Evaluation and Acceptance of PSC Tendon Surveillance Results (30th Year)

The surveillance was conducted by Precision Surveillance Corporation (PSC) between October and November 2007 with CR-3 site overview utilizing SP-182 as the controlling site procedure. The actual procedures used for testing activities were contained in the PSC In-Service Inspection Manual for Progress Energy Crystal River Unit 3 (N1002) Revision 0. This 30th year surveillance met all the requirements of ASME Section XI, subsection IWL as modified by 10CFR50.55(a). The results of this surveillance have shown that the CR-3 containment structure has not experienced abnormal degradation and is projected to meet its minimum design criteria until the end of its current forty-year life.

Code Compliance.

IWL-2400: Schedule
CR-3 performed the Structural Integrity Test in November of 1976. The code required the 30th year surveillance is to be performed in November of 2006 +/- 1 year. Since the 30th surveillance was performed between October and November 2007 this requirement was met.

IWL-2510: Examination of Concrete
The concrete was visually examined (VT-3) during the 30th surveillance period. For areas that required further evaluation, a detailed visual exam (VT-1) was performed. The data was reviewed by the Responsible Professional Engineer (RPE) and found to be acceptable.

IWL-2520: Examination of Unbonded Post-Tensioning Systems
The random selection for CR-3 resulted in three Dome, three Vertical and 5 Horizontal tendons being selected. These tendons were D129, D212, D238, 12V01, 45V20, 61V17, 46H21, 42H46, 51H34, 62H30 and 13H36. It was later determined that 12V01 (identified as a control tendon) was retensioned during the prior surveillance. Per IWL-2521 (b), 61V08 was selected as a substitute control tendon. Although not identified as an exempted tendon the IWL-2524 and IWL-2525 examinations were performed on the original selected tendon (12V01).

IWL-2522: Tendon Force Measurements
Tendon force measurements were performed on the selected sample and adjacent tendons as required. All vertical and dome tendons tested this inspection period were found to have forces greater than 95% of the corresponding predicted force. Of the hoop tendons, 42H46 and 51H34 were observed with forces above 95% of their predicted force. Tendons 62H30, 46H21 and 13H36 were found to have forces below 95% but above 90% of their corresponding predicted forces. While monitoring the forces of tendons adjacent to the respective surveillance tendons, PSC NCR's FN1002-001, 002, 003, 006, 007, 008, 009, 011 and 012 were generated to document the conditions and were dispositioned by CR03ENG in AR's 251318 and 252558. After the completion of testing the adjacent tendons, all tendons with an as-found force below 95% were restored to an as-left force –0%, +6% of their corresponding predicted force in accordance with PSC Procedure SQ9.0. The acceptance criteria of IWL-3221.1 were met for all the tendons with the exception of tendon 62H30, 13H36, and 46H21. The analysis of the as-found lift-off forces contained in the PSC final report, demonstrates that the as-found condition is acceptable for these tendons. Part of the analysis is a

discussion on the calculation of the predicted base value for each tendon. Historically CR-3 has found numerous tendons below the 95% of predicted base value, but demonstrated the acceptability of the containment with the as-found condition.

IWL-2523: Tendon Wire and Strand Sample Examination and Testing
Tendons D238, 61V17 and 51H34 were detensioned and a wire removed for testing. The acceptance criteria of IWI-3221.2 were met for all wire samples.

IWL-2524: Examination of Tendon Anchorage Areas
A VT-1 visual examination was performed for all tendons when the end cap was removed. The detailed inspections did not reveal any cracks in the concrete adjacent to the bearing plates nor in any of the anchorage components. There were several instances of missing or broken wires observed. These instances were compared against the acceptance criteria contained in IWL-3321.3 and SP-182 and found to be acceptable. Therefore no further analysis was required for these conditions.

IWL-2525: Examination of Corrosion Protection Medium and Free Water
There were no instances of free water in the corrosion protection medium. The acceptance criteria of IWL-3221.4 were met for all samples taken.

IWL-2526: Removal and Replacement of Corrosion Protection Medium
The amount of grease removed and replaced was recorded for each tendon.

10CFR50.55(a)(b)(viii) Examination of Concrete Containments

(a) During the visual exam, all grease caps were examined for leakage and deformation. No grease leakage or deformation was observed. Minor weepage continues to be observed on the intermediate building buttresses. See (d) (3) below for further discussion.

(b) The evaluation of the trend data does not indicate an adverse trend.

(c) The elongation of any tendon during restressing did not vary from previously recorded results by more than 10% and therefore was acceptable.

(d) The following items shall be included in the RFO 15 NIS-1 report:

(1) The presence of water in the grease sample. There was no water recorded for this surveillance.

(2) The absolute difference between the amount of grease removed and the amount replaced did not exceed 10% of the net duct volume in any of the tendons.

(3) Detection of grease leakage (if found). During the tendon accessibility walkdown PSC noted that small grease/oil leaks were occurring on multiple tendon caps, which were located inside existing structures that adjoin the containment building (adjacent to main steam and feedwater penetrations). The substance displacing from the tendon cap is actually the oil portion from the original P2 grease that has separated. This is a common occurrence that we has been noted throughout many plants which perform tendon surveillances. This condition does not correspond to the system's degradation. A small amount of oil can cause a large aesthetically unpleasing condition. On buttresses without any coating, the oil is absorbed into the concrete, leaving very little signs of leakage. However, in the existing condition, the coated surface does not allow for the absorption to occur.

Therefore, the oil continues to displace down the buttress face. PSC recommends this condition be monitored and cleaned on a periodic. Gasket replacement can be performed on the tendon cap, however the oil will continue to leak from the cap based on PSC's experience. The labor and material required for the gasket replacement is not cost effective and PSC does not recommend performing such task.

Based on the evaluation of the In-Service Inspection results of the 30th Year Containment IWL Tendon Surveillance performed at CR-3 have been determined to meet the code requirements and that the containment structure has experience no abnormal degradation of the post-tensioning system. The containment post-tensioning system is performing in accordance with the design requirements and is expected to continue to do so for the remaining life of the unit.

Prepared By: _____

Rick Portmann (IWE/IWL Program Owner)

Reviewed By: _____

Joe Lese (Designated CR3 IWE/IWL RPE)

Reviewed By: _____ NB 12597 ANI

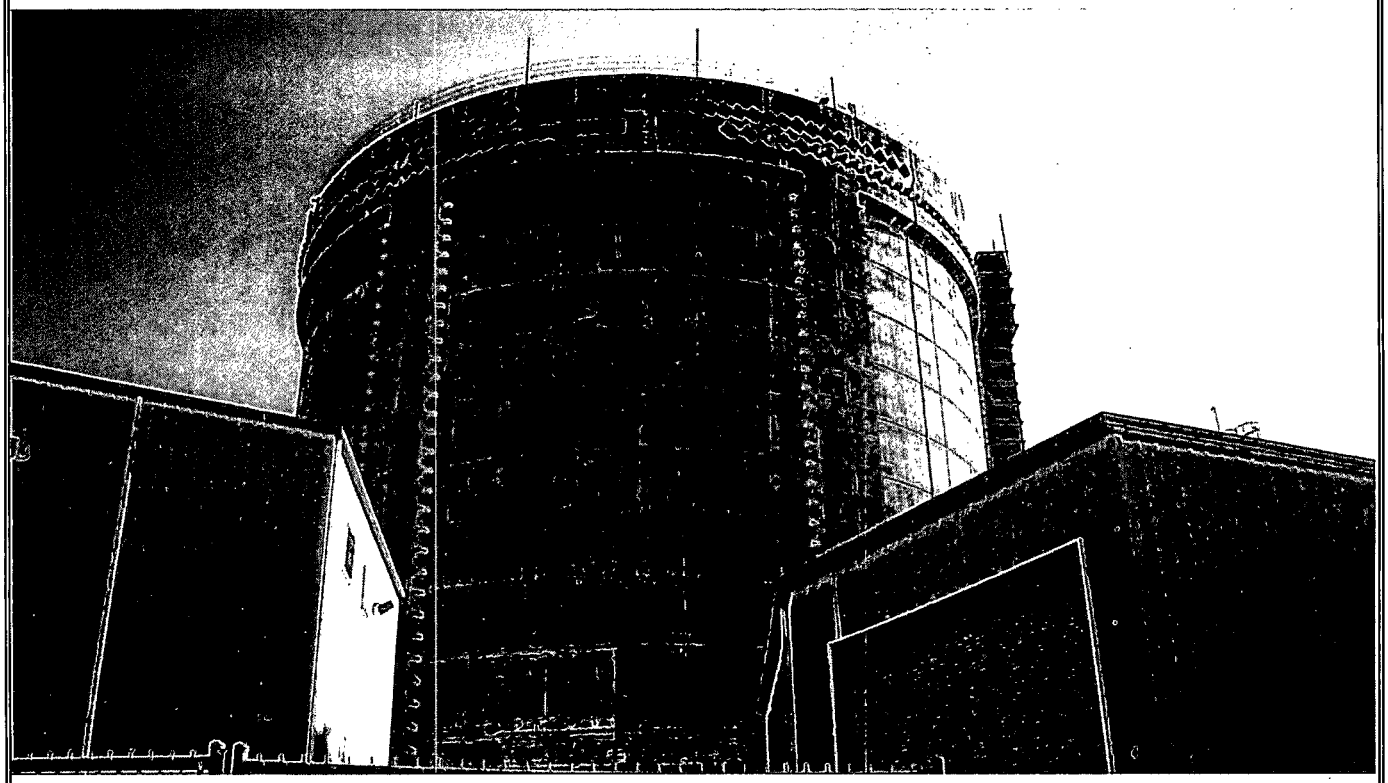
Loyd Larramore (ANII)

Progress Energy

DOCUMENT COVER SHEET

Document No: CR-1002-504

Title: FINAL REPORT FOR THE 30TH YEAR CONTAINMENT IWL INSPECTION



1	Revised Regression Analysis	*B.GIOMETTI*	*02/04/09*	*P.C.SMITH*	*02/04/09*
0	Submittal Issue	*C.E. COX*	*01/24/08*	*P.C. SMITH*	*01/24/08*
No.	**Description**	**Prepared By**	**Date**	**Reviewed By**	**Date**
		PSC SIGN OFF			

REVISIONS

PSC Document No. CR-N1002-505, Revision 1

Final Report for the 30th Year Containment IWL Inspection

30th Year Tendon Surveillance at Crystal River

Revision 1 Summary

Page i – Title Page: Changed the revision level

Page iv –Table of Contents: Added an additional Hoops – Regression Analysis Input Data Table (Table 65), re-numbered the remaining tables.

Page 55 – 56 - Regression Analysis Input Data Tables: Revised the input tables to include the missing data from the 1st surveillance.

ABSTRACT

The purpose of this report is to present the results of the 2007 30th Year Containment IWL Inspection of the Progress Energy Florida Crystal River Unit 3 Containment Structure post tensioning system. The results of this investigation are discussed in detail in the body of this report and are summarized as follows:

1. The sheathing filler (grease) samples were tested and found to have acceptable levels of water-soluble ions, (Chlorides, Nitrates, and Sulfides). All tendon ends had a moisture content within acceptable limits. All neutralization numbers were above the IWL requirement of 0.0 mg KOH/g value and acceptable. No visible breakdown of the grease was noted either by color or consistency for all grease samples tested.
2. No tendon end exhibited water during removal of the grease cap, detensioning or around the tendon anchorage.
3. Acceptable corrosion levels were found on all tendon ends and no cracks were found on any anchorage components. Cracks in the concrete surrounding the bearing plates were all within allowable tolerance of < 0.010"
4. Additional missing or protruding buttonheads were found on two of the inspected surveillance tendons. The conditions have been reported via NCR's FN1002-004 & FN1002-010 (12V01) and FN1002-005 (61V17) to CR03ENG for disposition.
5. The IWL baseline concrete examination for Unit 3 was required to be completed by September 10, 2001. The subsequent required examination of the containment concrete was performed during this 30th Year period. However, all of the examinations associated with this IWL requirement have been performed by the Utility and the results are reviewed and reported by CR03ENG.
6. The hydraulic jacks used for liftoffs, detensioning and retensioning tendons were calibrated and found to be within an acceptable variation of +/- 1.5%.
7. All surveillance tendons monitored for forces this inspection period were found to have forces greater than 95% of the corresponding predicted force OR, if found below 95%, had their adjacent tendons inspected until one tendon, on both sides of the original scope tendon, met the lift-off force criteria. All tendons, both original and adjacent found below 95% were restored to an As left force of –0%, +6% above predicted force.
8. The detensioned tendons were retensioned with acceptable elongations and acceptable force levels. All test wires removed from detensioned tendons were found to have acceptable corrosion levels and acceptable yield and tensile tests.
9. All tendons were resealed and regreased to acceptable levels in accordance with SQ12.1 of the PSC Surveillance Procedure, which is included in Appendix F.
10. A comparison of "As-found" force levels to the original force levels was made in an effort to detect any evidence of system degradation. The amount of force loss since the original installation is comparable to the losses of other plants of this age and does not show any evidence of system degradation.

Based on the data gathered during the 2007 30th Year Containment IWL Inspection and reported herein, the conclusion is reached that no abnormal degradation of the Post Tensioning System has occurred at the Progress Energy Florida Crystal River Unit 3 Containment Structure.