) was slightly different from RG 1.35 in its definition of the 2-year limit. Whereas RG 1.35 said the Structural Integrity Tests must be separated by no more than 2 years, IWL-2521(a) applies the 2-year limit to completion of "post-tensioning operations". The term is not defined within IWL. At STP, physical work (tensioning of last tendon) was completed 26 months apart (January 1986 in Unit 1 and March 1988 in Unit 2), which exceeds the 2-year limit. However, the Installation Final Reports were signed 23 months apart (July 1986 in Unit 1 and June 1988 in Unit 2), which is within the 2-year limit. In the nuclear industry, it is customary to regard work as incomplete until it is signed. Therefore, STP concluded in 2003 that STP's two units met the intent of IWL-2421(a). STP has followed that schedule in subsequent

surveillances (15th, 20th, 25th, and 30th years). The first paragraph of the License Renewal SER, page 3-35 documents NRC scrutiny of the multi-unit surveillance schedule and the transition from RG 1.35 to IWL. The NRC did not express disagreement with STP's use of IWL-2521(a).

6.7 Risks Associated with Surveillances

Performance of these surveillances, particularly liftoff testing, requires use of a crane to lift a work platform to access the tendon ends. Given the locations of the containment buttresses, this cannot be accomplished without lifting "Heavy Loads", as defined by Generic Letter 81-07 and NUREG 0612, over buildings housing safety-related equipment. The specific buildings effected are the Fuel Handling Building, the Electrical Auxiliary Building, and the Mechanical Auxiliary Building. Potential load drops and crane collapses onto the roofs of these buildings have been evaluated and shown to be acceptable in the sense that the safety-related functions would be maintained. Nevertheless, surveillance of the post-tensioning system introduces some risk of damage to safety-related buildings from load drops. To comply with the guidance in Generic Letter 81-07 and NUREG 0612, lifts of heavy loads over safety-related structures should be minimized.

In addition, surveillance of the post-tensioning system introduces some risk of injury to personnel performing the surveillance and to personnel working below them. The personnel risks include:

- High locations (risk is to personnel performing work and also personnel under them).
- Each tendon is tensioned to roughly 1.5 million pounds, which represents a dangerous amount of stored elastic energy. Liftoff testing and detensioning introduces slight risk of sudden release of energy due to tendon failure or equipment mishandling or malfunction.
- Liftoff testing is performed using a hydraulic ram with hydraulic fluid contained in hoses under high pressure.
- The Corrosion Protection Medium (grease) is heated to facilitate placement in tendon ducts. Mishandling could result in burns.

6.8 Acceptability of Proposed Alternative Surveillance Schedule

As shown in section 6.5, the performance has been excellent, with tendon force trends remaining above the Minimum Required Value (MRV) for the 40-year life for which the plant was designed, but also through the entire Period of Extended Operation and also beyond that through the 100th year of plant life. In addition, the MRV was established very conservatively, meaning that the trend lines shown in section 6.5 *understate* the actual available margin.

The conservatism of the design includes the following elements:

- The maximum calculated accident pressure is 41.2 psig, but the containment was designed for 56.5 psig rated pressure. This represents a margin of 37%.

- The post-tensioning system was designed to provide a minimum of 20% larger prestress force than required to offset internal pressure. This represents an additional

20% margin. The internal pressure that would balance the prestress force would be 56.5 x 1.2 = 67.8 psig, which exceeds the maximum accident pressure by 64.6%.

- The design took no credit for concrete strength in tension, assuming it to be zero. While concrete is weak in tension, its strength is greater than zero.

- The post-tensioning system was designed to provide the strength necessary to resist internal pressure without any credit taken for the liner plate or the reinforcing bars. The liner plate by itself could resist approximately 15 psi, as shown below.

  Hoop stress = PR/T = (15 psi)(75 ft x 12 in/ft)/(0.375 in) = 36,000 psi = 36 ksi (yield stress)

- The ultimate pressure capacity of the containment was estimated to be 141 psig.

The large design margin means that minor degradation would not threaten the containment's ability to perform its design function. The containment surveillance is intended to identify degradation early before it becomes major degradation. If a containment had very small design margin, it would be important to perform the surveillance relatively frequently to ensure degradation is identified before margin is lost. Given the large design margin, it is unlikely all margin will be eroded prior to the next surveillance interval.

The most recent surveillance of the post-tensioning system was performed at STP in 2018, which was the 30th year surveillance. The Proposed Alternative Surveillance, if approved, would skip the 35th year surveillance elements associated with IWL-2520 and perform full surveillances in both units during the 40th. The surveillance elements are considered individually below.

Tendon Forces

As stated in IWL-2421(b), liftoff testing occurs at 10-year intervals in each individual unit, with the two units staggered on 5-year alternating schedules. The 30th year surveillance included liftoff testing in Unit 1, but not in Unit 2. Liftoff testing is scheduled to occur again in Unit 1 in year 40. Therefore, the proposed alternative would make no change to the Unit 1 surveillance schedule for liftoff testing. Liftoff testing is scheduled to occur in Unit 2 in years 35, 45 and 55. The proposed alternative would change that to years 40 and 50*, aligned with Unit 1 liftoff testing. That would introduce a one-time surveillance interval of 15 years between liftoff tests in Unit 2 (between years 25 and 40), with 10-year intervals thereafter*.

The one-time 15-year interval is acceptable because the trend lines established by regression of liftoff data through the 25th year remain significantly above the Minimum Required Value between years 25 and 40 and beyond. Liftoff testing performed in Unit 1 at year 30 showed no appreciable change in trend in that unit between the 20th year and 30th year data (see Section 6.5). Since the units are essentially identical and subject to the same conditions, it is reasonable to assume Unit 2 likewise did not degrade significantly between the 25th year and 30th year.

Therefore, the proposed alternative surveillance schedule provides an acceptable level of quality and safety with respect to liftoff forces.

Concrete Exterior Examination
The examinations required by IWL-2410 and IWL-2510 will continue unchanged, at 5-year intervals.

Wires
Wire damage or breakage since construction has been very low. Nearly all wires determined to be ineffective after construction were damaged either deliberately or inadvertently during surveillances. No degradation mechanism other than the surveillance itself has been observed during the life of the plant. Total wire breakage is less than one-tenth the 1% allowance (426 wires per unit) included in the design. The proposed alternative surveillance, which reduces the number of surveillances, will have the beneficial effect of reducing the opportunities to damage wires. Therefore, the proposed alternative surveillance provides an acceptable level of quality and safety, with respect to tendon wires.

Corrosion Protection Medium
The purpose of the corrosion protection medium is to protect the tendons. Tendon liftoff force testing and wire removal and examination confirm that the tendons are behaving as designed. Chemistry samples of the corrosion protection medium have met acceptance limits during all surveillances. Volume discrepancies of the medium have been evaluated as being non-consequential and have not occurred during the three most recent surveillances. The proposed alternative surveillance skips the 35th-year surveillance and examines both Units in the 40th year. This proposed alternative schedule provides an acceptable level of quality and safety, with respect to the corrosion protection medium.

Anchorage Components
The proposed alternative surveillance extends the interval for visual anchorage inspections from 5 years to 10 years*, but the 5-year interval for general visual exterior inspection IWL-2511 will remain unchanged at 5 years. Those 5-year inspections will include the anchorage area outside the end caps; the entire concrete surface area defined by IWL 2524.1 is visible with the end caps in place. Other than ineffective wires, anchorage inspections throughout the life of the plant have not identified any noteworthy issues. Therefore, the proposed alternative surveillance provides an acceptable level of quality and safety.

*Assuming acceptance of future relief requests for each 10-year interval; otherwise, surveillances will be continued as required.

7. Duration of Proposed Alternative

STPNOC requests approval to use the proposed alternative surveillance schedule during the fourth 10-year Containment Inservice Inspection Interval. The fourth interval ends September 8, 2029.

8. Precedents

8.1 Vogtle Electric Generating Plant, Units 1 and 2 - Inservice Inspection Alternative VEGP-ISI-ALT-19-01 for Containment Tendon Inservice Inspection Extension (EPID L-2019-LLR-0017); July 11, 2019; ML19182A077.

8.2 Three Mile Island Nuclear Station, Unit 1 - Relief from The Requirements Of The ASME Code Re: Examination And Testing For Containment Unbonded Post-Tensioning System (EPID-L-2018-LLR-0132); September 19, 2019; ML19226A023.

8.3 Millstone Power Station, Unit 2 - Proposed Alternative RR-05-05 to the Requirements of the ASME Code Re: Containment Unbonded Post-Tensioning System Inservice Inspection Requirements (EPID L-2019-LLR-0120); October 20, 2020; ML20287A471.

8.4 Braidwood Station, Units 1 And 2, And Byron Station, Units 1 and 2 - Proposed Alternatives to The Requirements of The American Society of Mechanical Engineers Boiler & Pressure Vessel Code (EPIDS L-2020-LLR-0099 and L-2020-LLR-0100); August 3, 2021; ML21134A006.

8.5 Palo Verde Nuclear Generating Station, Units 1, 2, And 3 - Relief Request 67 For an Alternate Frequency to Containment Unbonded Post-Tensioning System Inservice Inspection (EPID L-2021-LLR-0050); May 12, 2022; ML22124A241.

9. References

9.1 American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel (BPV) Code, Section XI, Subsection IWL, 2013 edition.

9.2 Inservice Inspection Program Plan and Inservice Testing Program Snubber Inservice Test Plan for the Fourth Ten-Year Interval; May 20, 2021; ML21144A109; NOC-AE-21003806.

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