EXELON
THREE MILE ISLAND
UNIT 1 (40TH YEAR) PHYSICAL
CONTAINMENT BUILDING TENDON SURVEILLANCE

PRECISION SURVEILLANCE CORPORATION
IN-SERVICE INSPECTION
QUALITY CONTROL PROCEDURE

# MONITORING TENDON FORCE (LIFT-OFFS)

| | | |
|---|---|---|
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| Prepared by | Title | Date |
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## 1.0 PURPOSE

1.1 This procedure will establish the requirements for monitoring the forces that remain in a tendon for purposes of evaluating the Post-Tensioning System Tendons during the 40th Year In-Service Inspection (Surveillance) at Exelon's Three Mile Island-Unit 1.

## 2.0 RESPONSIBILITY

2.1 In the event of conflict between any TMI Procedure and an SQ, the former governs.

2.2 As stated in PSC Procedure QA 4.0.

## 3.0 QUALIFICATIONS

3.1 As stated in PSC Procedure QA 4.1.

## 4.0 EQUIPMENT

4.1 The gauges and test equipment necessary for the Quality Control activities will be itemized in PSC Procedure SQ 4.0.

## 5.0 PRECAUTIONS

5.1 Review the I.S.I. Tendon Surveillance Program Safety Comments for the items that shall apply both for tendon force control and personnel safety.

## 6.0 QUALITY CONTROL

6.1 All Quality Control Documentation (***QCD***) points noted in this procedure are Hold Points. The work shall not progress past or through a ***QCD*** without a verbal release from the Inspector. The required information or evaluative data shall be documented on Data Sheet 9.0 attached to this procedure.

## 7.0 PREREQUISITES

7.1 The Grease Cap will be removed.

7.2 The Anchorage Inspection of the stressed tendon will be completed.

7.3 The Anchorage threads will have been measured and the coupler verified for thread strength per SQ 7.1.

7.4 The hydraulic jack has been examined for damage and is in current calibration status.

7.5 Stressing pressure gauge has been calibration checked before use as per PSC Procedure QA 10.1.

7.6 ***QCD*** – Document the tendon identification, Unit #, and tendon end on Data Sheet 9.0

## 8.0 MEASUREMENTS

### 8.1 STEEL RULERS

8.1.1 Measurements of shim stack height shall be performed with calibrated steel rulers graduated in tenths of an inch (0.1"). The measurements shall be recorded to the nearest 0.1".

### 8.2 PRESSURE GAUGES

8.2.1 Measurements of ram pressure (tendon force) shall be measured by calibrated pressure gauges capable of being read directly to 20 psi or better.

8.2.1.1 View the gauge face from a plane of view directly in front of the indicator needle to avoid parallax errors.

8.2.1.2 Gauge readings may be interpolated to the nearest 10 psi.

8.2.1.3 All pressure gauges used shall have automatic compensation for temperature variations between gauge calibration and gauge use during surveillance.

## 9.0 MONITORING OF TENDON FORCES

9.1 The intention of this operation is to monitor the amount of force remaining on the tendon by taking lift-off readings as the tendon is being stressed. Subsequent evaluation of those lift-off readings with respect to Predicted Forces will determine if that force is acceptable or if degradation of the system has occurred.

9.2 Monitoring of Tendon Force can be performed on both ends of a tendon in a simultaneous and controlled manner or on one tendon end at a time, independent of the opposite end of the tendon. These procedures have been developed so that they apply to one end of the tendon. Every effort should be made to measure lift-off at opposite ends of a tendon at the same time. If this is prohibited by plant conditions (i.e., one end is accessible only with the plant operating and the other only when the plant is shut down), then measurements must be made as close together in time as possible and under similar temperature regimes. Adequate communication shall be maintained between both ends of the tendon during the taking of lift-off readings for simultaneous stressing operations. Vertical tendon monitoring of force is to be performed from one end, top end, only unless the tendon was double end stressed during original installation.

9.2.1 Regardless of the method of monitoring there will probably be variations in the forces detected at each end of the tendon. Because of this, the average force from both ends will represent the force that the tendon is holding. If the average force for both ends of the tendon meet the Acceptance Criteria cited in Section 10.0 of this Procedure, that tendon will be acceptable. If the average force does not meet the criteria, then the action required of Section 10 of this Procedure shall be required for the respective condition detected.

9.2.2 All data shall be documented on Data Sheet 9.0.

9.3 ***QCD*** – Document the concrete surface temperature near the tendon and the ambient air temperature on Data Sheet 9.0. Also document the thermometer identification number and calibration due date for each thermometer used.

9.4 ***QCD*** – The anchorhead and stressing adaptor/stressing rod threads are to be inspected for dirt, burrs, nicks, and damaged threads and measurements taken per SQ 7.1, if any condition precludes proper coupling the condition shall be corrected. Anchorhead threads shall be inspected for deformation before and after any stressing operation and if any deformation is detected Exelon Engineering is to be notified. Document acceptance on Data Sheet 9.0

9.5 ***QCD*** – Document the amount of effective wires in each end of the tendon on Data Sheet 9.0. Refer to Data Sheet 8.0 for each end of the tendon.

9.6 ***QCD*** – Couple the rams to each anchorhead on that tendon (for vertical tendons only the top anchorhead is used, unless it was double end stressed during original installation). Document on Data Sheet 9.0 that the stressing coupler/stressing rod is evenly aligned on the anchorhead washer and that full thread engagement is obtained.

9.6.1 Note do not let coupler touch shims.

9.7 ***QCD*** – On Data Sheet 9.0 document the ram and gauge identification and the calibrated status of each. Also document the ram calibration data including its area and constant, K.

9.8 ***QCD*** – On Data Sheet 9.0 document the dimension of each shim stack height, from the bearing plate to the bottom of the anchorage. Document the thickness of each shim in each shim stack, starting from the Bearing Plate and working up to the Anchorage. Also document the ruler identification and calibration date.

9.9 ***QCD*** – Establish the Lift-off Overstress Force (LOSF) for the tendon being monitored. Tendon Lift-off Overstress Force for purposes of Monitoring of Tendon Force shall be that force less than 1592 kips (based on a tendon with 169 effective wires, 9.425 kips per wire), which permits placement of the feeler gauges or provides complete looseness of the shim stacks.

9.9.1 Maximum force equals the number of effective wires multiplied by 9.425 kips.

9.10 ***QCD*** – On Data Sheet 9.0 document the selected Tendon Predicted Force (PF), document the 95% Predicted Force (0.95PF), and document the 90% Predicted Force (0.9PF), from the Predicted Force Tables of Procedure SQ 9.1. Space is provided beneath each entry to document the gauge pressures for each force requirement.

CAUTION ONCE ACTUAL STRESSING BEGINS, THE RAM MUST NEVER BE EXTENDED TO THE FULL LIMIT OF ITS STROKE. THE EXTENSION SHOULD BE AT LEAST 1/2" LESS THAN THE FULL STROKE OF THE RAM.

### 9.11 TENDON LIFT-OFF (MONITORING)

9.11.1 Gradually pressurize the rams in 20 to 100 psi increments until lift-off is achieved. Carefully observe for signs of rotation. If rotation is noted at any time, stop work until shim rotation has stopped. If rotation is noted, pressurizing shall stop until rotation ceases. Once rotation has ceased and alignment has been verified keep increasing pressure at prescribed intervals. The intent is to allow rotation to be released in a slow and controlled fashion. Do not exceed a Lift-off Overstress Force of 1592 kips (based on a tendon with 169 effective wires, 9.425 kips per wire), if lift-off has not been achieved at this force, then unload the jack, and notify Exelon Engineering for resolution of the condition.

9.11.2 Once the shims become loose, insert two feeler gauges or shim stock, about 0.030" in thickness, between the anchorhead and shim. The gauges should be located about 180 degrees apart and approximately centered.

9.11.3 Reduce the ram pressure until the load is transferred on the shim stack. It shall not be necessary to return to zero gauge pressure, but at least 2000 psi less than the pressure that was needed to insert the shim stock.

9.11.4 Gradually pressurize the ram while pulling the feeler gages. The point at which the feeler gauge comes loose and can be withdrawn is the Liftoff Point.

9.11.5 ***QCD*** – Document the pressure for each Liftoff of each shim stack. Place a circle around that Liftoff Value that was the last to have the feeler gauge or shim removed. (The last shim stack to come loose.) Do not intermix the values for the shim stacks. Stack 1 will always be Stack 1.

9.11.6 Repeat sections 9.11.3, 9.11.4 and 9.11.5 until 3 consecutive Liftoff readings have been taken. The three circled readings should be within 25 kips of each other, if this is not achieved the feeler gauges may be repositioned, and additional liftoff readings may be taken until three consecutive readings within 25 kips of each other are achieved.

9.11.7 The space between the stacks of shim halves for the first shims in direct contact with the anchorage should not exceed a space of 1/4". The remaining shims in the shim stack may be placed with a larger spacing but should not exceed 1/2".

9.11.8 Slowly decrease the pressure on the jack to allow the stressing washer to reseat onto the shims. No additional shims are to be added at this time.

9.11.9 No part of the anchorhead shall overhang the shim stack. If the anchorhead is not correctly positioned after releasing the pressure, gradually re-pressurize the ram and adjust as necessary.

9.11.10 The ram shall be uncoupled from the anchorage.

9.11.11 If the lift-off forces are determined to be acceptable, this tendon shall be completed by replacing the grease can in accordance with PSC Procedure SQ 12.0.

9.11.12 NOTE: Neither end shall be de-tensioned until lift-off has been recorded for both ends.

9.11.13 ***QCD*** – Post the Circled Liftoff Values into the Circled Liftoff Value Column. It may be possible to have the Liftoff occur at the same pressure in each shim stack. Add the Circled Liftoff Values and divide by 3 to get the end average. Post the end average to Data Sheet 9.0. Convert the Average Pressure (PSI) to Force (KIPS) and document results.

9.11.14 ***QCD*** – Enter the end average from the opposite end of the tendon if it is available at this time.

9.11.15 ***QCD*** – Calculate the Average Liftoff Value (ALV) for this tendon by averaging the end averages from both ends.

9.11.16 ***QCD*** – Document the acceptance or non-acceptance of the average liftoff value for the condition representative of the tendon on Data Sheet 9.0. Choose one of the conditions listed in Section 10.0 as each condition might apply.

9.11.17 ***QCD*** – Document the need for Adjacent Tendon Monitoring and the tendon numbers. Notify Exelon that Adjacent Tendon Monitoring is being performed.

## 10.0 ACCEPTANCE CRITERIA

10.1 The average liftoff value of the forces required to achieve lift-off for each tendon shall not be less than the 95% Predicted Force obtained from PSC Procedure SQ 9.1.

10.2 If the average value of the end forces required for lift-off fails to meet the acceptance criteria of Section 10.1, but equals or exceeds the 90% Predicted Force obtained from PSC Procedure SQ 9.1, the tendons designated as adjacent to the defective tendon and listed in SQ 9.1, Table 3.0 or 4.0 as applicable shall be checked as outlined in Section 11.0. If both adjacent tendons satisfy the acceptance criteria as indicated in section 10.1, then the original tendon shall be restored to its Predicted Force within a minus 0%, plus 6% tolerance, but in no case, no greater than 0.70 GUTS as determined for the number of effective wires, the single deficiency shall be considered unique and acceptable.

10.2.1 If either of the adjacent tendons fails to satisfy the acceptance criteria of section 10.1, the extent of investigation into the cause, which may include de-tensioning the deficient tendons, shall be determined by Exelon. This condition does not meet IWL requirements and is considered reportable to the NRC by Exelon.

10.3 If the average value of the end forces required for lift-off falls below the 90% Predicted Force obtained from PSC Procedure SQ 9.1, an investigation is to be conducted by Exelon to determine the extent and cause of the occurrence and the required course of action to be taken. This condition does not meet IWL requirements and is considered reportable to the NRC by Exelon.

10.4 The average of all normalized tendon lift-off forces, including adjacent tendons, if any, for each tendon group shall be equal to, or greater than, the required minimum average tendon force for that tendon group. The required minimum average force is 1033 kips for vertical tendons,1064 kips for dome tendons, and 1108 kips for hoop tendons. This requirement will be verified upon completion of the final surveillance report

10.5 ***<u>QCD</u>*** – Any tendon which has a lift-off force below its specified 95% Predicted Force, and has not been required to be de-tensioned, shall have both ends re-tensioned to within minus 0%, plus 6% of the specified Predicted Force but in no case, no greater than 0.70 GUTS as determined for the number of effective wires. Tendon shall not be detensioned, however, both ends of a double end stressed tendon, or, one end of a single end stressed tendon shall be taken to OSF to ensure full transfer of force. The final lift-off force (lock-off) shall be the original predicted force from PSC Procedure SQ 9.1; Data Sheet 11.0 of PSC Procedure SQ 11.0, shall be completed for all such tendons.

10.6 If any deformation of anchorage threads is detected before or after any stressing operation, Exelon Engineering is to be notified.

## 11.0 ADJACENT TENDON - MONITORING OF FORCES

11.1 The monitoring of forces in tendons adjacent to the defective tendon shall follow the requirements of this procedure, as each applies.

11.2 It shall be necessary to remove the Grease Cap in accordance with PSC Procedure SQ 6.0 using Data Sheet 6.0 for the documentation requirements for each adjacent tendon.

11.3 It shall not be necessary to take Grease Samples unless water is detected during the inspection. Grease samples may be taken if requested by Exelon.

11.4 It shall be necessary to perform the anchorage inspection in accordance with PSC Procedure SQ 8.0. Data Sheet 8.0 shall be used to document this information for each Adjacent Tendon.

11.5 It shall not be necessary to perform the concrete inspection of PSC Procedure SQ 8.3.

11.6 Lift-off monitoring shall be performed in accordance with Section 9.11 of this procedure and evaluated per Section 10.0.

## 12.0 NOTIFICATION

12.1 ***QCD*** – Exelon shall be formally notified with a nonconformance report when each one or more of the Acceptance Criteria noted in section 10.0, of this procedure are not met.

## 13.0 DOCUMENTATION

13.1 The items requiring documentation in this procedure, shall be documented on Data Sheet 9.0.

13.2 Some information from Data Sheet 8.0 of PSC Procedure SQ 8.0, which has already been started for this tendon, shall require posting onto Data Sheet 9.0.

## 14.0 ATTACHMENTS

14.1 Data Sheet 9.0

PSC PRECISION SURVEILLANCE

N1091 PSC PROCEDURE SQ 9.0
**MONITOR TENDON FORCE**
**DATA SHEET 9.0**
09/03/13
Page 1 of 1
Revision 0

Project: TMI 40$^{TH}$ YEAR TENDON SURVEILLANCE ☐ Unit 1

(7.6)Tendon No.: ______ Tendon End: ______ ☐Shop ☐ Field

| LIFT-OFF INSPECTION CRITERIA | Q.C. Signoff |
|---|---|
| (9.3) Temp. of Concrete: ____ °F Thermometer No.: ______ Recal Date: ______<br>Ambient Temp.: ____ °F Thermometer No.: ______ Recal Date: ______ | |
| (9.4) Anchorhead and Stressing Adapter Threads : ☐ Acceptable ☐ Unacceptable<br>(9.5) Number of Effective Wires: ______ | |
| (9.6) Anchorhead and Stressing Adapter Engagement/Alignment : ☐ Acceptable ☐ Unacceptable | |
| (9.7) RAM ID: ______ Recal Date: *end of job* RAM Area: ______ K = ______<br>Gauge ID: ______ Recal Date: ______ Daily Check: ______ | |
| (9.8) Shim Stack Height: #1 ____ in. #2 ____ in. Ruler ID: ______ Recal Date: ______<br>Individual Shims: Stack #1: ______ in. Stack #2: ______ in. | |
| (9.9) Lift-off Overstress Force (LOSF): ______ kips Pressure: ______ psi | |
| (9.10) PF: ______ kips 95% PF: ______ kips 90% PF: ______ kips<br>______ psi ______ psi ______ psi | |
| (9.11.5) As-Found Lift-Off (9.11.13) Circled Values<br>Stack #1: 1) ____ psi Stack #2: 1) ____ psi 1) ____ psi<br>2) ____ psi 2) ____ psi 2) ____ psi<br>3) ____ psi 3) ____ psi 3) ____ psi<br>(9.11.13) End Average Force (this end): ______ kips Average: ______ psi | |
| (9.11.14) End Avg. Force (other end): ______ kips (9.11.15) Average Liftoff (ALV) ______ kips | |
| (9.11.16) Liftoff (ALV) Acceptance Criteria:<br>a) ☐ Acceptable – ALV is ≥ 95% PF.<br>b) ☐ Adjacent Tendons to be stressed – ALV is < 95%PF but ≥ 90%PF. Document on a NCR.<br>c) ☐ Unacceptable – ALV is < 90%PF. Document on a NCR.<br>NCR Required ☐ Yes ☐ No Customer Notified NCR No.: ______ | |
| (9.11.17) Adjacent Tendon Lift-Offs (***Note**: Use a separate Data Sheet 9.0 to document Liftoff forces.*)<br>a) Adj Tendon: ______ This Tendon: ______ Adj Tendon: ______<br>☐ Acceptable – ALV > 95% of PF, The original scope tendon SHALL be restored to within –0/+6% of PF, but in no case, no greater than 0.70 GUTS as determined for the number of effective wires.<br>EXELON Notified: ☐ Yes ☐ No Name/Date: ______ | |
| b) Adj Tendon: ______ Adj Tendon: ______<br>☐ Unacceptable – ALV < 95% of PF for either tendon. Document the condition on a NCR.<br>Customer Notified NCR No.: ______ | |
| c) Adj Tendon: ______ Adj Tendon: ______<br>☐ Unacceptable – ALV < 90% of PF for either tendon. Document the condition on a NCR.<br>Customer Notified NCR No.: ______ | |

QC Reviewed: ______ Level: ______ Date: ______

# EXELON
# THREE MILE ISLAND
# UNIT 1 (40$^{TH}$ YEAR) PHYSICAL
# CONTAINMENT BUILDING TENDON SURVEILLANCE

PRECISION SURVEILLANCE CORPORATION
IN-SERVICE INSPECTION
QUALITY CONTROL PROCEDURE

## PRESTRESS FORCES

| | | |
|---|---|---|
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| Gerald F. Bussone | *Q.A. MANAGER* | 09/03/13 |
| Approved by | Title | Date |
| Paul C. Lift | *PRESIDENT* | 09/03/13 |
| Approved by | Title | Date |

## 1.0 PURPOSE

1.1 The purpose of this procedure is to provide in table form the predicted lift-off forces for the 40th Year In-Service Inspection (Surveillance) at Exelon's Three Mile Island Nuclear Plant.

## 2.0 SURVEILLANCE TENDON DATA

2.1 The Normalization Adjustment, the Predicted Forces, 90% of the Predicted Forces (.9 PF), and 95% of the Predicted Forces (.95 PF) have been obtained from Exelon.

2.2 The Normalization Adjustment, the Predicted Forces, 90% of the Predicted Forces (.9 PF), and 95% of the Predicted Forces (.95 PF) to be used during the 40th year inspection are listed below for each UNIT 1 tendon scheduled for monitoring of force. The same information is provided for the adjacent tendons.

## 3.0 TMI UNIT 1 – 40TH YEAR PREDICTED FORCES – ORIGINAL SCOPE TENDONS

| TENDON | NORMALIZATION ADJUSTMENT (KIPS) | PREDICTED FORCE (KIPS) | 95% PF (KIPS) | 90% PF (KIPS) |
|---|---|---|---|---|
| D-142 | -21 | 1,128 | 1,072 | 1,015 |
| **D-143** | **-47** | **1,153** | **1,095** | **1,038** |
| D-144 | -11 | 1,117 | 1,061 | 1,005 |
| D-224 | 5 | 1,101 | 1,046 | 991 |
| **D-225** | **45** | **1,061** | **1,008** | **955** |
| D-226 | 26 | 1,081 | 1,027 | 973 |
| D-236 | 7 | 1,100 | 1,045 | 990 |
| **D-237** | **19** | **1,088** | **1,034** | **979** |
| D-238 | 12 | 1,095 | 1,040 | 986 |
| D-302 | -9 | 1,116 | 1,060 | 1,004 |
| **D-303** | **-35** | **1,142** | **1,085** | **1,028** |
| D-304 | -7 | 1,114 | 1,058 | 1,003 |
| | | | | |
| H13-02 | -5 | 1,105 | 1,050 | 995 |
| **H13-03** | **-40** | **1,141** | **1,084** | **1,027** |
| H13-04 | 14 | 1,086 | 1,032 | 977 |
| **H13-10** | **4** | **1,097** | **1,042** | **987** |
| H13-11 | -54 | 1,154 | 1,096 | 1,039 |
| H13-12 | -2 | 1,103 | 1,048 | 993 |
| H24-14 | -27 | 1,128 | 1,072 | 1,015 |
| **H24-15** | **N/A*** | **1,051** | **998** | **946** |
| H24-17 | 25 | 1,076 | 1,022 | 968 |

| TENDON | NORMALIZATION ADJUSTMENT (KIPS) | PREDICTED FORCE (KIPS) | 95% PF (KIPS) | 90% PF (KIPS) |
|---|---|---|---|---|
| **H24-22** | **-37** | **1,116** | **1,060** | **1,004** |
| H24-23 | 34 | 1,045 | 993 | 941 |
| H24-24 | -16 | 1,095 | 1,040 | 986 |
| H35-01 | -41 | 1,142 | 1,085 | 1,028 |
| **H35-02** | **8** | **1,093** | **1,038** | **984** |
| H35-05 | -67 | 1,168 | 1,110 | 1,051 |
| H62-25 | 46 | 1,054 | 1,001 | 949 |
| **H62-26** | **2** | **1,099** | **1,044** | **989** |
| H62-27 | 47 | 1,053 | 1,000 | 948 |
| | | | | |
| V-30 | -10 | 1,179 | 1,120 | 1,061 |
| **V-32** | **-7** | **1,176** | **1,117** | **1,058** |
| V-33 | -48 | 1,217 | 1,156 | 1,095 |
| V-107 | -6 | 1,175 | 1,116 | 1,058 |
| **V-108** | **14** | **1,155** | **1,097** | **1,040** |
| V-109 | 33 | 1,136 | 1,079 | 1,022 |
| **V-159** | **20** | **1,149** | **1,092** | **1,034** |
| V-160 | -6 | 1,175 | 1,116 | 1,058 |
| V-161 | -13 | 1,182 | 1,123 | 1,064 |

▨ **= SURVEILLANCE TENDON**

☐ = ADJACENT TENDON

## 4.0 TMI UNIT 1 – 40TH YEAR PREDICTED FORCES – AUGMENTED SCOPE TENDONS

| TENDON | NORMALIZATION ADJUSTMENT (KIPS) | PREDICTED FORCE (KIPS) | 95% PF (KIPS) | 90% PF (KIPS) |
|---|---|---|---|---|
| H46-33 | N/A | 1,293 | 1,164 | 1,228 |
| **H46-34** | **N/A** | **1,232** | **1,170** | **1,109** |
| H46-35 | N/A | 1,293 | 1,228 | 1,164 |
| H51-39 | N/A | 1,309 | 1,244 | 1,178 |
| **H51-40** | **N/A** | **1,198** | **1,138** | **1,078** |
| H51-41 | N/A | 1,321 | 1,255 | 1,189 |

| TENDON | NORMALIZATION ADJUSTMENT (KIPS) | PREDICTED FORCE (KIPS) | 95% PF (KIPS) | 90% PF (KIPS) |
|---|---|---|---|---|
| V-114 | N/A | 1,332 | 1,265 | 1,199 |
| **V-115** | **N/A** | **1,311** | **1,245** | **1,180** |
| V-116 | N/A | 1,308 | 1,243 | 1,177 |
| V-135 | N/A | 1,347 | 1,280 | 1,212 |
| **V-136** | **N/A** | **1,306** | **1,241** | **1,175** |
| V-137 | N/A | 1,353 | 1,285 | 1,218 |

▨ **= SURVEILLANCE TENDON**

□ = ADJACENT TENDON

# EXELON
# THREE MILE ISLAND
# UNIT 1 (40TH YEAR) PHYSICAL
# CONTAINMENT BUILDING TENDON SURVEILLANCE

PRECISION SURVEILLANCE CORPORATION
IN-SERVICE INSPECTION
TENDON SURVEILLANCE PROGRAM

## DETENSION TENDON

| | | |
|---|---|---|
| Melissa Lara | *Q.C. INSPECTOR* | 09/03/13 |
| Prepared by | Title | Date |
| Gerald F. Bussone | *Q.A. MANAGER* | 09/03/13 |
| Approved by | Title | Date |
| Paul C. | *PRESIDENT* | 09/03/13 |
| Approved by | Title | Date |

## 1.0 PURPOSE

1.1 This procedure will establish the requirements for detensioning tendons for purposes of visual inspection, testing and evaluation, during In-Service-Inspections (surveillance) of Post-Tensioning Systems Tendons at Exelon's Three Mile Island Nuclear Plant - Unit 1.

## 2.0 RESPONSIBILITY

2.1 In the event of conflict between any TMI Procedure and an SQ, the former governs.

2.2 As stated in PSC Procedure QA 4.0.

## 3.0 QUALIFICATIONS

3.1 As stated in PSC Procedure QA 4.1.

## 4.0 EQUIPMENT

4.1 The gauges and test equipment necessary for the Quality Control activities will be itemized in PSC Procedure SQ 4.0.

## 5.0 QUALITY CONTROL

5.1 There are no Hold Points or documentation requirements for this Procedure.

## 6.0 PRECAUTIONS

6.1 Do not exceed a jack force of 1592 kips (for a tendon with 169 effective wires, 9.425 kips per wire). If lift-off has not been achieved at this maximum force. The jack shall be unloaded and Exelon Engineering shall be notified for resolution of the condition.

6.2 Review the I.S.I. Tendon Surveillance Program Safety Comments for the items that shall apply both for tendon force control and personnel safety.

6.3 Verify that the tendon to be de-tensioned is listed in PSC Procedure SQ 2.0 or has been approved for de-tensioning by Exelon Engineering.

6.4 No more than one tendon from each group (dome, hoop, vertical) shall be de-tensioned at any given time without Exelon Engineering concurrence.

## 7.0 PREREQUISITES

7.1 The tendon will have been monitored for tendon force as required of PSC Procedure SQ 9.0. The De-tensioning shall continue from that point where the final or third liftoff was taken. The tendon shall not be de-tensioned until the liftoffs are documented. The ram will still be coupled to the anchorage.

7.2 De-tensioning of each tendon end may proceed independently of the other end; however, jacks must not be uncoupled until the tendon is completely de-tensioned.

7.3 To alleviate holding jacks under pressure for period of time, it is recommended that both ends of a tendon be de-tensioned in unison except single end stressed vertical tendons which are detensioned from one end. This should assist in correct positioning of the anchor head.

## 8.0 DETENSIONING THE TENDON

8.1 Where a tendon is specified to require De-tensioning, to permit inspection of the De-tensioned anchorages, wires, shims and bearing plates, the following operations shall take place.

8.2 With the final liftoff being completed and the load completely off the shims, all the shims shall be removed. If more clearance is required, the load on the tendon may be increased up to a maximum jack force of 1592 kips (based on a tendon with 169 effective wires). If the shims can not be removed at this force, then unload the jack, and notify Exelon Engineering to resolve condition.

8.2.1 Keep the shims from each stack separate (The shims are paired and must be stacked in pairs.). This will permit the shims to be replaced without extensive re-matching.

CAUTION AFTER IMPLEMENTING STEP 8.3, A 10 MINUTE WAITING PERIOD **SHALL** BE IMPOSED TO ALLOW THE DISSIPATION OF ENERGY THT MAY BE TRAPPED WITHIN THE TENDON.

8.3 With the shims removed, the load on the tendon shall be reduced to zero. The maximum de-tensioning rate of the jacks for each tendon shall correspond to a reduction in tendon force in a slow and controlled manner. Both ends of a tendon shall be de-tensioned in unison unless otherwise directed by the PSC Superintendent. To alleviate holding jacks under pressure for periods of time, it is recommended that both ends, if applicable, of a tendon be de-tensioned in unison.

8.4 Jacks shall not be uncoupled until the tendon is completely de-tensioned.

8.5 Once de-tensioning is complete, anchorage inspection shall be performed per PSC Procedure SQ 8.0 for corrosion, cracks, off-size button heads, missing, broken, and/or damaged wires and recorded on Data Sheet 8.0A, 8.0B if there is any change in previously recorded data.

## 9.0 CONTINUING OPERATIONS

9.1 Once De-tensioning is complete any number of operations may follow such as:

9.1.1 Continuity Test

9.1.2 Tendon Wire Removal

9.1.3 Re-tensioning the Tendon

## 10.0 ACCEPTANCE

10.1 There are no requirements for acceptance or non-acceptance during De-tensioning of a Tendon.

## 11.0 DOCUMENTATION

11.1 Section 8.5 of this procedure to be documented to Data Sheet 8.0A or 8.0B of PSC Procedure SQ 8.0.

# EXELON
# THREE MILE ISLAND
# UNIT 1 (40TH YEAR) PHYSICAL
# CONTAINMENT BUILDING TENDON SURVEILLANCE

PRECISION SURVEILLANCE CORPORATION
IN-SERVICE INSPECTION
TENDON SURVEILLANCE PROGRAM

## DE-TENSIONED ANCHORAGE INSPECTION

| | | |
|---|---|---|
| Melissa Lara | *Q.C. INSPECTOR* | 09/03/13 |
| Prepared by | Title | Date |
| Gerald F. Bussone | *Q.A. MANAGER* | 09/03/13 |
| Approved by | Title | Date |
| Paul C. | *PRESIDENT* | 09/03/13 |
| Approved by | Title | Date |

## 1.0 PURPOSE

1.1 This procedure will establish the requirements for the visual inspection and evaluation of the tendon end anchorages, shims, bearing plate, button heads and wires during In-Service-Inspection (Surveillance) of Post-Tensioning System Tendons after that tendon has been De-tensioned at Exelon's Three Mile Island Nuclear Plant - Unit 1.

## 2.0 RESPONSIBILITY

2.1 In the event of conflict between any TMI Procedure and an SQ, the former governs.

2.2 As stated in PSC Procedure QA 4.0.

## 3.0 QUALIFICATIONS

3.1 The inspector performing this inspection is to be qualified as a Level II examiner as defined in PSC's written certification practice approved by Exelon and each examiner shall be approved by the Exelon Responsible Engineer.

## 4.0 EQUIPMENT

4.1 The gauges and test equipment necessary for the Quality Control activities will be itemized in PSC Procedure SQ 4.0.

## 5.0 QUALITY CONTROL

5.1 All Quality Control Documentation (QCD) points noted in this procedure are Hold Points. The work shall not progress past or through a QCD without a verbal release from the Inspector. The required information or evaluative data shall be documented on Data Sheet 8.0A or 8.0B of PSC Procedure SQ 8.0 that has already been started for this tendon.

## 6.0 PRECAUTIONS

CAUTION - NEVER STRIKE THE BUTTONHEADS, THE WIRES OR THE ANCHORAGES OF A STRESSED TENDON WITH A HAMMER OR ANY OTHER METAL OBJECT.

## 7.0 PREREQUISITES

7.1 The Anchorage Cleanup will be completed.

7.2 The tendon will be in a De-tensioned Condition.

## 8.0 ANCHORAGE INSPECTION

8.1 The tendon anchorage, including the shop head, field head and bushing, bearing plate, stressing shims, and wires of all selected tendons shall be visually inspected for signs of excessive stress, corrosion, cracks, missing, or broken wires. Button heads shall be inspected for cracks, splits and slips.

8.2 Inspect the interior of the bearing plate and trumpet tube for any evidence of voids or incompleteness of the grease coverage. It should be noted that air pockets will be seen, probably in the shape of a cone. This is the typical condition of the grease in a solid condition and must not be construed as a deficiency.

8.3 Inspect the tendon wires from the bottom of the anchorage into the tendon duct for signs of corrosion. Use PSC Procedure SQ 8.0 Table 1 to evaluate the Corrosion Condition of the wires.

8.3.1 **QCD-** Document the Corrosion Condition rating for the tendon wires.

8.4 Inspect the bottom side of the anchorages for Corrosion Level rating, using PSC Procedure SQ 8.0 Table 1 to evaluate the anchorages.

8.4.1 **QCD-** Document the Corrosion Level rating for the anchorages. (9.2 of DS 8.0)

8.5 Inspect the shims and bearing plate for signs of Corrosion using PSC Procedure SQ 8.0 Table 1 for evaluation. Clean the shims and bearing plate as necessary to perform this evaluation.

8.5.1 **QCD-** Document the Corrosion Level ratings for the shims and bearing plate (9.2 of DS 8.0).

8.6 Inspect the anchorages, shims and bearing plates for any evidence of cracking during the Corrosion Level evaluation.

8.6.1 **QCD-** Document any cracks found on Sketch Sheet 8.0 from PSC Procedure SQ 8.0. Include any dimensions that could help to locate or evaluate the cracks. Indicate whether cracks or excessive stress have been found on DS 8.0 (10.1).

8.7 The anchorages shall be pushed back from the ends of the wires toward the bearing plate. This may be accomplished manually or with mechanical devices, just so the anchorages, threads wires are not damaged in any way.

8.8 Inspect the wires from the bottom of the button heads to that point where the bottom of the anchorage was located, for signs of corrosion. The button heads shall be visually inspected at this time in accordance with the requirements of Section 11.0 of PSC Procedure SQ 8.0.

8.8.1 **QCD-** If the Corrosion Condition of this area of the wires is the same or better than that evaluated in Section 8.3.1 of this procedure, it shall not be necessary to enter any additional information on the Data Sheet.

8.8.1.1 **QCD-** If the Corrosion Condition is of a lower rating than the original entry in the Corrosion Condition rating area shall be corrected to reflect that lower rating.

8.8.1.2 It shall be acceptable to delay the documentation of Section 8.3.1 until this area of the wire has been inspected and evaluated. If both ratings are the same, only one entry need be made.

8.9 With the anchorages pushed back, protruding wires can be evaluated for Continuity through the use of PSC Procedure SQ 10.5.

8.9.1 If it is determined during this inspection that a protruding wire is broken, it shall not be necessary to perform the Continuity Test on that wire, but that wire shall be removed and Exelon notified with a nonconformance report.

8.9.2 If it is determined during this inspection that any other wire is broken, that wire shall be removed and Exelon notified with a nonconformance report.

8.9.2.1 **QCD-** Document the broken protruding wire as required of PSC Procedure SQ 10.5 on Data Sheet 8.0.

8.9.2.2 **QCD-** Additional broken wires shall be documented directly on Data Sheet 8.0 in the manner required of PSC Procedure SQ 8.0 Section 12.3.

8.9.2.3 If the amount of broken wires detected in this inspection increases the total quantity of Broken/Missing Wires/Button heads for the earlier Anchorage Inspection of this tendon in a stressed condition to 1 or more during this surveillance, it shall be necessary to notify Exelon Nuclear of this condition in accordance with the requirements of Section 9 of this Procedure.

8.9.2.4 It shall be acceptable to continue working to complete all the inspections so that all the results are available for evaluation. Exelon shall be notified within 24 hours of discovery.

8.10 The tendon wire to be used for physical testing shall be removed at this time, in accordance with PSC Procedure SQ 10.2.

8.11 Damaged or excessively deformed shims shall be replaced at this time. Damage other than would be noted from the load resting on the shims shall be documented.

8.11.1 **QCD-** Document unusual damage or conditions for any item of the tendon end, on Sketch Sheet 8.0 (PSC Procedure SQ 8.0).

8.12 With the completion of this inspection and the required documentation, if all results are acceptable, then it shall be permitted to continue working or inspecting the tendons.

8.13 Once the inspections of Procedure SQ 10.1 are completed, if nonconforming conditions are detected and Exelon notified in accordance with Section 9 of this procedure, no further work beyond PSC Procedure SQ 10.1 shall be performed on this tendon without the permission of Exelon, which should include a recommendation for corrective action.

8.14 The tendon ends shall be protected whenever it is not being worked or inspected. This protection shall include a light coating of grease and covering with a plastic bag, plastic sheeting or the grease cap if that tendon is exposed to the weather.

8.15 Prior to pulling the anchorage back to the ends of the wire, the tendon wires shall be coated with grease. The grease may be brushed on or poured on, just so the wires get coated.

8.16 The anchorages shall be pulled back to the button heads.

8.17 Examine the tendon wires in the tendon duct after pulling back the anchor heads and re-centering the tendon. If the tendon wires in the trumpet tube appear to be a little thin on grease coating, it shall be acceptable to brush some grease onto the wires as an additional measure of protection.

8.18 That portion of wire extending from the back of the anchorage to the pushed back location of the anchorage shall be coated with grease.

8.19 Be prepared to catch any runoff of the grease as it is being applied to the tendon wires.

8.20 The tendon shall now be ready for Re-tensioning, concluding this procedure.

## 9.0 NOTIFICATION

9.1 Exelon shall be formally notified when each one or more of the following conditions are detected as a result of the inspection of a tendon.

9.1.1 CORROSION LEVEL C-when detected for Anchorages, Tendon Wire, Shims and/or Bearing Plates, Exelon shall be notified with a nonconformance report.

9.1.2 CRACKS-no matter how small, when detected for Anchorages, Shims and/or Bearing Plates, Exelon shall be notified with a nonconformance report.

9.1.3 ADDITIONAL MISSING OR BROKEN WIRES/BUTTONHEADS-when detected for a quantity of 1 or more since the original installation or previous surveillance, Exelon shall be notified with a nonconformance report, but it will not be necessary to stop work to await approval of the NCR.

## 10.0 DOCUMENTATION

10.1 The items in this procedure requiring documentation shall be documented on Data Sheet 8.0 already started for this tendon from the Anchorage Inspection of PSC Procedure SQ 8.0.

10.2 The Data Sheet references the applicable section number of the procedure for each QCD point.

# EXELON
# THREE MILE ISLAND
# UNIT 1 (40TH YEAR) PHYSICAL
# CONTAINMENT BUILDING TENDON SURVEILLANCE

PRECISION SURVEILLANCE CORPORATION
IN-SERVICE INSPECTION
QUALITY CONTROL PROCEDURE

## TEST WIRE REMOVAL

| | | |
|---|---|---|
| Melissa Lara | *Q.C. INSPECTOR* | 09/03/13 |
| Prepared by | Title | Date |
| Gerald F. Bussone | *Q.A. MANAGER* | 09/03/13 |
| Approved by | Title | Date |
| Paul C. | *PRESIDENT* | 09/03/13 |
| Approved by | Title | Date |

## 1.0 PURPOSE

1.1 This procedure will establish the requirements for removing a sample wire to be used for physical testing, during the 40th Year In-Service-Inspections (Surveillance) of the Post-Tensioning System Tendons of Exelon's Three Mile Island Nuclear Plant - Unit 1.

1.2 One continuous and any other discontinuous tendon wires will be removed from the designated tendons to have wire removed. Do not remove more than three wires from any one tendon during this surveillance period without TMI Engineering approval.

## 2.0 RESPONSIBILITY

2.1 In the event of conflict between any TMI Procedure and an SQ, the former governs.

2.2 As stated in PSC Procedure QA 4.0.

## 3.0 QUALIFICATIONS

3.1 As stated in PSC Procedure QA 4.1.

## 4.0 EQUIPMENT

4.1 Quality Control gauges or test equipment will not be required for this activity, except where hydraulic devices and gauges are used.

## 5.0 QUALITY CONTROL

5.1 This procedure contains ***HOLD POINTS***. The work shall not progress past or through a ***HOLD POINT*** without a sign-off from the QC Inspector. All Quality Control Documentation (***QCD***) points shall only require documentation of information or evaluation data. The sign-offs and required information or evaluation data shall be documented on Data Sheet 10.2 or Data Sheet 8.0 of PSC Procedure SQ 8.0.

## 6.0 PRECAUTIONS

6.1 When pulling individual wires, never exceed 80% GUTS of that wire when pulling with the pulling device - 9,425 pounds.

6.2 Discontinuous wires shall not be used to satisfy the requirements for the physical testing of this procedure.

6.3 If other Broken/Missing Wires are found in this tendon as a result of this inspection or previous inspections, it shall be necessary to select a wire from this tendon that would tend to balance the forces in that tendon anchorage and try to maintain symmetry with the missing wires in the hole pattern.

- BE SURE THAT THE CORRECT WIRE HAS BEEN LOCATED BEFORE CUTTING.
- BE SURE THAT THIS TENDON REQUIRES SAMPLE WIRE REMOVAL.
- USE CARE TO AVOID DAMAGING OTHER WIRES OR BUTTONHEADS.
- AVOID UNNECESSARY MARKS OR DAMAGE TO THE WIRE WHILE REMOVING.
- USE CARE WHEN COILING THE WIRE AND SECURING IT INTO A COIL. THIS WIRE HAS CONSIDERABLE SPRING FORCE AND MUST BE PREVENTED FROM UNCOILING VIOLENTLY.

## 7.0 PREREQUISITES

7.1 The anchorage inspection will be complete and Data Sheet 8.0 available.

7.2 The tendon will be detensioned; monitoring of forces has been completed.

## 8.0 WIRE REMOVAL

8.1 A wire shall be selected, preferable from the two outer rows of the anchorage hole pattern.

8.2 The Tendon Surveillance Wire Puller shown in Figure 1 of PSC Procedure SQ 10.5 shall be attached to the selected wire.

8.3 The wire shall be pulled with the Wire Puller using as little force as possible.

8.3.1 If the wire cannot be moved by hand, it shall be acceptable to use any mechanical device to accomplish that purpose, such as a "Come-A-long", "Chain-Hoist", "Chain Pawl" or hydraulic ram.

8.3.1.1 It is unlikely that anything but the hydraulic ram will be able to exert such an amount of force so as to yield or break the wire. Therefore hydraulic devices shall be controlled for force through a calibrated gauge or controlled for maximum force through a locking valve to control the amount of pressure to be exerted.

8.3.1.2 There remains a possibility that a limited force might not move the wire. It shall be necessary to abandon that wire and select a new wire, continuing this process until a wire can be moved. All abandoned wires shall be identified on Data Sheet 8.0 of Procedure 8.0. All wires shall be considered effective wires provided the yield strength of the wire was not exceeded.

8.4 Once a tendon wire is located that can be moved, it shall be witnessed for that movement at the opposite end of the tendon to verify that this is a continuous wire.

8.5 Prepare to cut the wire at the opposite end of the tendon from where the wire is to be pulled.

8.5.1 ***QCD*** – Document the location of wire removal on Data Sheet 8.0 of Procedure SQ 8.0. Once this is posted, document that action on Data Sheet 10.2 of this Procedure.

8.5.2 Measure back from the buttonhead 1 inch plus or minus 1/16 inch and mark or scribe a line; it shall be acceptable to notch the wire with a file.

8.5.3 Cut the wire somewhere between the buttonhead and the marked line, but not on the line.

8.5.4 Pull the wire completely through the tendon duct.

8.5.4.1 While pulling, the entire length of the tendon wire shall be visually inspected for pitting, corrosion, or other signs of deterioration and evaluated in accordance with TMI Procedure 1301-9.1 Rev 23.

8.5.4.1.1 ***HOLD POINT*** – Document the Category of Corrosion rating on Data Sheet 10.2, for every 10 feet of length.

8.5.4.1.2 If the Category of Corrosion is found to be active as defined in Table 1 of SQ 8.0, TMI Engineering shall be notified with a nonconformance report. TMI Engineering shall provide the final corrective action, which could include removing additional wires and performing Physical Testing.

8.5.4.2 While the tendon wire is being pulled, it may be cleaned of excess grease and coiled into coil form of approximately five-foot diameter. Secure the coil from unwinding. Solvent cleaning may be performed to facilitate cleaning before inspection.

8.5.4.2.1 It shall be acceptable to cut the wires into 10 foot lengths if coiling is impractical. The cut wires shall be identified as required of Section 8.5.5 of this procedure.

8.5.4.3 After the tendon wire has been pulled through, it shall be measured for length.

8.5.4.3.1 ***QCD*** – Document the total length of wire on Data Sheet 10.2. Remember to include the length of wire that was cut from the opposite end.

## 8.5.4.4 WIRE SAMPLE QUANTITY AND LOCATION REQUIREMENTS

### 8.5.4.4.1 ACCEPTABLE WIRE

8.5.4.4.1.1 Three specimens shall be tested. One sample shall be taken from approximately the middle of the tendon wire length, with the two remaining samples being taken, one from approximately each end of the tendon wire.

### 8.5.4.4.2 BROKEN WIRE

8.5.4.4.2.1 If Broken Wires require testing, three specimens shall be tested. One sample shall be taken from the wire length about one foot from either side of the break. The two remaining samples shall be taken, one from approximately each end of the tendon wire.

### 8.5.4.4.3 UNACCEPTABLE CATEGORY OF CORROSION CONDITION

8.5.4.4.3.1 If Unacceptable Category of Corrosion Condition Wires require testing, at least one specimen shall be tested, with that sample being taken from what is judged to be the worst representative section of the wire length. Other samples may be selected and/or tested at the request of TMI Engineering.

8.5.4.5 If the wire testing is to be performed on site, it shall be acceptable to cut the 3 sample wires while the wire is being pulled out and coiled. Refer to PSC Procedure SQ 10.3 for the control and documentation requirements. The sample shall be cut from each end and the middle of the wire and as cited in Section 8.5.4.4.1.1 above and shall be about 10' long, unless the wires are to be cut to the required testing length.

8.5.4.6 Sample selection shall include areas representative of the most significant Category of Corrosion if this condition exists on the removed wire. Provide samples of this condition in addition to the original 3 samples required. Samples shall not contain gripper marks from the pulling device.

8.5.4.6.1 As a note of caution, be sure that the wire is moving freely before cutting. Otherwise there could be difficulty in removing the wire, requiring assist devices that could leave surface marks on the wire.

8.5.4.6.2 ***QCD*** – When the wire is cut for samples, document the area of removal on Data Sheet 10.2 for later transfer to Data Sheet 10.3 of PSC Procedure SQ 10.3. Document each location of sample removal and tag each cut length for area of removal, tendon identification, pulling direction, date, and plant name and unit.

8.5.5 Attach a tag to the end of the wire being pulled that identifies the tendon, end of removal, pulling direction, date, and plant name and unit. If the wire is cut for samples during removal, the cut lead or front end of the wire shall be identified by tendon number, end of removal, and location in the total length of the test wire to permit reconstruction of that wire as it existed in the tendon.

8.5.6 The coiled wire, whether a single piece or cut pieces, shall be securely tied and covered with plastic sheeting or a plastic bag to protect the wire from inclement conditions.

8.6 If it becomes necessary to remove any additional wires from a tendon for physical testing, this procedure shall be followed to include the additional documentation. For example, Broken Wires or wires with Active Corrosion may be instructed to be removed by TMI Engineering.

8.7 ***QCD*** – Each wire that has been removed for physical testing during this surveillance shall be documented for location of removal on Data Sheet in TMI Procedure 1301-9.1 Rev 23, using the appropriate Code Symbol. Document the posting of this information on Data Sheet 10.2.

8.8 ***QCD*** – Document the identification and recalibration date of the measuring device and the wire Pulling Ram, if used, on Data Sheet 10.2.

## 9.0 DOCUMENTATION

9.1 The items requiring documentation in this procedure shall be documented on Data Sheet 10.2.

9.2 Some information documented on Data Sheet 10.2 shall require subsequent posting to Data Sheet in TMI Procedure 1301-9.1 Rev 23 and to Data Sheet 10.3 of PSC Procedure SQ 10.3.

9.3 The Data Sheet references the applicable Section or Step number of the procedure for each ***QCD*** or ***HOLD POINT***.

## 10.0 ATTACHMENTS

10.1 Data Sheet 10.2

N1091 PSC PROCEDURE SQ10.2
**TEST WIRE REMOVAL**
**Data Sheet 10.2**
09/03/13
Page 1 of 1
Revision 0

Project: TMI 40TH YEAR TENDON SURVEILLANCE ☐ UNIT 1

Tendon No.: ______ Tendon End: ______ ☐ Shop ☐ Field

Removal Date: ______ Inspection Date: ______

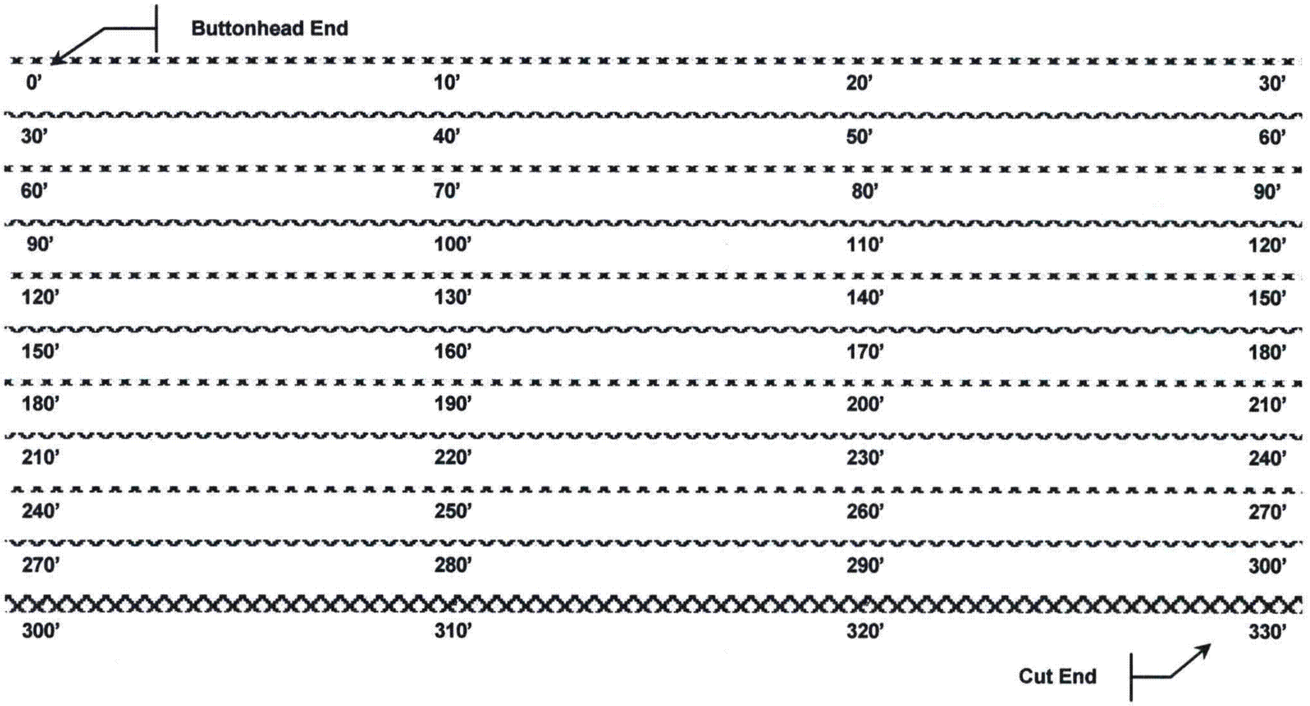
## WIRE REMOVAL INSPECTION

*CORROSION INSPECTION @ LENGTH INTERVALS*

(8.5.4.1.1) Document the Corrosion Category for each 10' of wire in the increments below. Use Categories described in PSC SQ 8.0.

For Corrosion Level C document condition on an NCR. NCR Req'd: ☐ NO ☐ YES NCR# ______

(8.5.4.3.1) Document the total length of the wire on the diagram below. Completed: ☐ NO ☐ YES



(8.5.4.6.2) Was the wire cut for samples: ☐ NO ☐ YES document the area of removal above using symbol ✕.

(8.7) Document the location of wire removed on Data Sheet 8.0, ANCHORAGE INSPECTION: ☐ Completed

(8.8) Measuring Device: ______ ID Number: ______ Recal Date: ______

(8.8) Wire Pull Ram ID Number: ______

Q.C Inspector: ______ Level: ______ Date: ______

QC Reviewed: ______ Level: ______ Date: ______

# EXELON
# THREE MILE ISLAND
# UNIT 1 (40TH YEAR) PHYSICAL
# CONTAINMENT BUILDING TENDON SURVEILLANCE

PRECISION SURVEILLANCE CORPORATION
IN-SERVICE INSPECTION
QUALITY CONTROL PROCEDURE

## TESTING TENDON WIRES

| | | |
|---|---|---|
| Melissa Lara | *Q.C. INSPECTOR* | 09/03/13 |
| Prepared by | Title | Date |
| Gerald F. Bussone | *Q.A. MANAGER* | 09/03/13 |
| Approved by | Title | Date |
| Paul C. | *PRESIDENT* | 09/03/13 |
| Approved by | Title | Date |

## 1.0 PURPOSE

1.1 This procedure will establish the requirements for the Physical Testing of tendon wires removed from Post-Tensioning System Tendons, during the 40th Year In-Service-Inspections (surveillance) of the Post-Tensioning System Tendons of Exelon's Three Mile Island Nuclear Plant - Unit 1.

## 2.0 SCOPE

2.1 The intention of this procedure is to provide the means of physically testing an Acceptable Wire removed from a tendon. However, this Procedure shall also apply for the physical testing of wires which may have been found to be Broken or in an Unacceptable Category of Corrosion.

2.2 An approved Test Laboratory will be utilized for the physical testing.

2.3 Testing is to be done per the requirements of ASTM A370 as noted in ASTM A421.

2.4 The Laboratory that performs the testing shall be responsible for controlling the samples, performing the testing, documenting the testing on Laboratory letterhead stationery and submitting the reports to:

PRECISION SURVEILLANCE CORPORATION
3468 Watling Road
East Chicago, IN 46312
Attention: Quality Assurance

2.4.1 The Laboratory shall further be responsible to utilize trained personnel for the testing and maintain the calibrated status, traceable to the NIST, for all test or measuring devices that may be used in providing test results.

2.4.2 The Laboratory shall provide open access for inspection, survey or audit, as the need might arise, to PSC or its customers.

2.5 The PSC Quality Assurance Organization shall be responsible for the qualification of Laboratory sources.

2.6 Where specified in the Contract Documents, the Owner or his Agent shall have the right of approval for Laboratory sources.

2.7 The PSC Quality Control/Quality Assurance and/or Engineering Department shall review the reports for accuracy and content and for evaluation of the acceptability of those results.

2.7.1 This report shall be submitted to the Owner or his Agent with the final Surveillance Report.

# EXELON
# THREE MILE ISLAND
# UNIT 1 (40TH YEAR) PHYSICAL
# CONTAINMENT BUILDING TENDON SURVEILLANCE

## PRECISION SURVEILLANCE CORPORATION
## IN-SERVICE INSPECTION
## QUALITY CONTROL PROCEDURE

## CONTINUITY TEST

| | | |
|---|---|---|
| Melissa Lara | *Q.C. INSPECTOR* | 09/03/13 |
| Prepared by | Title | Date |
| Gerald F. Bussone | *Q.A. MANAGER* | 09/03/13 |
| Approved by | Title | Date |
| Paul C. [illegible] | *PRESIDENT* | 09/03/13 |
| Approved by | Title | Date |

## 1.0 PURPOSE

1.1 This procedure will establish the requirements for performing a Continuity Test of tendon wires for purposes of visual inspection and evaluation of, usually, Protruding/Unseated tendon wires for Post-Tensioning System Tendons, during the 40th Year In-Service-Inspections (surveillance) of the Post-Tensioning System Tendons of Exelon's Three Mile Island Nuclear Plant - Unit 1.

## 2.0 SCOPE

2.1 The Continuity Test may be performed at the request of TMI Engineering if additional tendon wires are found to be Protruding/Unseated since the original installation or previous surveillance during the Buttonhead Inspection of PSC Procedure SQ 8.0.

## 3.0 RESPONSIBILITY

3.1 In the event of conflict between any TMI Procedure and an SQ, the former governs.

3.2 As stated in PSC Procedure QA 4.0.

## 4.0 QUALIFICATIONS

4.1 As stated in PSC Procedure QA 4.1.

## 5.0 QUALITY CONTROL

5.1 This procedure contains no ***HOLD POINTS***. All Quality Control Documentation (***QCD***) points shall only require documentation of information or evaluation data. The required information or evaluation data shall be documented on Data Sheet 10.5.

## 6.0 EQUIPMENT

6.1 Equipment needed for the continuity test includes a tapeline, the pulling device and jacks or hoisting equipment, calibrated hydraulic devices and gauges.

## 7.0 PRECAUTIONS

- CAUTION - WHEN PULLING INDIVIDUAL WIRES, NEVER EXCEED 80% OF THE GUARANTEED MINIMUM ULTIMATE STRENGTH OF THAT WIRE WHEN PULLING WITH THE PULLING DEVICE – 9,425 POUNDS.

## 8.0 PREREQUISITES

8.1 The Grease Cap will be removed and grease samples taken.

8.2 The Anchorage Inspection will be complete, with protruding wires in evidence.

8.3 The tendon will be detensioned; it has been monitored for forces.

8.4 Each wire that was determined to be Protruding/Unseated as a result of the Buttonhead Inspection of TMI Procedure 1301-9.1 Rev 23 will be adequately identified either by marking, tagging or reference to Data Sheet.

8.5 The anchorages at each end of the tendon will be pushed back about 12 inches.

8.6 ***QCD*** – Document the tendon identification, Unit # and tendon end on Data Sheet 10.5.

## 9.0 CONTINUITY TEST

9.1 The Protruding/Unseated wire shall be located.

9.1.1 ***QCD*** – Document the location of each wire by marking it on the appropriate anchorhead sketch. Number each mark corresponding with the wire numbers in the table so as to identify which data is for each wire tested. If more wires need to be tested on one tendon than will fit on Data Sheet 10.5 it will be acceptable to use additional sheets and continue the sequential numbering so as not to reuse any numbers.

9.2 The Tendon Surveillance Wire Puller shown in Figure 1 of this procedure shall be attached to the wire to be tested.

9.3 The wire shall be pulled with the Wire Puller using as little force as possible, but not to exceed 9,425 pounds.

9.3.1 If the wire cannot be moved by hand, it shall be acceptable to use any mechanical device to accomplish that purpose, such as a "Come-A-long", "Chain-Hoist", "Chain-Pawl" or hydraulic cylinder.

9.3.2 It is unlikely that anything but the hydraulic cylinder will be able to exert such an amount of force so as to yield or break the wire. Therefore, hydraulic devices shall be controlled for force through a calibrated gauge or controlled for maximum force through a locking valve to control the amount of pressure to be exerted.

9.3.3 There remains a possibility that a limited force might not move the wire. It may be possible to break that wire loose with force in excess of 9,425 pounds. This attempt shall only be undertaken with the mutual consent of TMI Engineering responsible for the In-Service Inspection and the PSC Construction Manager.

9.3.3.1 If it is decided to exceed the control force, the amount of force used to move that wire shall be documented and evaluated for impact on the strength of the wire and the force to be applied to the Retensioning of the tendon.

9.3.3.2 ***QCD*** – Document the maximum force used to move the wire on Data Sheet 10.5, if over 9,425 pounds.

9.4 The wire shall be considered continuous if it can be observed to move at the opposite end of the tendon.

9.4.1 ***QCD*** – Document that wire as continuous on Data Sheet 10.5.

9.5 If the wire cannot be observed to be moving, it could be broken and the pulling shall continue until that wire is removed.

9.5.1 ***QCD*** – Document that wire as discontinuous on Data Sheet 10.5. As the wire is drawn it shall be checked for corrosion condition and to determine the cause of breakage, if possible. Document the Category of Corrosion of the wire using Table 1 in SQ 8.0. Also document, where possible, the reason for breaking.

9.5.2 ***QCD*** – If the wire is broken, it shall be shown as broken on Data Sheet 8.0 and added to the total of Broken/Missing Wires and the Code Symbol modified to reflect that fact.

9.5.2.1 If any or all of the Protruding/Unseated wires since the original installation or previous surveillance are found to be broken and when added to the amount of Broken/Missing Wires on Data Sheet totals 1 or more, it shall be necessary to notify TMI Engineering of this condition in accordance with the requirements of TMI Procedure 1301-9.1 Rev 23. It shall be acceptable to continue working and notify TMI Engineering at the earliest opportunity, but within 24 hours of discovery.

9.5.2.2 If any or all the Protruding/Unseated wires have been determined to be continuous, each shall be re-inspected for Protrusion after Retensioning to see if they have seated themselves. An evaluation of that condition shall be performed after Retensioning.

9.5.2.3 ***QCD*** – If any or all the Protruding/Unseated wires remain unseated after Retensioning, it shall be reported as required of TMI Procedure 1301-9.1 Rev 23.

9.6 ***QCD*** – Document any comments identifying any nonconforming or adverse observations or conditions

## 10.0 DOCUMENTATION

10.1 The items requiring documentation shall be documented on Data Sheet 10.5 or to TMI Data Sheet of TMI Procedure 1301-9.1 Rev 23.

## 11.0 ATTACHMENTS

11.1 Data Sheet 10.5

11.2 Figure 1.0 – Tendon Wire Puller

PRECISION SURVEILLANCE

N1091 PSC PROCEDURE SQ 10.5
**CONTINUITY TEST**
**Data Sheet 10.5**
09/03/13
Page 1 of 1
Revision 0

Project: TMI 40TH YEAR TENDON SURVEILLANCE ☐ UNIT 1

(8.6)Tendon No.: ____________ Tendon End: ____________ ☐ Shop ☐ Field

## CONTINUITY TEST DOCUMENTATION

| (9.1.1) Wire No. | (9.3.3.2) Force if greater than 9,425 lbs | Continuous | | (9.5.1) Corrosion Condition | (9.5.2.3) Broken & Posted to D.S. 8.0 | (9.6) Comments | QC Signoff |
|---|---|---|---|---|---|---|---|
| | | (9.4.1) Yes | (9.5.1) No | | | | |
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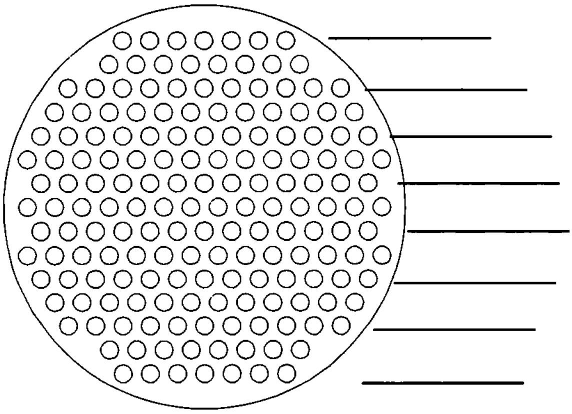
| | | | | | | | |

Identify each wire to be tested by labeling it on one of the sketches below. Mark each wire with a number corresponding to the rows above. Orient the anchorage sketch with the Anchorhead ID. The Comments area is to be used to identify any nonconforming conditions.



| Row | Wires |
|---|---|
| 1 | 7 |
| 2 | 8 |
| 3 | 11 |
| 4 | 12 |
| 5 | 13 |
| 6 | 14 |
| 7 | 13 |
| 8 | 14 |
| 9 | 13 |
| 10 | 14 |
| 11 | 13 |
| 12 | 12 |
| 13 | 11 |
| 14 | 8 |
| 15 | 7 |

This form can be used to verify up to 17 individual wires in columnar fashion. If more than 17 are to be verified or if the entire row is to be verified, then a row by row inspection shall be performed.

Orient the anchorage sketch with the Heat Code Identification and note the wire number as it appears in each row starting from the left side of each row.

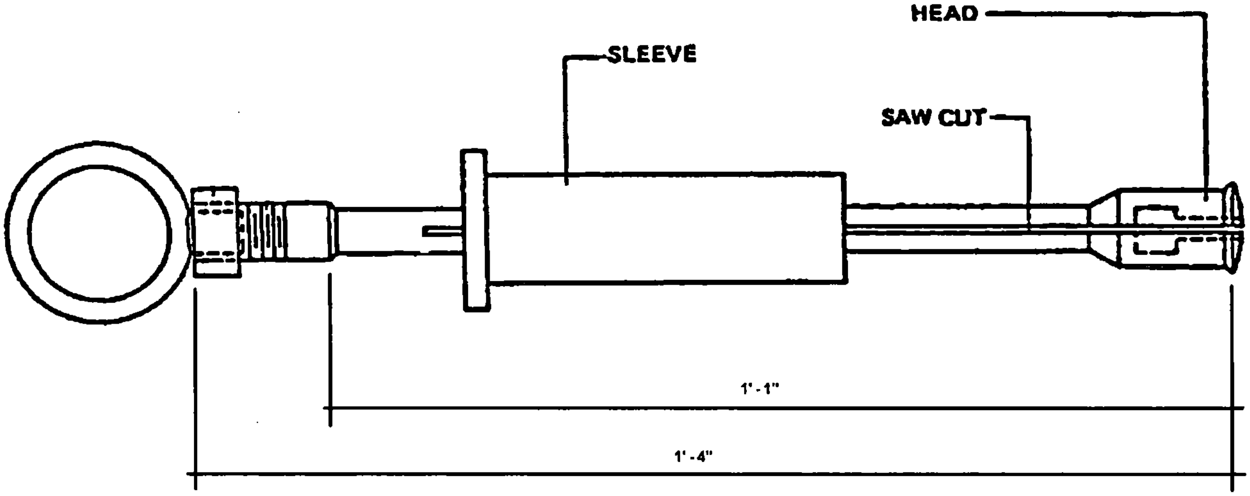
The comment area shall be used to identify particular wires or provide inspection remarks.

Q.C Inspector ____________________ Level: ____________ Date ____________

QC Reviewed ____________________ Level: ____________ Date ____________

## Figure 1.0 – Tendon Wire Puller

Figure 1.0 is a represented sample of a wire puller and is not a quality controlled device. The actual wire puller may vary somewhat from this configuration.



# EXELON
# THREE MILE ISLAND
# UNIT 1 (40TH YEAR) PHYSICAL
# CONTAINMENT BUILDING TENDON SURVEILLANCE

PRECISION SURVEILLANCE CORPORATION
IN-SERVICE INSPECTION
QUALITY CONTROL PROCEDURE

## RE-TENSIONING TENDONS

| | | |
|---|---|---|
| Melissa Lara | *Q.C. INSPECTOR* | *09/03/13* |
| Prepared by | Title | Date |
| Gerald F. Bussone | *Q.A. MANAGER* | *09/03/13* |
| Approved by | Title | Date |
| | *PRESIDENT* | *09/03/13* |
| Approved by | Title | Date |

## 1.0 PURPOSE

1.1 This procedure will establish the requirements for Retensioning Tendons after visual inspection, testing and evaluation during the In-Service Inspections (Surveillances) of the Post-Tensioning System Tendons at Exelon's Three Mile Island Nuclear Plant-Unit 1.

## 2.0 RESPONSIBILITY

2.1 In the event of conflict between any TMI Procedure and an SQ, the former governs.

2.2 As stated in PSC Procedure QA 4.0.

## 3.0 QUALIFICATIONS

3.1 As stated in PSC Procedure QA 4.1.

## 4.0 EQUIPMENT

4.1 The gauges and test equipment necessary for the quality control activities will be itemized in PSC Procedure SQ 4.0.

## 5.0 PRECAUTIONS

5.1 Review the I.S.I. Tendon Surveillance Program Safety Comments for the items that shall apply both for tendon force control and personnel safety.

## 6.0 QUALITY CONTROL

6.1 This procedure contains ***HOLD POINTS***. The work shall not progress past or through a ***HOLD POINT*** without a sign-off from the QC Inspector. All Quality Control Documentation (***QCD***) points shall only require documentation of information or evaluation data. The sign-off's and required information or evaluation data shall be documented on Data Sheet 11.0 or Data Sheet 9.0 of PSC Procedure SQ 9.0.

## 7.0 PREREQUISITES

7.1 All inspections required by PSC Procedure SQ 2.0 will be complete and acceptable.

7.2 Ensure that coupler strength verification (SQ 7.1) has been completed for that coupler/anchorage combination.

## 8.0 MEASUREMENTS

8.1 STEEL RULERS

8.1.1 Measurements of tendon elongation or shim stack height shall be performed with calibrated steel rulers graduated in tenths of an inch (0.1"). The measurements shall be recorded to the nearest 0.05". See Sketch 7.0 at the end of this procedure.

8.1.2 A steel caliper may be used to take the elongation measurement. One caliper blade shall be placed against the bearing plate and the other blade placed against the bottom of the anchorhead. The caliper blades shall be parallel to the tendon during measurement. When the parallel condition is established the blades shall be locked and the caliper withdrawn without disturbing the blade setting. The caliper blades shall be placed on the steel ruler and the dimension determined. See Sketch 7.0 at the end of this procedure.

8.1.3 Tendon elongation measurement shall be performed by measuring the distance between the bearing plate and the bottom of the anchorhead for each end of the tendon.

8.2 PRESSURE GAUGES

8.2.1 Measurements of ram pressure (tendon force) shall be measured by calibrated pressure gauges capable of being read directly to 20 psig.

8.2.2 View the gauge face from a plane of view directly in front of the indicator needle to avoid parallax errors.

8.2.3 Gauge readings shall be interpolated to the nearest 10 psi.

8.2.4 All pressure gauges used shall have automatic compensation for temperature variations between gauge calibration and gauge use during surveillance.

## 9.0 RETENSIONING TENDONS

9.1 The intention of this operation is to stress (retension) those tendons that were detensioned for wire removal and testing during this surveillance and any other tendons that may have been detensioned for evaluation.

9.2 Retensioning of tendons shall be performed on both ends of a hoop and dome tendon, or, single end of a vertical tendon which are only retensioned from the top end. Where it is not possible to perform simultaneous stressing of a tendon, Exelon Engineering shall be notified in writing to provide resolution for such conditions. Adequate communication shall be maintained between both ends of the tendon during the taking of liftoff readings for simultaneous stressing operations.

9.2.1 All data shall be documented on Data Sheet 11.0.

9.3 **QCD** – Document the tendon identification, unit # and tendon end on Data Sheet 11.0.

9.4 **QCD**- Document the exterior surface temperature near the tendon, ambient air temperature, identification and calibrated status of the thermometer(s) on Data Sheet 11.0.

9.5 **HOLD POINT** – The anchorhead and stressing adaptor threads are to be inspected for dirt, burrs, nicks, and damaged threads, if any condition precludes proper coupling the condition should be corrected after notifying Exelon Engineering in writing. Anchorhead threads shall be inspected for deformation before and after any stressing operation and if any deformation is detected Exelon Engineering is to be notified in writing. Document acceptance on Data Sheet 11.0.

9.6 **QCD**- Document the amount of effective wires in each end of the tendon. Refer to Data Sheet 8.0 (12.5) for each tendon end. Document on Data Sheet 11.0.

9.7 **HOLD POINT** – Couple the rams to each anchorhead on that tendon (for single end stressed vertical tendons only the top anchorhead is used). Document on Data Sheet 11.0 that the stressing coupler is evenly aligned on the anchorhead washer and that full thread engagement is obtained.

9.7.1 Be sure that buttonheads do not protrude a significant distance, about one inch or more, above the anchorage face. Otherwise full engagement of the stressing adaptor may bend the wire over before the buttonheads seat on the anchorage face.

9.7.1.1 If wires protrude more than 1 inch the stressing adaptor may be coupled a minimum of 2 inches engagement and the tendon stressed to PTF to seat wires.

9.7.1.2 The stressing adaptor must then be removed to ensure protruding wires are less than 1 inch.

9.7.1.3 Recouple and procede.

9.7.2 Be sure that the anchorage does not recess itself inside the stressing adaptor during coupling. Otherwise the stressing adaptor will seat on the shim stack and will not be capable of being unthreaded from the anchorage. Anchorage should protrude a maximum of ¼" from coupler face.

9.7.3 **QCD**- Document the ram and pressure gauge identification number, calibration due date of each and the Ram Area and Calibration Constant (K). Document on Data Sheet 11.0.

9.8 Determine the Pretensioning Force, Overstress Force and Lock-off (seating) Force and pressure values for that tendon based on the following definitions:

9.8.1 Pretensioning Force (PTF) - That force necessary to bring the tendon into a lightly stressed condition to remove slack and seat the button heads. This force establishes the base for elongation measurement. The Pretensioning Force values for each tendon to be re-tensioned shall be seen in the Re-tensioning Data, PSC Procedure SQ 11.1.

9.8.2 Overstress Force (OSF) - That force at which maximum elongation is determined. Overstress values for each tendon to be re-tensioned shall be found in the Re-tensioning data, PSC Procedure SQ 11.1.

9.8.3 Lock-off Force (LOF) – That force at which the tendon load is transferred to the shim stack from the ram. If the detensioned tendon had an accepted lift-off force greater than its Predicted Force obtained in PSC Procedure SQ 9.0 the Lock-Off Force shall be the as found lift-off force within a tolerance of minus 0% and plus 6%. If the detensioned tendon had a lift-off force less than its Predicted Force obtained in PSC Procedure SQ 9.0 the Lock-Off Force shall be the Predicted Force from PSC Procedure SQ 9.1 within a tolerance of minus 0% and plus 6%. Lock-off Force is not to exceed 70% of G.U.T.S. (1394 kips for a 169 wire tendon, or 8.25 kips per wire).

9.8.4 **QCD**- Document the calculated PTF, Step 1 (800 Kips), Step 2 (1200 Kips), LOF and OSF forces and pressures. Document the Calculated Elongation for Step 1, Step 2, and Overstress from PSC Procedure SQ 11.1 on Data Sheet 11.0.

9.8.5 The tendon shall never be stressed beyond 80% of the Minimum Guaranteed Ultimate Strength (GUTS) of the effective wires remaining in that tendon.

CAUTION-ONCE ACUTAL STRESSING BEGINS, THE RAM MUST NEVER BE EXTENDED TO THE FULL LIMIT OF ITS STROKE. THE EXTENSION SHOULD BE AT LEAST 1/2" LESS THAN THE FULL STROKE OF THE RAM.

## 9.9 TENDON STRESSING (RETENSIONING)

9.9.1 The shim space at each end of the tendon shall be approximately equalized by pressurizing the stressing rams. (Teamwork is especially important from now on until the stressing is completed.) The two stressing crews shall verbally confirm the equalization of the space, or adjust it as necessary. This distance from the bearing plate to the back of the anchorhead should be approximately equal at both ends.

9.9.2 During the application of force to a tendon that is being simultaneously stressed from both ends, the pressure at one end of the tendon shall not exceed the other by more than 1000 psi. For example, if End "A" has moved to 2000 psi, the pressure at that end shall be held until the Opposite or "B" End has achieved that value, then both shall progress to the next value. If different size Rams/Jacks are being used, contact PSC Engineering or QA for maximum variance.

9.9.3 It may be necessary to multiple stage stress the tendon if the ram stroke is too short to accommodate reaching overstress. Stage stressing is accomplished by shimming the load at either end of the tendon when the stroke limit is reached. The pullrod shall be adjusted for the next stressing stage and stressing shall continue as cited below.

9.9.4 Once the space is approximately equalized at each end of the tendon, the ram or rams shall be pressurized to the Pre-tensioning Force (PTF) for the amount of effective wires remaining in the tendon.

9.9.4.1 **QCD**- Document the actual force in kips and pressure in psi and the Actual Elongation measured at PTF. Document on Data Sheet 11.0.

9.9.5 Continue pressurizing the ram past the PTF to Step 1 (800 kips).

9.9.5.1 **QCD**- Document the Actual Elongation measured at Step 1 and the Actual Force in kips and pressure in psi observed at Step 1. Document on Data Sheet 11.0.

9.9.6 Continue pressurizing the ram past Step 1 to Step 2 (1200 kips).

9.9.6.1 **QCD**- Document the Actual Elongation measured at step 2 and the Actual Force in kips and pressure in psi observed at Step 2. Document on Data Sheet 11.0.

9.9.7 Continue stressing to the Overstress Force (OSF).

9.9.7.1 **QCD**- Document the Actual Overstress Pressure in psi and Force in kips reached and measure and document the elongation of the tendon at OSF. Document on Data Sheet 11.0.

9.9.8 ***QCD*** – Calculate Actual Elongation by subtracting the elongation at PTF (9.9.4.1) from the elongation at OSF (9.9.7.1). Document on Data Sheet 11.0.

9.9.9 ***QCD*** – Document the other end tendon elongation on Data Sheet 11.0.

9.9.10 ***QCD*** – Calculate and document the Total Tendon Elongation by adding the elongation from both ends together. Document on Data Sheet 11.0.

9.9.11 ***HOLD POINT*** – Calculate the percent variation between the total tendon elongation during surveillance and the total tendon elongation at original installation using the following formula:

$$\frac{TotalTendonElongation(Surveillance) - TotalTendonElongation(Original)}{TotalTendonElongation(Original)} \times 100\%$$

9.9.12 The Total Tendon Elongation of the tendon during the Surveillance shall be compared to the Original Installation. Percent variation shall not exceed plus or minus 10%.

9.9.12.1 **QCD**- Document the percent of variation, and document the identification and recalibration date of the measuring device. Document on Data Sheet 11.0.

9.9.12.2 If the Total Tendon Elongation, when compared to the original installation elongation is not within the plus or minus 10% tolerance, the shims shall be removed and the load shall be reduced to zero and Sections 9.9.1 through 9.9.12.1 repeated. If the elongation does not meet the specified tolerance after the second restressing, the tendon shall be locked off at the required force and Exelon Engineering shall be notified of the deficiency as required by Section 10.0 of this Procedure.

9.9.12.3 **QCD**- Document the acceptance or non-acceptance of the elongation and the notification of Exelon Engineering, if applicable. Document on Data Sheet 11.0. If the elongation variation is acceptable, the work shall continue as follows:

9.9.12.4 Depressurize the ram reducing the force from overstress to a point about 100 kips above Lock-off but below overstress and prepare to install the shims. As a guide, the original shim stack height should be considered as the starting point for achieving the restoration of force.

9.9.12.5 At any point prior to or during stressing, the field crew shall prepare shim stacks of uniform thicknesses, so that when the shims are placed, the height differential between individual stacks shall not exceed 1/16 inches, thereby maintaining the integrity of the established parallelism between the bearing plate and anchorhead. Badly deformed shims should be replaced by new or acceptable shims of equivalent thickness.

9.9.12.6 After the Target Lock-off point has been reached or slightly higher, the shims shall be placed between the bearing plate and anchorage in diametrically opposite pairs. Continue filling this gap with shims until a small enough space remains so that the anchorhead can be lowered to the shim stack placing the load transfer within the required lock-off tolerance.

9.9.12.7 ***HOLD POINT*** – When inserting split shims, the three inch (3") thick shim is adjacent to the anchorhead and the one inch (1") thick shim is adjacent to the bearing plate. Incremental shims are inserted between the 3 inch and 1 inch shims. The difference in height of the stacks of shim halves shall not differ by more than 1/16". While the shims are being placed, the space between the each shim halve for the first shims in direct contact with the anchorage shall not exceed a space of 1/4 inch on either side of the shims. The remaining shims in the shim stack may be placed with a larger spacing but shall not exceed 1/2 inch on either side of the shims. No part of the anchorhead shall overhang the shim stack.

## 9.10 LOCK-OFF VERIFICATION

9.10.1 To assure that the correct forces have been applied to the tendon, the following lock-off verification shall be performed.

9.10.2 Insert two feeler gages or shim stock, about 0.030" in thickness, between the anchorhead and shim. The feeler gages should be located about 180 degrees apart and approximately centered.

9.10.3 Reduce the ram pressure until the load is transferred on the shim stack. It shall not be necessary to return to zero gauge pressure, but at least 2000 psi less than the pressure that was needed to insert the shim stock.

9.10.4 Gradually pressurize the ram while pulling the feeler gages. The point at which the feeler gauge comes loose and can be withdrawn is the Lock-off Reading.

9.10.5 ***QCD*** – Document the acceptable lock-off tolerance range which is calculated in accordance with section 9.8.3 of this procedure. Indicate with a check which option is being used. Document on Data Sheet 11.0.

9.10.6 **QCD**- Document the pressure for each Lock-off Reading of each shim stack. Place a circle around that Lock-off Reading that was the last to have the feeler gauge or shim removed. (The last shim stack to come loose.) Do not intermix the values for the shim stacks. Stack 1 will always be Stack 1. Document on Data Sheet 11.0.

9.10.7 Repeat sections 9.10.1 through 9.10.5 until 3 consecutive circled Lock-off readings have been taken, which should be within 25 kips of each other, if this cannot be achieved the feeler gauges may be repositioned and readings attempted again.

9.10.8 **QCD**- Post the Circled Lock-off Readings into the Circled Lock-off Reading Column. It may be possible to have the Lock-off occur in each shim stack. Add the Circled Lock-off Values and divide by 3 to get the Actual End Average. Record the Actual End Average. Document on Data Sheet 11.0.

9.10.9 ***QCD*** – Enter the Actual End Average from the opposite end of the tendon. Document on Data Sheet 11.0.

9.10.10 ***QCD*** – Calculate the Average Lock-off Value (ALV) for this tendon by adding the lock-off forces from both ends (9.10.8 and 9.10.9) and dividing by 2 to get the average. Document on Data Sheet 11.0.

9.10.11 ***HOLD POINT*** – On Data Sheet 11.0, document the acceptance or non-acceptance of the ALV in accordance with section 9.8.3 of this procedure. If the requirements cannot be met, notify Exelon Engineering by a Nonconformance Report.

9.10.12 If the Lock-off readings are acceptable, the load shall be transferred to the shim stack and the ram pressure reduced to zero.

9.10.13 With the ram at zero force or pressure, it shall be uncoupled from the anchorage.

9.10.14 A visual examination of the tendon just retensioned, shall be performed to determine if any wires have broken during stressing. The number of additional wires or buttonheads that have broken or are missing shall be documented.

9.10.15 ***QCD*** – Document additional broken/missing wires/buttonheads on Data Sheet 11.0 for later transfer to Data Sheet 8.0. Document on Data Sheet 11.0

9.10.16 ***QCD*** - Document additional Protruding/Unseated wires for later transfer to Data Sheet 8.0. Document on Data Sheet 11.0.

9.10.17 **QCD**- Document the shim stack height for the final accepted Lock-off reading.

9.10.18 The Re-tensioning is now concluded and grease cap replacement shall follow.

## 10.0 NOTIFICATION

10.1 Exelon Engineering shall be formally notified when each one or more of the following conditions are detected during retensioning of tendons.

10.2 If coupling to a certain tendon or simultaneous stressing from both ends of a hoop or dome tendon is not possible, notify Exelon Engineering in writing.

10.3 If one or more additional broken/missing buttonheads/wires are detected, Exelon Engineering shall be notified with a Nonconformance Report (NCR).

10.4 If the tendon Lock-Off Force cannot be left within minus 0% or plus 6% of the force as stated in Section 9.8.3 of this Procedure, Exelon Engineering shall be notified by a nonconformance report.

10.5 If the variation between the measured elongation at installation and the calculated measured elongation during surveillance exceeds plus or minus 10%, Exelon Engineering shall be notified with a nonconformance report.

10.6 If any deformation of anchorage threads are detected before or after any stressing operation, Exelon Engineering is to be notified with a nonconformance report.

## 11.0 DOCUMENTATION

11.1 The items requiring documentation in this procedure shall be documented on Data Sheet 11.0.

11.2 The Data Sheet references the applicable section or step number of this procedure for each **QCD** or ***HOLD POINT***.

11.3 Some information from Data Sheet 8.0 of PSC Procedure SQ 8.0, which has already been started for this tendon, shall require posting onto Data Sheet 11.0.

11.4 Some information from Data Sheet 11.0 shall require posting onto Data Sheet 8.0.

## 12.0 ATTACHMENTS

12.1 Data Sheet 11.0

12.2 Sketch 7.0

N1091 PSC PROCEDURE SQ 11.0
**RETENSION TENDONS**
**DATA SHEET SQ 11.0**
09/03/13
Page 1 of 2
Revision 0

Project: TMI $40^{TH}$ YEAR TENDON SURVEILLANCE ☐ Unit 1 ☐ Unit 2

(9.3)Tendon No.: ________ Tendon End: ________ ☐ Shop ☐ Field

(9.4) Temp. of Concrete: ________ °F Thermometer No.: ________ Recal Date: ________

Ambient Temp.: ________ °F Thermometer No.: ________ Recal Date: ________

(9.5) Anchorhead and Stressing Adapter Threads: ☐ Acceptable ☐ Unacceptable

| RETENSIONING DOCUMENTATION | QC Signoffs |
|---|---|

(9.6) Number of Effective Wires: ________ (from Data Sht. 8.0)

(9.7) Anchorhead and Stressing Adapter Engagement/Alignment : ☐ Acceptable ☐ Unacceptable

(9.7.3) RAM ID: ________ Recal Date: ________ RAM Area: ________ K ________

Gauge ID: ________ Recal Date: ________ Daily Check: ________

**Calculated Force for Elongation Measurement and Retensioning using formula below**

***NOTE:*** *Stress during Lift-Off should not exceed 9.425 kips per effective wire or 1592 kips for a 169 wire tendon.*

| | | | | | |
|---|---|---|---|---|---|
| (9.8.4) PTF = | kips | Pressure: | psi | | |
| Step 1 = | kips | Pressure: | psi | Elongation: | in. |
| Step 2 = | kips | Pressure: | psi | Elongation: | in. |
| LOF = | kips | Pressure: | psi | | |
| OSF = | kips | Pressure: | psi | Elongation: | in. |

$$P = \frac{(F - K)}{A} \times 1000$$

Key:
F = Force (kips)
A = Ram Area ($in^2$)
P = Gauge Pressure (psi)
K = Constant factor (kips)
(CAUTION: "K" constants can be either positive or negative.)

QC Reviewed: ________ Level: ________ Date: ________

PSC
PRECISION SURVEILLANCE

N1091 PSC PROCEDURE SQ 11.0
**RETENSION TENDONS**
**DATA SHEET SQ 11.0**
09/03/13
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Revision 0

Project: TMI 40TH YEAR TENDON SURVEILLANCE ☐ Unit 1 ☐ Unit 2

(9.3)Tendon ________ Tendon End: ________ ☐ Shop ☐ Field

**Actual Observed Force and Elongation Measurements using formula below** | QC Signoffs

(9.9.4.1) PTF = ________ kips Pressure: ________ psi ① Elongation: ____ in.
(9.9.5.1) Step 1 ________ kips Pressure: ________ psi Elongation: ____ in.
(9.9.6.1) Step 2 ________ kips Pressure: ________ psi Elongation: ____ in.
(9.9.7.1) OSF = ________ kips Pressure: ________ psi ② Elongation: ____ in.

$$F = \frac{A \times P}{1000} + K$$

(9.9.8) ② – ①= ________ in. Elongation Value (this end)
(9.9.9) ________ in. Elongation Value (opposite end)
(9.9.10) ________ in. TOTAL Tendon Elongation Value
(9.9.12.1) Elongation ____ % Ruler ID: ________ Recal Date: ________

(9.9.12.3) Elongation Results ☐ Acceptable ☐ Unacceptable
Customer Notified NCR No: ________

| **Options** | **Original Lift-off Values from Data Sheet SQ 9.0** | | |
|---|---|---|---|
| A | Lift-off < Predicted Force | ☐ | Use Predicted Force - 0 + 6% |
| B | Lift-off > Predicted Force | ☐ | Use Lift-off - 0 + 6% |
| C | Lift-off > 67% GUTS | ☐ | Use 70% + 0 - 3% GUTS (effective wires) |
| D | Lift-off > 70% GUTS | ☐ | Use 70% + 0 - 3% GUTS (effective wires) |

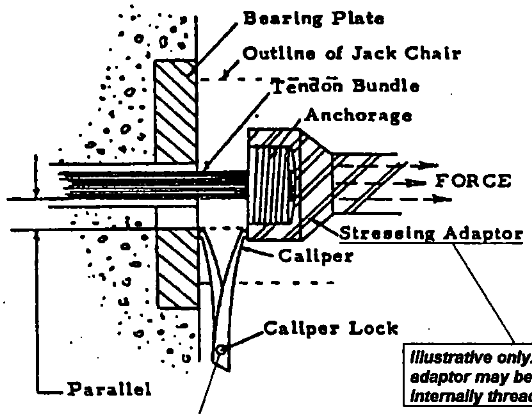
(9.10.5) **LOF Acceptable Range** **Min** **Max**
As found lift-off/or predicted (highest): ________ kips ________ kips
From: ________ psi To: ________ psi

(9.10.6) Actual Lift-Off (9.10.8) Circled Values
Stack #1: 1) ________ psi Stack #2: 1 ________ psi 1) ________ psi
2) ________ psi 2 ________ psi 2) ________ psi
3) ________ psi 3 ________ psi 3) ________ psi

(9.10.8) Force (this end): ________ kips Actual Average: ________ psi
(9.10.9) Force (opposite end): ________ kips (9.10.10)Tendon ALV Force ________ kips
(9.10.11) ALV Acceptable: ☐ Yes ☐ No Customer Notified *NCR* No.: ________
(9.10.15) Additional broken/missing wires: ☐ No ☐ Yes Amount: ________
(9.10.16) Additional Protruding/Unseated wires: ☐ No ☐ Yes Amount: ________
If Yes – Customer Notified NCR No.: ________
(9.10.17) Final Shim Stack Height: #1: ________ in. #2: ________ in.

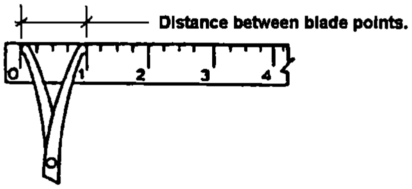
QC Reviewed: ________________ Level: ________ Date: ________

## Elongation Measurement – Sketch 7.0

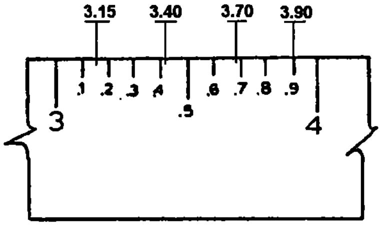


***Illustrative only. Stressing adaptor may be externally or internally threaded.***

**Caliper placed between bearing plate and stressing adaptor, parallel to the tendon bundle. Lock caliper after taking dimension and before removal. Verify accuracy as necessary.**



**After caliper is removed without disturbing setting, place the caliper on the scale at a convenient point, but not on an uneven end and make the measurement.**



**Scale graduated in tenths of an inch (0.10") and estimated to the nearest 0.05 inches.**

# EXELON
# THREE MILE ISLAND
# UNIT 1 (40TH YEAR) PHYSICAL CONTAINMENT BUILDING TENDON SURVEILLANCE

## PRECISION SURVEILLANCE CORPORATION
## IN-SERVICE INSPECTION
## QUALITY CONTROL PROCEDURE

## PSC ENGINEERING DATA

| | | |
|---|---|---|
| Melissa Lara | *Q.C. INSPECTOR* | 09/03/13 |
| Prepared by | Title | Date |
| Gerald F. Bussone | *Q.A. MANAGER* | 09/03/13 |
| Approved by | Title | Date |
| Paul C. [illegible] | *PRESIDENT* | 09/03/13 |
| Approved by | Title | Date |

## 1.0 PURPOSE

1.1 This procedure will establish the PSC Engineering requirements for the Retensioning of Tendons after the tendon has been Detensioned for purposes of Anchorage Inspection and Sample Wire Removal from the Post-Tensioning System Tendons of Exelon's Three Mile Island Nuclear Plant - Unit 1.

## 2.0 SCOPE

2.1 The requirements for the Retensioning of Tendons have been described in TMI Procedure 1301-9.1 Rev 23. While there was some mention of the force values to be applied to a tendon in that Procedure that was only intended as general information. This Procedure will provide the required Engineering Data for the Retensioning operation.

2.2 The data shown herein shall establish the requirements for tendon elongation, PTF and OSF for tendon elongation during the Retensioning of Tendons and the Predicted Forces that affect each Surveillance Tendon.

### 2.2.1 PRETENSIONING FORCE (PTF)

2.2.1.1 The Pretensioning Force (PTF) removes the slack from the tendon and provides a baseline number for elongation measurement. The Table seen in Section 3 of this Procedure will provide the required data for the Retensioning of Tendons.

### 2.2.2 OVERSTRESS FORCE (OSF) - FOR ELONGATION

2.2.2.1 The Overstress Force for Elongations is that force which must be achieved in order to develop the final elongation measurement used in the comparison of actual tendon elongation to the original or calculated tendon elongation. The Overstress Force for this surveillance will be the same as used for the Original Installation adjusted for the remaining Effective Wires.

### 2.2.3 OVERSTRESS FORCE - DO NOT EXCEED

2.2.3.1 At no time shall any tendon be subjected to an Overstress Force which exceeds 1592 Kips for a 169 wire tendon. Tendons with less than 169 wires shall be reduced in force by 9.425 Kips for each wire less than 169.

## 3.0 RETENSIONING DATA

### 3.1 TMI Unit 1 – Restressing Data – Original Scope Tendons

| | PREVIOUSLY | | AT RETENSIONING | | | | | |
|---|---|---|---|---|---|---|---|---|
| TENDON | ORIG PTF (KIPS) | ORIG OSF (KIPS) | NUMBER OF WIRES | NEW PTF (KIPS) | NEW OSF (KIPS) | 800 KIPS (IN.) | 1200 KIPS (IN.) | ORIGINAL ELGONATION (IN.) |
| D-237 | 208.3 | 1518.9 | 168 | 207 | 1510 | 4.28 | 7.16 | 9.4 |
| | | | 167 | 206 | 1501 | 4.31 | 7.22 | |
| | | | 166 | 205 | 1492 | 4.35 | 7.27 | |
| H13-03 | 208.3 | 1593 | 168 | 207 | 1584 | 4.22 | 7.07 | 9.8 |
| | | | 167 | 206 | 1574 | 4.26 | 7.12 | |
| | | | 166 | 205 | 1565 | 4.29 | 7.17 | |
| V-159 | 208.3 | 1472.8 | 168 | 207 | 1464 | 5.80 | 9.72 | 12.3 |
| | | | 167 | 206 | 1455 | 5.85 | 9.79 | |
| | | | 166 | 205 | 1447 | 5.90 | 9.86 | |

### 3.2 TMI Unit 1 – Restressing Data – Augmented Scope Tendons

| | PREVIOUSLY | | AT RETENSIONING | | | | | |
|---|---|---|---|---|---|---|---|---|
| TENDON | ORIG PTF (KIPS) | ORIG OSF (KIPS) | NUMBER OF WIRES | NEW PTF (KIPS) | NEW OSF (KIPS) | 800 KIPS (IN.) | 1200 KIPS (IN.) | ORIGINAL ELGONATION (IN.) |
| H51-40 | 199.8 | 1588.7 | 168 | 199 | 1579 | 4.68 | 7.80 | 10.75 |
| | | | 167 | 197 | 1570 | 4.72 | 7.85 | |
| | | | 166 | 196 | 1560 | 4.76 | 7.91 | |
| V-136 | 199.4 | 1586.6 | 168 | 198 | 1577 | 4.80 | 7.99 | 11 |
| | | | 167 | 197 | 1568 | 4.84 | 8.05 | |
| | | | 166 | 196 | 1558 | 4.88 | 8.11 | |

## 3.3 NOTES CONCERNING ELONGATION DATA

3.3.1 The tendons for this project were based on 169 wires.

3.3.2 Pretensioning Force (PTF) for purposes of elongation shall be as shown in the table above for a 168 or less wire tendon. For each wire less than shown above, reduce PTF proportionately for each tendon using the formula shown in Section 3.2.2 of this procedure.

3.3.3 Overstress Force (OSF) for purposes of elongation shall be as shown in the table above for a 168 wire or less wire tendon. For each wire less than shown above, reduce OSF proportionately for each tendon using the formula shown in Section 3.2.1 of this Procedure.

3.3.4 The Overstress (OSF) Elongation shown above is the Total Elongation for the tendon from Installation or Previous Surveillance. The total elongation from Installation or Previous Surveillance shall be compared to the Total Actual Measured Elongation during this Surveillance.

## 3.4 FORCES DURING SURVEILLANCE

3.4.1 Overstress (OSF) during Retensioning:

$$\frac{(\text{OSF at Installation}) \times (\text{\# of Wires during Retension})}{\text{\#of Wires during Installation}}$$

3.2.2. Pre-Tensioning (PTF) during Retensioning:

$$\frac{(\text{PTF at Installation}) \times (\text{\# of Wires during Retension})}{\text{\#of Wires during Installation}}$$

## 3.5 USE OF "K" (CONSTANT)

3.5.1 With the use of regression analysis for the calibration of ram area, as seen in the PSC Ram Calibration Procedure where error calculation is also considered within the computer program, the ram area no longer reflects the ram size, but instead provides an area measurement with a correction factor related to pressure. This correction factor becomes a "Constant" (K), related only to that ram being calculated for area. The constant is a factor that considers the amount of force necessary to overcome internal resistance. This Constant will vary from ram to ram and could be positive or negative; that is, it may have to be added or subtracted from the total force to provide the true actual force measurement, whether that force is Pre Tensioning Force, Over-Stress Force, or Lock-Off Force.

## 3.6 FORMULA AND WORKING RELATIONSHIPS

3.6.1 The basic formula for determining stressing force or stressing pressure when three factors are known is:

$$F = \frac{A \times P}{1000} + K$$

Key:
F = Force (kips)
A = Ram Area ($in^2$)
P = Gauge Pressure (psi)
K = Constant factor (kips)
(**CAUTION**: "K" constants can be either positive or negative.)

3.6.2 Only P or F could be unknown and remain to be determined. The other three factors will always be provided before beginning the calculations.

# EXELON
# THREE MILE ISLAND
# UNIT 1 (40TH YEAR) PHYSICAL
# CONTAINMENT BUILDING TENDON SURVEILLANCE

PRECISION SURVEILLANCE CORPORATION
IN-SERVICE INSPECTION
QUALITY CONTROL PROCEDURE

## GREASE CAP REPLACEMENT

| | | |
|---|---|---|
| Melissa Lara | *Q.C. INSPECTOR* | 09/03/13 |
| Prepared by | Title | Date |
| Gerald F. Bussone | *Q.A. MANAGER* | 09/03/13 |
| Approved by | Title | Date |
| Paul C. | *PRESIDENT* | 09/03/13 |
| Approved by | Title | Date |

## 1.0 PURPOSE

1.1 This procedure will establish the requirements for the Replacement of Grease Caps after visual inspection and evaluation has been completed for the tendon end anchor head, shims, bearing plates and wires during In-Service Inspections (surveillance) of Post-Tensioning System Tendons of Exelon's Three Mile Island Nuclear Plant - Unit 1.

## 2.0 RESPONSIBILITY

2.1 In the event of conflict between any TMI Procedure and an SQ, the former governs.

2.2 Precision Surveillance Corporation Field Construction Personnel shall be responsible for the physical activities and recording of documentation associated with this procedure, as an option a Precision Surveillance Corporation QC Inspector may record the documentation.

## 3.0 QUALIFICATIONS

3.1 Precision Surveillance Corporation Field Construction Personnel shall be fit by skill, training and/or experience to perform these duties.

## 4.0 EQUIPMENT

4.1 There is no need for Quality control equipment for this procedure.

## 5.0 QUALITY CONTROL

5.1 There are no Quality Control Documentation (QCD) points or HOLD Points in this procedure.

## 6.0 PRECAUTIONS

6.1 Be prepared to support the weight of the grease cap.

## 7.0 PREREQUISITES

7.1 All other work, inspections and evaluations shall be completed with the exception of Grease Replacement.

7.2 Prior to replacement of grease caps record on Data Sheet SQ 12.0 the information required for tendon number, tendon end and date of grease cap replacement.

## 8.0 GREASE CAP REPLACEMENT

8.1 Tendon end caps are being installed per TMI Procedure 1410-Y-83.

8.2 Installation of Hoop, Dome and lower Vertical caps.

8.2.1 Only minor cleaning and brushing should be necessary to prepare the bearing plate and grease cap for remounting to the bearing plate or anchorage.

8.2.2 Prepare bearing plate surface by cleaning with rags and solvent. If detrimental foreign matter such as mill scale, rust, and dirt is detected on the gasket bearing surface of the plate, and power tool cleaning is required, then:

8.2.2.1 Make suitable provisions to protect the tendon wires and anchor head threads from accidental rubbing, cutting, or scratching by coming into contact with the power tool's rotating wire brushes and/or abrasive disks. Sheet metal shrouds around the tendon and end anchorage may be necessary.

8.2.2.2 Take precautions to keep dirt and other foreign material out of the tendon, and from the inside of the trumpet and conduit.

8.2.2.3 Power tools should remove loose mill scale, loose rust, loose or flaking paint, etc. Surfaces must be clean and smooth but not necessarily burnished after using power tools.

8.2.2.4 Remove sharp edges, and smooth down remaining mill scale to a "feather-edge".

8.2.3 Fill scratches, nicks, and other sharp depressions in the gasket bearing surface with nonmetallic epoxy, such as "Belzona" epoxy if approved by TMI Engineering. Use of epoxy shall be according to manufacture's application instructions.

8.2.3.1 Smooth out epoxy to prevent grease leakage under the gasket.

8.2.4 Remove all dust and loose mater from the vicinity of the tendon and entrance to the trumplet.

8.2.5 Clean any foreign material from the threaded bearing plate grease cap mounting holes.

8.2.6 Smear, swab or brush a coating of grease over all the exposed portions of the anchor head, bearing plate, shims, buttonheads and wires, if not previously done in another operation or if needed.

8.2.7 A thread chaser or tap may be required to clear the threads of the bearing plate's grease cap mounting holes so that the bolts can be sufficiently tightened to bottom in the threaded holes.

8.2.8 Clean and dry the flange and gasket sealing surface of the grease cap.

8.2.9 Record on Data Sheet SQ 12.0 that the bearing plate, grease cap, and gasket mating surfaces and bolt holes have been properly prepared and that foreign material has been controlled so as not to enter the tendon void.

8.2.10 On hoop and dome caps where the original through-cap mounting bolting is being replaced with hold down clamps the through-cap holes shall be plugged with Pop-A-Plugs.

8.2.11 With the grease cap on end, place a new gasket on the grease cap. Pliobond or a similar industrial adhesive, as approved by TMI Engineering, may be used to hold the gasket in place.

8.2.12 New gaskets shall be used in the final placement of the grease cap. Old or used gaskets may be used during temporary placement of the grease caps.

8.2.13 Place the gasket retainer (verticals only) and grease cap over the tendon end and align the cap by placing it over the two 1" aligning pins. If slotted aligning pins are used, insert the tapered wedges through the slots in the aligning pins to hold the cap in place. Be sure the gasket is in place and not pinched between the gasket retainer and the bearing plate. For vertical tendons, the wedges and pins need not always be used. The grease cap bolts may be used at this time while using a hoisting device to hold the cap in place temporarily.

8.2.14 Place 1 washer, standard or hardened, over each of the 1" bolts and put the bolts into the 2 remaining holes of the bearing plate. Tighten by hand until seated. Remove the aligning pins and replace them with two bolts and washers.

8.2.15 Tighten each bolt with a wrench, equalizing the load on each bolt as well as possible. Tighten until there is evidence of metal to metal contact all around between the flange, gasket retainer, and bearing plate.

8.2.16 For Horizontal tendons and Dome tendons, the grease cap shall be placed so that the bushing (inlet, outlet) is oriented in its highest altitude or toward the top of the containment.

8.2.17 After aligning the cap and placing over the anchorage install the four tendon end cap holding down clamps with bolts and washers to the bearing plate and hand tighten them.

8.2.18 Reckeck that the gasket has not slipped or become crimped and that the tendon end cap and hold down bolts are aligned properly.

8.2.19 Tighten each bolt, equalizing the load on each as much as possible, to evenly compress the gasket by approximately 1/8".

8.2.20 Apply a new wrapping of TMI approved sealant to the grease cap filler bushing prior to final insertion and tightening.

8.2.21 Record on Data Sheet SQ 12.0, the completeness of the installation and that the bolts were tightened in incremental passes.

8.2.22 The replacement is now complete and re-greasing can be performed observing the requirements of PSC Procedure SQ 12.1.

8.3 Installation of upper Vertical caps

8.3.1 Only minor cleaning and brushing should be necessary to prepare the bearing plate and grease cap for remounting to the bearing plate or anchorage.

8.3.2 Prepare bearing plate surface by cleaning with rags and solvent. If detrimental foreign matter such as mill scale, rust, and dirt is detected on the gasket bearing surface of the plate, and power tool cleaning is required, then:

8.3.2.1 Make suitable provisions to protect the tendon wires and anchor head threads from accidental rubbing, cutting, or scratching by coming into contact with the power tool's rotating wire brushes and/or abrasive disks. Sheet metal shrouds around the tendon and end anchorage may be necessary.

8.3.2.2 Take precautions to keep dirt and other foreign material out of the tendon; and from the inside of the trumpet and conduit.

8.3.2.3 Power tools should remove loose mill scale, loose rust, loose or flaking paint, etc. Surfaces must be clean and smooth but not necessarily burnished after using power tools.

8.3.2.4 Remove sharp edges, and smooth down remaining mill scale to a "feather-edge".

8.3.3 Fill scratches, nicks, and other sharp depressions in the gasket bearing surface with nonmetallic epoxy, such as "Belzona" epoxy if approved by TMI Engineering. Use of epoxy shall be according to manufacture's application instructions.

8.3.3.1 Smooth out epoxy to prevent grease leakage under the gasket.

8.3.4 Remove all dust and loose mater from the vicinity of the tendon and entrance to the trumplet.

8.3.5 Clean any foreign material from the threaded bearing plate grease cap mounting holes.

8.3.6 Smear, swab or brush a coating of grease over all the exposed portions of the anchor head, bearing plate, shims, buttonheads and wires, if not previously done in another operation or if needed.

8.3.7 Clean and dry the gasket sealing surface of the grease cap.

8.3.8 Record on Data Sheet SQ 12.0 that the bearing plate, grease cap, and gasket mating surfaces and bolt holes have been properly prepared and that foreign material has been controlled so as not to enter the tendon void.

8.3.9 With the grease cap on end, place a new gasket on the grease cap. Pliobond or a similar industrial adhesive, as approved by TMI Engineering, may be used to hold the gasket in place.

8.3.10 New gaskets shall be used in the final placement of the grease cap. Old or used gaskets may be used during temporary placement of the grease caps.

8.3.11 Install the four studs in to the retaining ring attached to the anchor head.

8.3.12 Align the grease cap over the anchorage against the bearing plate using care to avoid damaging or misaligning the gasket.

8.3.13 Install the four end cap hold down nuts (with gasket and washer) on the studs and hand tighten.

8.3.14 Recheck that the gasket has not slipped or become crimped and that the tendon cap is properly aligned.

8.3.15 Tighten each nut, equalizing the load on each stud as much as necessary to evenly compress the main gasket. No torqueing is required.

8.3.16 Record on Data Sheet SQ 12.0, the completeness of the installation and that the bolts were tightened in incremental passes.

8.3.17 The replacement is now complete and re-greasing can be performed observing the requirements of PSC Procedure SQ 12.1.

## 9.0 DOCUMENTATION

9.1 The items requiring documentation in this procedure shall be documented by the assigned field construction person of the working crew on Data Sheet SQ 12.0 attached to this procedure, as an option a Precision Surveillance Corporation QC Inspector may record the documentation.

## 10.0 NOTIFICATION

10.1 PSC Site Superintendent shall be notified if any problems are encountered during the replacement of grease caps.

## 11.0 ATTACHMENTS

11.1 Data Sheet SQ 12.0.

PSC PRECISION SURVEILLANCE

N1091 PSC PROCEDURE SQ 12.0
**REPLACE GREASE CAP**
**Data Sheet 12.0**
09/03/13
Page 1 of 1
Revision 0

Project: TMI 40$^{TH}$ YEAR TENDON SURVEILLANCE

Tendon No.: ____________ Tendon End: ____________ ☐ Shop ☐ Field

## ANCHORAGE INSPECTION CRITERIA

| | | |
|---|---|---|
| BEARING PLATE SURFACE PROPERLY PREPARED: | ☐ YES | ☐ NO |
| GREASE CAP SURFACE PROPERLY PREPARED: | ☐ YES | ☐ NO |
| GASKET MATING SURFACE PROPERLY PREPARED: | ☐ YES | ☐ NO |
| STUD/BOLT HOLES PROPERLY PREPARED: | ☐ YES | ☐ NO |
| FOREIGN MATERIAL EXCLUSION CONTROLLED: | ☐ YES | ☐ NO |

COMMENTS

CREW FOREMAN SIGNOFF ____________________ Date: ________

QC Reviewed: ____________________ Level: ____________ Date: ________

30 SQ 12.0 TMI.13 ISI

# EXELON
# THREE MILE ISLAND
# UNIT 1 (40TH YEAR) PHYSICAL
# CONTAINMENT BUILDING TENDON SURVEILLANCE

PRECISION SURVEILLANCE CORPORATION
IN-SERVICE INSPECTION
QUALITY CONTROL PROCEDURE

## GREASE REPLACEMENT

| | | |
|---|---|---|
| Melissa Lara | *Q.C. INSPECTOR* | 09/03/13 |
| Prepared by | Title | Date |
| Gerald F. Bussone | *Q.A. MANAGER* | 09/03/13 |
| Approved by | Title | Date |
| | *PRESIDENT* | 09/03/13 |
| Approved by | Title | Date |

## 1.0 PURPOSE

1.1 This procedure will establish the requirements for the Replacement of Grease in the tendon duct after scheduled inspections and evaluation during the 40th Year In-Service-Inspections (Surveillance) of the Post-Tensioning System Tendons of Exelon's Three Mile Island Nuclear Plant - Unit 1.

## 2.0 SCOPE

2.1 This procedure is intended to provide the Grease Replacement requirements for the wire post-tensioning system. This procedure requires that all tendons worked on shall be full of grease at the end of the project.

## 3.0 RESPONSIBILITY

3.1 In the event of conflict between any TMI Procedure and an SQ, the former governs.

3.2 As stated in PSC Procedure QA 4.0.

## 4.0 QUALIFICATIONS

4.1 As stated in PSC Procedure QA 4.1.

## 5.0 EQUIPMENT

5.1 The gauges and test equipment necessary for the Quality Control activities will be itemized in PSC Procedure SQ 4.0.

## 6.0 QUALITY CONTROL

6.1 This procedure contains Quality Control Documentation (***QCD***) points. The work shall not progress past or through a ***QCD*** without a sign-off or verbal approval from the QC Inspector. The sign-off's and required information or evaluation data shall be documented on Data Sheet 12.1. It shall be necessary to acquire the Total Grease Loss for the tendon from the Data Sheets 6.0 of PSC Procedure SQ 6.0 for each end, if applicable.

## 7.0 PRECAUTIONS

7.1 During Grease Replacement, the grease may be very hot and pumped under pressure. It is therefore essential to avoid direct contact with the hot grease and to make sure all connections are secure.

CAUTION - DURING GREASING, BE AWARE THAT THE GREASE IS HOT AND MAY BE PUMPED UNDER PRESSURE.

7.2 Spilled grease from hoses and voids could be a slipping safety hazard, during all operations it should be cleaned up and placed in waste drums.

7.3 Pumping of grease should be stopped immediately if it is suspected or known that the grease is going somewhere else besides the immediate tendon void.

## 8.0 PREREQUISITES

8.1 All Inspections, if required per SQ2.0, will be complete.

8.2 The tendon will be in a stressed condition.

8.3 The Grease Cap shall be ready to be installed or already have been installed.

8.4 ***QCD*** – Document the type of grease (corrosion inhibitor) being used for the greasing of this tendon. The requirements for acceptable corrosion inhibitor are listed in section 9.1.2 of this procedure.

8.5 ***QCD*** – Enter the tendon end designation and quantity of total grease loss from Data Sheet 6.0 for one end of the tendon, if applicable

8.6 ***QCD*** – Enter the tendon end designation and the quantity of total grease loss from Data Sheet 6.0 for the other end of the tendon, if applicable.

8.7 ***QCD*** – Enter the tendon end designation and any estimated grease loss that may have occurred as a result of leaks from the grease cap or gasket since the original installation or previous surveillance for the first end of the tendon.

8.8 ***QCD*** – Enter the tendon end designation and any estimated grease loss that may have occurred as a result of leaks from the grease cap or gasket since the original installation or previous surveillance for the second end of the tendon.

8.9 ***QCD*** – Calculate the total tendon grease loss by adding 8.5 + 8.6 + 8.7 + 8.8 and document the total tendon grease loss on Data Sheet 12.1.

## 9.0 CONTROLS FOR REFILLING THE TENDON VOID

9.1 All Tendons

9.1.1 The replacement of grease shall be performed prior to demobilization of the tendon surveillance equipment and personnel.

9.1.2 Tendons shall be filled with Tendon Corrosion Inhibitor (Certified) issued by the Utility Quality Program OR drained grease removed from the system ONLY after acceptable sample testing per Section SQ 7.0 OR upon written approval by Exelon.

9.1.3 Grease Temperature required at grease cap inlet: *180°F min.*, 250*°F* max.

9.1.4 Required grease to be drain for Thermal Expansion upon successful pump through: *1 gallon*. This will curtail any excess pressure build up which may lead to gasket failure. (Vertical tendons bottom end only)

9.1.5 Required hold time at full pressure: *30 minutes* if pump through not achieved.

9.1.6 Pumping shall be stopped immediately if it is suspected or known that the grease is going somewhere else besides the immediate tendon void.

9.2 Hoop and DomeTendons

9.2.1 Maximum pressure at grease cap inlet when pressure pumping: *100 psig*

9.2.2 If less than 5 gallons of grease has been lost from the tendon void (duct) at each end of the tendon, each end shall be poured or hand pumped with hot grease until full.

9.2.3 If more than 5 gallons of grease has been lost from the tendon void (duct) at either end of the tendon, the tendon shall be pressure pumped with hot grease from one end until it exits the Opposite End. Pumping may be stopped after 30 minutes if nothing exits at the Top end.

9.2.3.1 Where there is no grease exiting from the opposite end of a hoop or dome tendon, it shall be necessary to hand pump hot grease into the opposite end grease cap until full.

9.3 Vertical Tendons

9.3.1 Maximum pressure at grease cap inlet when pressure pumping: *110 psig* (may be pulsated up to *150 psig* to clear any blockage)

9.3.2 If more than 10 gallons of grease has been lost from the tendon void (duct) at the lower end, the tendon shall be pressure pumped with hot grease from the bottom end until it exits the Top End. Pumping may be stopped after 30 minutes if nothing exits at the Top end.

9.3.2.1 Where there is no grease exiting from the top end of a vertical tendon, it shall be necessary to pour or hand pump hot grease into the top end grease cap until full.

## 10.0 MEASUREMENT OF GREASE REPLACEMENT

10.1 The grease may be in a large storage container or in 55-gallon drums. The large storage container shall have an automatic thermostat control for temperature, while drum heaters shall be used to heat the grease in drums.

10.2 The grease shall be monitored for quantity by measuring the quantity of grease remaining in the drum or by measuring the drum to determine the quantity that has been pumped out.

10.3 To provide a grease volume number in gallons based on a standard 55 gallon drum, divide the 55 gallons by the usable height of the drum (31 inches). This provides a figure of 1.77 gallons per inch of drum height. Note that a typical 55 gallon drum is 34 inches high, but based on actual observation, grease shrinkage and the depressed lid take up 3 inches of height.

10.4 Take a measurement of the height of the grease in the drum with a clean measuring device before installing any grease. It will be acceptable to take the measurement from the top of the grease in the drum to the top edge of the drum. Document the grease height dimension to the nearest .05 of an inch.

10.5 Take a measurement of the height of the grease in the drum after installing the grease. Document the final grease height dimension to the nearest 0.05 of an inch.

10.6 Calculate and document the Total Quantity of grease replaced into the cap to the nearest tenth (0.1) of a gallon.

10.6.1 *EXAMPLE*: If the initial grease height was 25.5" and the final grease height was 6.25", this is a 19.25" reduction multiplied by 1.77 gallons per inch which equals 34.1 gallons pumped in.

10.7 The same methodology may be used for containers of different size or configuration.

## 11.0 MEASUREMENT OF GREASE WASTE

11.1 When it becomes necessary to determine the volume of grease that was pumped into the tendon void, it will be necessary to subtract the waste grease outflow, spillage, grease remaining in the pump-in hose, grease remaining in the waste line hose from the grease volume that was pumped from the drum into that tendon.

11.2 The 1 gallon of grease drained from the inlet end after a successful pump through shall be considered waste grease if it is not drained back into the original drum.

11.3 If the waste grease is pumped into a 55 gallon drum, then each inch of drum height will equal to 1.77 gallons.

11.4 Smaller containers should be evaluated for size to determine the capacity. These types of containers would only require a simple estimate for the waste grease contained therein.

11.5 Before pumping any waste grease into a container, always verify the quantity within that container prior to pumping.

## 12.0 PRESSURE PUMPING

12.1 The grease replacements described in this procedure are for both ends of a tendon. The terms tendon void, tendon conduit, and tendon duct are synonymous.

12.2 If more than 5 gallons of grease has been lost from the tendon void (duct) at either end of a hoop or dome tendon, the tendon shall be pressure pumped with hot grease from one end until it exits the opposite end. Pumping may be stopped after 30 minutes if nothing exits.

12.3 If more than 10 gallons of grease has been lost from the tendon void (duct) at the lower end of a vertical tendon, the tendon shall be pressure pumped with hot grease from the bottom end until it exits the top end. Pumping may be stopped after 30 minutes if nothing exits.

12.4 Remove the grease cap plug; attach the "Y-Device" to the end of the grease cap to be pumped. Connect the Y-Device, if necessary, and waste outflow hose to the opposite end of the tendon. Be sure to have a suitable quantity of waste containers on hand to collect the waste.

12.5 Be sure that adequate communication is provided at each end of the tendon so that the crew at each end of the tendon will know what actions are taking place.

12.6 ***QCD*** – Document the ambient temperature near the tendon, as well as the Thermometer Identification and Recalibration Date.

12.7 ***QCD*** – Document the inlet temperature of the grease as well as the thermometer identification and its recalibration date.

12.8 Prior to attaching the inlet greasing hose to the Y-Device, circulate hot grease through the system to ensure the grease is at sufficient temperature prior to pumping into the tendon void. Pressure pump and greasing hose should be fully primed prior to connecting to the Y-Device.

12.9 ***QCD*** – Document the initial grease height dimension to the nearest .05 of an inch. Refer to Section 10.0 for further explanation of grease measurement.

12.10 Commence pressure pumping grease into the tendon in accordance with the controls stated in Section 9.0.

12.11 If the grease exits the opposite end of a dome tendon, pumping shall continue until a minimum of 1 gallon of clean grease has exited from the opposite end with a temperature of $140^0$F. The opposite end Y-Device shall then be closed and pressure pumping from the inlet end will continue until maximum pressure is achieved. Upon achievement of maximum pressure, stop pumping and drain 1 gallon of grease from the inlet end.

12.12 When pump through is not achieved on the initial attempt, the following actions should take place in order to maximize the effort of filling the tendon void.

12.12.1 Build pressure to the maximum pressure at the grease cap inlet in accordance with Section 9.3.1.

12.12.2 Hold pressure for a minimum of 30 minutes. This may require additional pumping in order to remain at the desired maximum pressure.

12.12.3 If pump through is achieved, continue with step 12.11.

12.12.4 If pump through is still not successful pumping from this end shall be complete. It shall be necessary to hand pump the opposite end of the tendon by following the steps in Section 13.0

12.13 Release any pressure from the inlet end before disconnecting any of the hoses from the Y-Device. Ensure all shut-off valves are closed before disconnecting any grease connections at either end.

12.14 ***QCD*** – Once the tendon end has been completed, document the final grease height dimension to the nearest .05 of an inch. Refer to Section 10.0 for further explanation of grease measurement.

12.15 Remove grease hoses and Y-Devices from both ends and replace the grease cap plugs on both ends of the tendon.

12.16 ***QCD*** – Calculate and document the quantity of hot grease pressure pumped into this tendon end in accordance with Section 10.6. Also, document the tendon end identification, either shop/field and/or nearest buttress number to the tendon end being pumped.

12.17 ***QCD*** – Document whether successful pump through was achieved via exiting grease at the other end of the tendon. If exit was not achieved, document the pressure and time held in order to attempt pump through.

12.18 ***QCD*** – Document the quantities of waste grease if any, including any exiting outflow grease. Refer to Section 11.0 of this procedure for explanation on calculating waste grease.

12.19 ***QCD*** – Calculate and document the total amount of grease replaced through the current inlet end of the tendon by subtracting the amount of any waste grease from the quantity of hot grease pressure pumped into this tendon end.

12.20 Continue to Section 14.0 for final calculation of quantity of grease replaced if pump through was successful.

## 13.0 POURING AND HAND PUMPING

13.1 The grease replacements described in this procedure are for one end of a tendon, however both ends of the tendon will be documented on the same data sheet. The terms tendon void, tendon conduit, and tendon duct are synonymous.

13.2 If less than 5 gallons of grease has been lost from the tendon void (duct) at each end of a hoop or dome tendon, each end shall be poured or hand pumped with hot grease until full.

13.3 If less than 10 gallons of grease has been lost from the tendon void (duct) at the lower end, hot grease shall be poured or hand pumped into the top end until full.

13.4 If pressure pumping is unsuccessful from the end of any tendon hot grease shall be poured or hand pumped into the opposite end until full.

13.5 Remove the grease cap plug; attach the "Y-Device" to the end of the grease cap to be pumped or poured. It shall be acceptable to hand pump or pour grease directly into the grease cap without the use of a "Y-Device" if the grease cap configuration will allow this.

13.6 ***QCD*** – Document the ambient temperature near the tendon, as well as the Thermometer Identification and Recalibration Date.

13.7 ***QCD*** – Document the inlet temperature of the grease as well as the thermometer identification and its recalibration date.

13.8 Prior to attaching the inlet greasing hose to the Y-Device or grease cap, circulate hot grease through the system to ensure the grease is at sufficient temperature prior to pumping into the tendon void. Hand pump and greasing hose should be fully primed prior to connecting to the Y-Device. This step is not necessary if grease is being poured into the grease cap.

13.9 ***QCD*** – Document the initial grease height dimension to the nearest .05 of an inch. Refer to Section 10.0 for further explanation of grease measurement.

13.10 If grease is being hand pumped, commence pumping grease into the tendon in accordance with the controls stated in Section 9.0.

13.11 If grease is being poured, transfer grease into secondary (smaller) container and pour into the Y-Device or grease cap until full. Grease replacement must be in accordance with controls outlined in Section 9.0.

13.12 ***QCD*** – Once the tendon end has been completed, document the final grease height dimension to the nearest .05 of an inch. Refer to Section 10.0 for further explanation of grease measurement.

13.13 Remove grease hoses and Y-Devices as necessary from both ends and replace the grease cap plugs on both ends of the tendon. Verify no grease is leaking.

13.14 ***QCD*** – Calculate and document the quantity of hot grease hand pumped or poured into this tendon end in accordance with Section 10.6. Also, document the tendon end identification, either shop/field and/or nearest buttress number to the tendon end being pumped.

13.15 ***QCD*** – Document whether grease replacement was accomplished by hand pumping or pouring.

13.16 ***QCD*** – Document the quantities of waste grease if any. Refer to Section 11.0 of this procedure for explanation on calculating waste grease.

13.17 ***QCD*** – Calculate and document the total amount of grease replaced through the current inlet end of the tendon by subtracting the amount of any waste grease from the quantity of hot grease hand pumped or poured into this tendon end.

13.18 Repeat the steps in Section 13.0 for the other end of a hoop or dome tendon if applicable.

13.19 Continue to Section 14.0 for final calculation of quantity of grease replaced when grease replacement is complete.

## 14.0 CALCULATION OF GREASE REPLACEMENT

14.1 ***QCD*** – Calculate the total tendon grease replaced by adding the quantities of grease replaced by pressure pumping each end (combination of 12.19 and 13.17 as applicable).

14.2 ***QCD*** – Obtain the calculated net volume of the tendon void from PSC Procedure SQ12.2 and post it on Data Sheet 12.1

14.3 ***QCD*** – Compare the total tendon grease replaced (14.1) to the total tendon grease loss (8.9). Calculate the percent difference by the following formula:

$$\frac{[\mathit{TOTAL\ TENDON\ QUANTITY\ REPLACED}\ (14.1)] - [\mathit{TOTAL\ TENDON\ GREASE\ LOSS}\ (8.9)]}{\mathit{NET\ VOLUME\ TENDON\ VOID}\ (SQ\ 12.2)} \times 100\%$$

14.4 ***QCD*** – Verify that no grease is leaking. If there is some leakage, the deficiency shall be corrected and cleanup performed. Document the acceptance of leak tightness.

14.5 ***QCD*** – Document the acceptability of the refilling. An acceptable refilling is one in which the percent difference from Section 14.3 of this procedure does not exceed 10% and there are no leaks.

14.6 ***QCD*** – Document any pertinent comments, unusual occurrences or references that could assist in evaluating the refill or for future surveillances.

## 15.0 NOTIFICATION

15.1 If the absolute difference between the amount of grease removed from the tendon and the amount of grease replaced exceeds 10% of the net duct volume, it shall be necessary to notify TMI Engineering with a nonconformance report within 24 hours.

## 16.0 DOCUMENTATION

16.1 The items requiring documentation shall be documented on Data Sheet 12.1a or 12.1b as necessary. Data Sheet 12.1a shall be used when a tendon is pressure pumped and 12.1b shall be used when a tendon is hand pumped from both ends.

16.2 Some information shall be posted from Data Sheet 6.0 of PSC Procedure SQ 6.0 onto Data Sheet 12.1a or 12.1b as applicable.

16.3 The Data Sheets reference the applicable Section or Step number of the procedure for each ***QCD*** point.

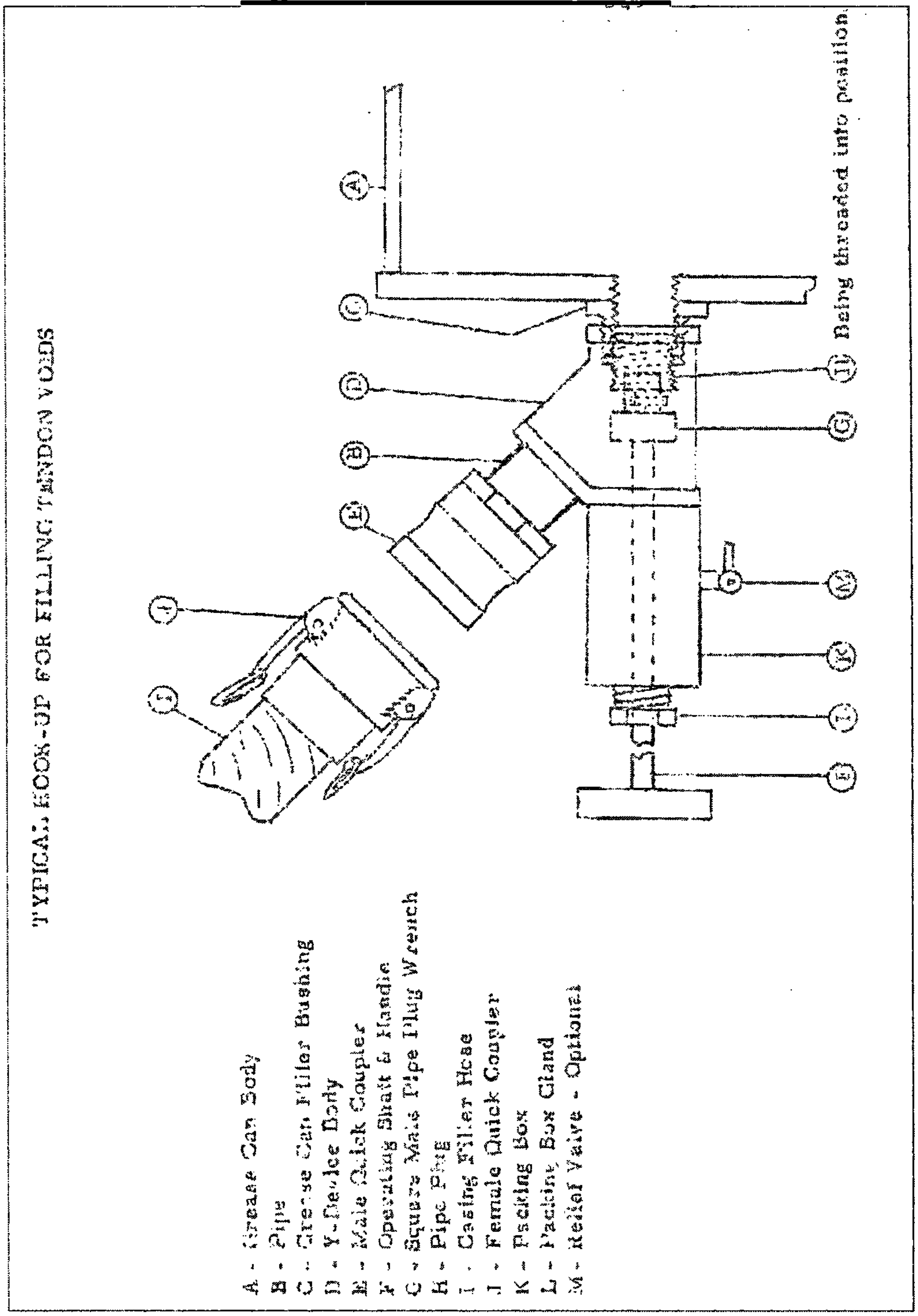
## 17.0 ATTACHMENTS

17.1 Figure 1.0 – PSC "Y" Device

17.2 Data Sheet 12.1a – Pressure Pumping

17.3 Data Sheet 12.1b – Hand Pumping

## Figure 1.0 – PSC "Y-Device"



PRECISION SURVEILLANCE

N1091 PSC PROCEDURE SQ 12.1
**GREASE REPLACEMENT**
**Data Sheet 12.1a – Pressure Pumping**
09/03/13
Page 1 of 1
Revision 0

Project: TMI 40th YEAR TENDON SURVEILLANCE Tendon No.:

GREASE REPLACEMENT QC SIGNOFFS

(8.4) Grease Used ☐ NEW ☐ OLD - TEST DATE: ☐ ACCEPTABLE ☐ APPROVAL LETTER DATED:

**8.0 PREREQUISITES**

(8.5) Total Grease Loss from Data Sheet 6.0 for tendon end: gal.

(8.6) Total Grease Loss from Data Sheet 6.0 for tendon end: gal.

(8.7) Estimated grease losses from leaks for tendon end: gal.

(8.8) Estimated grease losses from leaks for tendon end: gal.

(8.9) TOTAL Tendon Grease Loss: gal.

**12.0 INITIAL PRESSURE PUMPING**

(12.6) Ambient Temp.: °F Thermometer ID: Recal Date:

(12.7) Grease Temp.: °F Thermometer ID: Recal Date:

(12.9) **Initial** Grease Height (a) in. (12.14) **Final** Grease Height (b) in.

(12.16) Total amount of Grease **Pumped**: gal. (a – b) x 1.77 into the end

(12.18) Quantity of Waste Grease: gal. (12.17) Was Exit Achieved? ☐ Yes ☐ No

(12.19) Total Grease **Replaced** this end: gal. If no, Pressure Held for psi min

**13.0 HAND PUMPING – SECOND END (if necessary)**

(13.6) Ambient Temp.: °F Thermometer ID: Recal Date:

(13.7) Grease Temp.: °F Thermometer ID: Recal Date:

(13.9) **Initial** Grease Height (a) in. (13.12) **Final** Grease Height (b) in.

(13.14) Total amount of Grease added: gal. (a – b) x 1.77 into the end

(13.16) Quantity of Waste Grease: gal. (13.15) ☐ Poured ☐ Hand Pumped

(13.17) Total Grease **Replaced** this end: gal.

**14.0 CALCULATION OF PRESSURE PUMPING**

(14.1) Total **Tendon** Grease Replaced: gal. *(12.19 + 13.17)*

(14.2) Net Tendon Duct Grease Volume: gal. *Refer to SQ 12.2 – GREASE VOLUMES, for the Tendon Net Duct Volume*

(14.3) Percent Difference: $\frac{\text{Total Tendon Replaced (14.1) - Total Tendon Loss (8.9)}}{\text{Net Tendon Duct Grease Volume (14.2)}} \times 100 =$ % Difference

(14.4) Grease Leaks: ☐ Yes ☐ No

(14.5) Refill Acceptable: ☐ Yes *(less than 10%)* ☐ No *(greater than 10%)*

If No – Customer Notified NCR No.:

(14.6) Comments:

QC Reviewed: Level: Date:

PRECISION SURVEILLANCE

N1091 PSC PROCEDURE SQ 12.1
**GREASE REPLACEMENT**
**Data Sheet 12.1b – Hand Pumping**
09/03/13
Page 1 of 1
Revision 0

Project: TMI 40th YEAR TENDON SURVEILLANCE Tendon No.: ____

## GREASE REPLACEMENT

QC SIGNOFFS

(8.4) Grease Used ☐ NEW ☐ OLD - TEST DATE: ☐ ACCEPTABLE ☐ APPROVAL LETTER DATED:

**8.0 PREREQUISITES**

(8.5) Total Grease Loss from Data Sheet 6.0 for ____ tendon end: ____ gal.

(8.6) Total Grease Loss from Data Sheet 6.0 for ____ tendon end: ____ gal.

(8.7) Estimated grease losses from leaks for ____ tendon end: ____ gal.

(8.8) Estimated grease losses from leaks for ____ tendon end: ____ gal.

(8.9) TOTAL Tendon Grease Loss: ____ gal.

**13.0 POURING AND HAND PUMPING – FIRST END**

(13.6) Ambient Temp.: ____ °F Thermometer ID: ____ Recal Date: ____

(13.7) Grease Temp.: ____ °F Thermometer ID: ____ Recal Date: ____

(13.9) **Initial** Grease Height (a) ____ in. (13.12) **Final** Grease Height (b) ____ in.

(13.14) Total amount of Grease added: ____ gal. (a – b) x 1.77 into the ____ end

(13.16) Quantity of Waste Grease: ____ gal. (13.15) ☐ Poured ☐ Hand Pumped

(13.17) Total Grease **Replaced** this end: ____ gal.

**13.0 HAND PUMPING – SECOND END**

(13.6) Ambient Temp.: ____ °F Thermometer ID: ____ Recal Date: ____

(13.7) Grease Temp.: ____ °F Thermometer ID: ____ Recal Date: ____

(13.9) **Initial** Grease Height (a) ____ in. (13.12) **Final** Grease Height (b) ____ in.

(13.14) Total amount of Grease added: ____ gal. (a – b) x 1.77 into the ____ end

(13.16) Quantity of Waste Grease: ____ gal. (13.15) ☐ Poured ☐ Hand Pumped

(13.17) Total Grease **Replaced** this end: gal.

**14.0 CALCULATION OF PRESSURE PUMPING**

(14.1) Total **Tendon** Grease Replaced: ____ gal. *(13.17 + 13.17)*

(14.2) Net Tendon Duct Grease Volume: ____ gal. *Refer to SQ 12.2 – GREASE VOLUMES, for the Tendon Net Duct Volume*

(14.3) Percent Difference: $\frac{\text{Total Tendon Replaced (14.1) - Total Tendon Loss (8.9)}}{\text{Net Tendon Duct Grease Volume (14.2)}} \times 100 =$ ____ % Difference

(14.4) Grease Leaks: ☐ Yes ☐ No

(14.5) Refill Acceptable: ☐ Yes *(less than 10%)* ☐ No *(greater than 10%)*

If No – Customer Notified NCR No.: ____

(14.6) Comments: ____

QC Reviewed: ____ Level: ____ Date: ____

# EXELON
# THREE MILE ISLAND
# UNIT 1 (40TH YEAR) PHYSICAL
# CONTAINMENT BUILDING TENDON SURVEILLANCE

## PRECISION SURVEILLANCE CORPORATION
## IN-SERVICE INSPECTION
## QUALITY CONTROL PROCEDURE

## GREASE VOLUMES

| | | |
|---|---|---|
| Melissa Lara | *Q.C. INSPECTOR* | 09/03/13 |
| Prepared by | Title | Date |
| Gerald F. Bussone | *Q.A. MANAGER* | 09/03/13 |
| Approved by | Title | Date |
| Paul C. | *PRESIDENT* | 09/03/13 |
| Approved by | Title | Date |

## 1.0 PURPOSE

1.1 This procedure will establish the Net Tendon Duct Grease Volumes to be observed during the refilling of the Post-Tensioning System Tendons with Corrosion Protection Material (Grease) during the 40th Year In-Service-Inspection (surveillance) of the Post-Tensioning System at Exelon's Three Mile Island - Unit 1 as provided by TMI Engineering.

## 2.0 SCOPE

2.1 This procedure shall apply to PSC Procedure SQ 12.1.

## 2.2 Table 7-1: TMI Unit 1 – Grease Void Volumes for All Surveillance Tendons

| TENDON | NET DUCT VOLUME (GAL.) | 10% NET DUCT VOL. (GAL.) |
|---|---|---|
| D-142 | 86.9 | 8.69 |
| **D-143** | **85.4** | **8.54** |
| D-144 | 84.1 | 8.41 |
| D-224 | 97.5 | 9.75 |
| **D-225** | **97.5** | **9.75** |
| D-226 | 97.6 | 9.76 |
| D-236 | 93.6 | 9.36 |
| **D-237** | **92.8** | **9.28** |
| D-238 | 92.1 | 9.21 |
| D-302 | 78.4 | 7.84 |
| **D-303** | **80.3** | **8.03** |
| D-304 | 82.2 | 8.22 |
| | | |
| H13-02 | 109.7 | 10.97 |
| **H13-03** | **109.7** | **10.97** |
| H13-04 | 110.4 | 11.04 |
| **H13-10** | **110.7** | **11.07** |
| H13-11 | 110.6 | 11.06 |
| H13-12 | 111.3 | 11.13 |
| **H24-15** | **110.9** | **11.09** |

| TENDON | NET DUCT VOLUME (GAL.) | 10% NET DUCT VOL. (GAL.) |
|---|---|---|
| **H24-22** | **110.1** | **11.01** |
| H24-23 | 110.1 | 11.01 |
| H24-24 | 110.4 | 11.04 |
| H35-01 | 110.3 | 11.03 |
| **H35-02** | **110.1** | **11.01** |
| H35-05 | 110.0 | 11.00 |
| H62-25 | 110.3 | 11.03 |
| **H62-26** | **110.1** | **11.01** |
| H62-27 | 110.1 | 11.01 |
| | | |
| V-30 | 119.8 | 11.98 |
| **V-32** | **120.4** | **12.04** |
| V-33 | 120.2 | 12.02 |
| **V-84** | **120.0** | **12.00** |
| V-107 | 119.6 | 11.96 |
| **V-108** | **120.3** | **12.03** |
| V-109 | 119.9 | 11.99 |
| **V-159** | **119.9** | **11.99** |
| V-160 | 119.8 | 11.98 |
| V-161 | 120.0 | 12.00 |

☐ **= SURVEILLANCE TENDON**

☐ = ADJACENT TENDON

## 2.3 Table 7-2: TMI Unit 1 – Grease Void Volumes for All Augmented Scope Tendons

| TENDON | NET DUCT VOLUME (GAL.) | 10% NET DUCT VOL. (GAL.) |
|---|---|---|
| H46-33 | 109.7 | 10.97 |
| **H46-34** | **109.8** | **10.98** |
| H46-36 | 109.6 | 10.96 |
| H51-39 | 109.6 | 10.96 |
| **H51-40** | **109.1** | **10.91** |
| H51-41 | 108.8 | 10.88 |

| TENDON | NET DUCT VOLUME (GAL.) | 10% NET DUCT VOL. (GAL.) |
|---|---|---|
| V-114 | 119.0 | 11.90 |
| **V-115** | **119.0** | **11.90** |
| V-116 | 120.3 | 12.03 |
| V-135 | 121.7 | 12.17 |
| **V-136** | **121.6** | **12.16** |
| V-137 | 122.8 | 12.28 |

☐ = **SURVEILLANCE TENDON**

☐ = ADJACENT TENDON

# EXELON
# THREE MILE ISLAND
# UNIT 1 (40TH YEAR) PHYSICAL
# CONTAINMENT BUILDING TENDON SURVEILLANCE

## PRECISION SURVEILLANCE CORPORATION
## IN-SERVICE INSPECTION
## QUALITY CONTROL PROCEDURE

## PROGRAM PURPOSE

| | | |
|---|---|---|
| Melissa Lara | *Q.C. INSPECTOR* | *09/03/13* |
| Prepared by | Title | Date |
| Gerald F. Bussone | *Q.A. MANAGER* | *09/03/13* |
| Approved by | Title | Date |
| Paul C. | *PRESIDENT* | *09/03/13* |
| Approved by | Title | Date |

## 1.0 PURPOSE

1.1 This section of the Surveillance I.S.I Manual shall outline the Quality Assurance/Quality Control activities necessary to insure that the In-Service Inspection operations are performed in accordance with approved procedures and provide the required quality level, consistent with the project specifications, industry standards, regulatory code requirements and the Precision Surveillance Corporation Quality Assurance Program.

# EXELON
# THREE MILE ISLAND
# UNIT 1 (40TH YEAR) PHYSICAL
# CONTAINMENT BUILDING TENDON SURVEILLANCE

PRECISION SURVEILLANCE CORPORATION
IN-SERVICE INSPECTION
QUALITY CONTROL PROCEDURE

## PROGRAM SCOPE

| | | |
|---|---|---|
| Melissa Lara | *Q.C. INSPECTOR* | 09/03/13 |
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| Gerald F. Bussone | *Q.A. MANAGER* | 09/03/13 |
| Approved by | Title | Date |
| Paul C. | *PRESIDENT* | 09/03/13 |
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## 1.0 SCOPE

1.1 The Quality Assurance Procedures within this Section of the Surveillance Program I.S.I. Manual are intended to be supplemental to the Precision Surveillance Corporation (PSC) Quality Assurance Manual. They are not intended to replace any Criteria of the Quality Assurance Manual. The Quality Assurance Manual remains as the highest category of document within the Quality Assurance Program hierarchy of documents.

# EXELON
# THREE MILE ISLAND
# UNIT 1 (40TH YEAR) PHYSICAL
# CONTAINMENT BUILDING TENDON SURVEILLANCE

PRECISION SURVEILLANCE CORPORATION
IN-SERVICE INSPECTION
QUALITY CONTROL PROCEDURE

## QUALITY ORGANIZATION

| | | |
|---|---|---|
| Melissa Lara | *Q.C. INSPECTOR* | 09/03/13 |
| Prepared by | Title | Date |
| Gerald F. Bussone | *Q.A. MANAGER* | 09/03/13 |
| Approved by | Title | Date |
| | *PRESIDENT* | 09/03/13 |
| Approved by | Title | Date |

## 1.0 ORGANIZATION

1.1 PSC Field Quality Control Inspectors operate under the immediate direction of the Lead Field Quality Control Inspector, who in turn reports to the PSC Manager, Quality Assurance.

1.2 The Field Quality Control Inspectors shall have full authority and responsibility in all matters pertaining to or affecting the quality control function for the Surveillance of the Post-Tensioning System. These Inspectors shall have the authority to accept, reject, or recommend changes to the field operations or performance.

1.3 The Field Quality Control Inspectors, and the Quality Assurance personnel shall have the authority to issue a "Stop Work Order" for any activity, material, or procedure not in conformance with the project specifications, the Quality Assurance Manual or the Surveillance I.S.I. Manual. The stop work action shall be coordinated through the PSC Manager of Quality Assurance.

1.4 The Quality Assurance Procedures section of this manual shall serve to further outline the duties and responsibilities of those personnel engaged in performing the quality control functions for the Surveillance of the Post-Tensioning System.

1.5 All personnel engaged in those activities that affect the quality function for the Surveillance operations, shall be qualified by experience or training, prior to the initial performance of their assignments.

1.6 Documentation of qualification and/or training shall be maintained in the quality files on site for those personnel engaged in quality activities.

# EXELON
# THREE MILE ISLAND
# UNIT 1 (40TH YEAR) PHYSICAL
# CONTAINMENT BUILDING TENDON SURVEILLANCE

PRECISION SURVEILLANCE CORPORATION
IN-SERVICE INSPECTION
QUALITY CONTROL PROCEDURE

## QUALITY CONTROL RESPONSIBILITY

| | | |
|---|---|---|
| Melissa Lara | *Q.C.INSPECTOR* | 09/03/13 |
| Prepared by | Title | Date |
| Gerald F. Bussone | *Q.A. MANAGER* | 09/03/13 |
| Approved by | Title | Date |
| Paul C. | *PRESIDENT* | 09/03/13 |
| Approved by | Title | Date |

## 1.0 QUALITY CONTROL RESPONSIBILITY

1.1 The responsibility for the Quality Assurance and Quality Control functions for this project shall be incumbent on those organizations performing that portion of the work described within the various sections of this manual, or as otherwise agreed to in the contract documents.

1.2 Portions of the work not performed by PSC, but where PSC supplies only the equipment or material, shall be subject to the quality requirements specified within the applicable PSC Surveillance I.S.I. Manual, where that Quality Manual has been developed to comply with the project specifications or contract documents.

1.2.1 The development of the Quality Assurance and Quality Control procedures for the Surveillance operations shall be the responsibility of those organizations performing that portion of the work, unless otherwise agreed to in the contract documents.

1.3 PSC Field Quality Control Personnel shall provide the Quality Control actions for that portion of the work, where PSC or its subcontractors are performing the work or as agreed to in the project specifications or contract documents. All subcontractors performing work as an agent of PSC shall be subject to the Quality requirements of the project specifications and the applicable PSC Quality Program.

1.4 PSC and its subcontractors and vendors, shall maintain open access for Inspection, Survey and Audit by Exelon for all portions of the work being performed for the project.

# EXELON
# THREE MILE ISLAND
# UNIT 1 (40TH YEAR) PHYSICAL
# CONTAINMENT BUILDING TENDON SURVEILLANCE

PRECISION SURVEILLANCE CORPORATION
IN-SERVICE INSPECTION
QUALITY CONTROL PROCEDURE

## PERSONNEL QUALIFICATIONS

| | | |
|---|---|---|
| Melissa Lara | *Q.C. INSPECTOR* | 09/03/13 |
| Prepared by | Title | Date |
| Gerald F. Brussone | *Q.A. MANAGER* | 09/03/13 |
| Approved by | Title | Date |
| Paul C. | *PRESIDENT* | 09/03/13 |
| Approved by | Title | Date |

## 1.0 QUALIFICATIONS

### 1.1 QUALITY CONTROL INSPECTORS

1.2 All Quality Control Inspectors performing Inspections and Tests shall be qualified to minimum of Level II capability in accordance with the requirements of ANSI N45.2.6-1978. Inspectors performing General or Detailed Visual Examinations are to be qualified as a Level II examiner as defined in PSC's written certification practice approved by Exelon and each examiner shall be approved by the Exelon Responsible Engineer.

1.3 All Lead Field Quality Control Inspectors shall be qualified to a minimum of Level II capability in accordance with the requirements of ANSI N45.2.6-1978.

1.3.1 All Field Quality Control Inspectors performing reviews of Quality Control Documentation for the various procedures in the PSC Surveillance I.S.I. Manual shall be qualified to a minimum of Level II in accordance with the requirements of ANSI N45.2.6-1978.

1.3.2 All Quality Control Inspectors shall be certified to specific skill Levels by a Quality Control Inspector who has been qualified as Level III in accordance with the requirements of ANSI N45.2.6-1978.

### 1.4 PERSONNEL

1.4.1 Precision Surveillance Corporation Field Construction Personnel shall be responsible for the physical activities associated with the Surveillance of Post-Tensioning System Tendons. Construction Personnel shall be fit by skill, training and/or experience to perform these activities.

### 1.5 SUPERVISION

1.5.1 PSC Supervisory and Field Representative Personnel shall be responsible for administering the progress of the work and directing PSC Field Construction Personnel as necessary. These Personnel shall be fit by skill, training and/or experience to perform these duties.

1.5.2 Construction Personnel or Construction Supervision need not be qualified to ANSI N45.2.6 as they are supervised or overseen by a qualified individual participating in the inspection, examination, or test.

### 1.6 AUDITORS

1.7 PSC Personnel performing audits of field operations shall be qualified as auditors in accordance with the requirements of ANSI N45.2.23-1978.

## 2.0 DOCUMENTATION

2.1 Records of training and personnel skill certifications shall be documented in accordance with the requirements of the governing ANSI N45.2 or daughter specifications and shall be retained on site for those personnel so certified and/or trained.

# EXELON
# THREE MILE ISLAND
# UNIT 1 (40TH YEAR) PHYSICAL
# CONTAINMENT BUILDING TENDON SURVEILLANCE

PRECISION SURVEILLANCE CORPORATION
IN-SERVICE INSPECTION
QUALITY CONTROL PROCEDURE

## PERSONNEL TRAINING

| | | |
|---|---|---|
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| Approved by | Title | Date |
| Paul C. | *PRESIDENT* | 09/03/13 |
| Approved by | Title | Date |

## 1.0 TRAINING

1.1 Precision Surveillance Corporation personnel on site involved in the Surveillance of the Post-Tensioning System, shall be qualified and experienced in all phases of Post-Tensioning operations.

1.2 All training activities shall be conducted and coordinated by qualified, experienced, PSC personnel.

1.3 At the start of the work and usually at the beginning of each new phase of the Post-Tensioning operations, the field crews shall be instructed to perform the work in a safe manner and in accordance with the approved surveillance procedures manual. They shall further, be trained in the use of the Post-Tensioning equipment for the operation for which they are being qualified, and for any subsequent actions during those operations that may affect the quality or integrity of the Post-Tensioning System.

1.4 The duration of the training period shall not be of a predetermined period of time, but shall instead be of such a length of time, that the PSC training personnel feel confident that the personnel being trained are sufficiently knowledgeable in the methods and procedures of the operation for which they are being trained. Each trainee shall be oriented by on-the-job training prior to the initial performance of any quality oriented function and each time he performs a different job assignment not previously trained or qualified for.

1.5 A list of the trained and qualified personnel shall be maintained on site, indicating the training received and the dates of training. Newly trained personnel shall be added to the list as the training is completed. This list shall be reviewed and controlled by PSC Field Quality Control personnel. Crew proficiency shall be verified during the progress of the work, through the mediums of inspection, surveillance or audit.

1.6 Procedures shall be used for training those personnel not familiar with Post-Tensioning Systems or Surveillance activities.

# EXELON
# THREE MILE ISLAND
# UNIT 1 (40TH YEAR) PHYSICAL
# CONTAINMENT BUILDING TENDON SURVEILLANCE

## PRECISION SURVEILLANCE CORPORATION
## IN-SERVICE INSPECTION
## QUALITY CONTROL PROCEDURE

## PROCUREMENT

| | | |
|---|---|---|
| Melissa Lara | *Q.C. INSPECTOR* | 09/03/13 |
| Prepared by | Title | Date |
| Gerald F. Bussone | *Q.A. MANAGER* | 09/03/13 |
| Approved by | Title | Date |
| Paul C. | *PRESIDENT* | 09/03/13 |
| Approved by | Title | Date |

## 1.0 PROCUREMENT

### 1.1 SAFETY – RELATED

1.2 The purchase of any safety-related material or service to be used for the Post-Tensioning System or surveillance operation shall be performed by the Procurement Section of the Precision Surveillance Corporation in accordance with the requirements of the Quality Assurance Program requirements in effect at that time and the requirements stated below.

1.2.1 Field personnel shall initiate a procurement request by a written or verbal order to the Construction or Project Management Section.

1.2.2 A requisition shall be prepared and submitted to the PSC Quality Assurance Section for attachment of applicable quality documents and/or comments and returned to the Project Management Section.

1.2.3 The requisition shall be sent to the Procurement Section for drafting of the purchase order, pricing, vendor selection, etc.

1.2.4 The purchase order shall be submitted to the Quality Assurance Section for review of quality content, approved vendor selection and sign-off. Other pertinent quality documents may be attached or referenced and then the purchase order shall be returned to the Procurement Section.

1.2.5 The purchase order shall be submitted to the vendor and copies of the order distributed to appropriate personnel.

1.2.6 Changes to the original purchase order shall be provided through the use of a Supplemental Purchase Order, which shall be subject to the same review and control process as the original purchase order.

### 1.3 NON-SAFETY-RELATED

1.3.1 Miscellaneous non-safety-related field purchases may be initiated by the field personnel or Procurement Section within the confines of the operating procedures established by the Operating or Construction Departments, independent of this manual.

# EXELON
# THREE MILE ISLAND
# UNIT 1 (40TH YEAR) PHYSICAL CONTAINMENT BUILDING TENDON SURVEILLANCE

PRECISION SURVEILLANCE CORPORATION
IN-SERVICE INSPECTION
QUALITY CONTROL PROCEDURE

## FIELD CHANGE REQUEST

| | | |
|---|---|---|
| Melissa Lara | *Q.C. INSPECTOR* | 09/03/13 |
| Prepared by | Title | Date |
| Gerald F. Bussone | *Q.A. MANAGER* | 09/03/13 |
| Approved by | Title | Date |
| Paul C. | *PRESIDENT* | 09/03/13 |
| Approved by | Title | Date |

## 1.0 FIELD CHANGE REQUEST

1.1 The Field Change Request (FCR) shall be the mechanism for requesting rapid evaluation and approval for those operations that must be changed to accommodate field conditions. The FCR shall be approved by Exelon prior to that change being put into effect.

1.2 Field Changes that take place prior to the approval of the FCR shall be documented by a Nonconformance Report (NCR) and subject to a "STOP WORK" order, depending on the magnitude of the change and the impact on the quality program. It shall not be necessary to generate an NCR where it has become necessary to return or move to a safe condition of the tendon or personnel.

1.3 Revisions to this manual shall be performed according to the Revision Control procedure found in the prologue of the Surveillance I.S.I. Manual. The following information will supplement those procedures for Field Change Request Activity.

1.3.1 When field operating procedures, as stated in this manual, become impractical to follow exactly for any reason, that portion, and any other affected portion of the manual shall be revised to provide the appropriate procedures. Where possible, revisions shall be made prior to performing the work.

1.3.2 When revisions become necessary, they shall be formally drafted by the PSC Quality Assurance Section and submitted to Exelon for formal approval. Where applicable, the responsible PSC Field Quality Control Personnel shall prepare a Field Change Request document to expedite approval from Exelon's Field Quality Organization, Maintenance Engineer or such other authority as designated by Exelon, in order to continue operations without extraordinary delays. The change document may then be transmitted to Exelon for formal approval or to issue a change order notice type of document.

1.3.3 Approval of the Field Change Request or emergency revision shall be obtained from the appropriate Site Quality Assurance Authority representing Exelon, before starting any Field Changes or Revisions.

1.3.4 Copies of the Field Change Request shall be submitted to the PSC Quality Assurance Section for review and where necessary for development of formal procedures to be included in the Surveillance I.S.I. Manual.

1.3.5 The approval of the FCR shall be considered as the acceptance for the Revised Procedures unless gross changes occur during the Revision drafting that affect other portions of the Surveillance I.S.I. Manual.

1.3.5.1 If gross changes occur, the Surveillance I.S.I. Manual affected procedures shall be submitted for formal review and approval. Otherwise, the FCR Revision shall be considered as approved and submitted on a controlled basis for inclusion in the Surveillance I.S.I. Manual.

1.3.6 As the PSC Quality Assurance Section and the Engineering Department are responsible for drafting Revisions, whether a result of the FCR process or Specification Changes, it shall not be necessary for either function to provide a formal review and signoff. It shall be necessary for the Originator or PSC Field Quality Control personnel to call the PSC Home Office to acquire agreement and acceptance of the FCR before submitting it to Exelon. This way Quality Assurance and Engineering can evaluate the impact of the FCR on Quality Control, Engineering features and other subsequent Surveillance activities.

1.3.6.1 The Originator or PSC Quality Control personnel shall document the review and acceptance of the PSC Home Office personnel by printing the name of the person accepting that FCR and the date of acceptance at the bottom of the Recommended Change area on the FCR form.

1.3.7 The original FCR shall be maintained with the Field Quality Control records.

1.3.7.1 The remaining distribution shall be completed, using the Distribution Listing shown at the bottom of the FCR form once the FCR is formally approved by PSC and Exelon.

1.3.7.2 The FCR shall be entered into the FCR Index Log for

1.3.7.2.1 FCR Number

1.3.7.2.2 Brief Description

1.3.7.2.3 Date Written

1.3.7.2.4 Date Approved

1.3.7.2.5 Date of Revision (to Surveillance I.S.I. Manual, if applicable)

## 1.4 DOCUMENTATION

1.4.1 Included with this procedure are the various forms and control sheets described in this procedure.

## 2.0 ATTACHMENTS

2.1 Field Change Request Form

2.2 Field Change Request Index Log

PRECISION SURVEILLANCE

N1091 PSC PROCEDURE QA 7.0
**FIELD CHANGE REQUEST FORM**
09/03/13
Page 1 of 1
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SPECIAL FIELD REVISION CONTROL FIELD CHANGE REQUEST NO.: FCR ____________

REQUEST BY: ____________ TITLE: ____________ DATE: ____________

ORIGINATOR: ____________ TITLE ____________ DATE: ____________

PROCEDURE NUMBER: ____________ REV NO.: _____ PROCEDURE TITLE ____________

AFFECTED SECTION: ____________ REVISION TO MANUAL REQUIRED: ☐ YES ☐ NO

NCR REQUIRED: ☐ YES ☐ NO NCR NUMBER: ____________ HOLD TAG NO.: ____________

DETAILED DESCRIPTION OF EXISTING CONDITION: (USE EXTRA PAGES OR WRITE ON BACK)

RECOMMENDED CHANGE:

| | | | |
|---|---|---|---|
| PSC APPROVAL SIGN & DATE: | QA | QC | ENGINEERING |

EXELON APPROVAL OR COMMENTS:

APPROVED SITE QA AUTHORITY: ____________ TITLE: ____________ DATE: ____________

DISPOSITION PSC QC: HOLD TAG APPLIED: ____________ HOLD TAG REMOVED: ____________

QC INSPECTOR: ____________ DATE: ____________

DISTRIBUTION

☐ EXELON QA
☐ QA PSC
☐ ENGINEERING PSC
☐ EXELON ENGINEERING
☐ PROJECT MGR. PSC
☐ EXELON QC
☐ QC PSC
☐ ____________
☐ ____________

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PRECISION SURVEILLANCE

N1091 PSC PROCEDURE QA 7.0
**FIELD CHANGE REQUEST INDEX LOG**
09/03/13
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Project: TMI NUCLEAR PLANT - UNIT 1 – 40th Year

## FIELD CHANGE REQUEST INDEX LOG

| FCR# | DESCRIPTION | DATE WRITTEN | DATE APPROVED | DATE REV. |
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# EXELON
# THREE MILE ISLAND
# UNIT 1 (40TH YEAR) PHYSICAL
# CONTAINMENT BUILDING TENDON SURVEILLANCE

PRECISION SURVEILLANCE CORPORATION
IN-SERVICE INSPECTION
QUALITY CONTROL PROCEDURE

## DOCUMENT CONTROL

| | | |
|---|---|---|
| Melissa Lara | *Q.C. INSPECTOR* | 09/03/13 |
| Prepared by | Title | Date |
| Gerald F. Bussone | *Q.A. MANAGER* | 09/03/13 |
| Approved by | Title | Date |
| Paul C. | *PRESIDENT* | 09/03/13 |
| Approved by | Title | Date |

## 1.0 DOCUMENT CONTROL

1.1 The responsibility for control and retention of all documentation and records, related to the quality control functions for the project within the limitations of the contract documents shall be incumbent on those organizations performing that portion of the work and as further stated in PSC Procedure QA 3.0.

1.2 All documentation, which includes inspections, tests, certifications, drawings, purchase orders, specifications, procedures, correspondence and audits, etc. shall be prepared in accordance with the procedures as described in the applicable job related manuals and procedures.

1.3 All inspection records shall be reviewed, initialed or signed and dated by the personnel responsible for the quality control functions.

1.4 All quality related documents pertaining to the project shall be retained in the field office file, jobsite vault, or both and maintained in such a manner so as to permit retrieval and prevent loss.

1.5 Document distribution or retention shall be in accordance with the requirements of the project specifications, or as agreed to in the contract documents.

1.5.1 All documents such as Data Sheets, Nonconformances, verification records, calibration records, certified mill test reports, engineering analyses, etc. generated during the course of the In-Service Inspection, shall be included in the Final Report or appended to that Final Report.

1.6 Copies of Non-Conformance Reports shall be distributed in accordance with the project specifications or as noted on the Non-Conformance/Corrective Action form; refer to PSC Procedure QA 9.0.

1.7 All records shall be sent to the responsible Quality Control Section for further distribution in accordance with the project specifications, or as agreed to in the contract documents, or the PSC Quality Assurance Manual.

# EXELON
# THREE MILE ISLAND
# UNIT 1 (40TH YEAR) PHYSICAL
# CONTAINMENT BUILDING TENDON SURVEILLANCE

## PRECISION SURVEILLANCE CORPORATION
## IN-SERVICE INSPECTION
## QUALITY CONTROL PROCEDURE

## REVISION CONTROL

| | | |
|---|---|---|
| Melissa Lara | *Q.C. INSPECTOR* | 09/03/13 |
| Prepared by | Title | Date |
| Gerald F. Bussone | *Q.A. MANAGER* | 09/03/13 |
| Approved by | Title | Date |
| Paul C. | *PRESIDENT* | 09/03/13 |
| Approved by | Title | Date |

## 1.0 GENERAL

1.1 The statements within this Manual are representative of the Precision Surveillance Corporation quality program activities in effect at the time of issue. The construction phase of the project and other delays have a direct influence on the amount of time that will transpire between the actual startup of fabrication and termination of the construction life of the contract. It may therefore become necessary to review and upgrade or revise the various quality procedures or manuals, as a means of accommodating changes in the specifications, codes, operating procedures, material procurement, or as a means of transmitting intent, information or clarification. Correction of misspelled words or typographical errors that do not affect intent, shall not be considered as revisions.

## 2.0 TRANSMITTAL

2.1 Submittal of revisions to Exelon shall be in conformance with PSC Procedure QA 6.0, Document Control, of the Quality Assurance Manual.

## 3.0 REVISION CONTROL

3.1 If a revision is submitted where a Surveillance I.S.I. Manual has been issued, only those procedures being revised shall be affected for approval status. The remainder of the Surveillance I.S.I. Manual shall still remain approved. The original or previous revision of the affected procedure shall remain in effect, unless unworkable, until the revised procedure has been approved.

3.2 When a revision is submitted, the entire manual shall then become "Revision One" for example. Included in the revision package are all those documents required to bring the original version of that manual to "Revision One" status.

3.3 A Revision Control Sheet shall show all the documents being submitted, with the correct revision status of each page. The Revision Control Sheet provides a chronological history of development for the manual while the Index Status Sheet indicates all the original documents contained within the original submittal of the manual.

3.4 The Index Status Sheet shall not be revised to any extent greater than to show a date and revision number in the Revision Status column on the Index Status Sheet.

3.5 It is unlikely that any document within any Surveillance I.S.I. Manual shall be of an unrevised status or of the same revision status as the Manual itself. Therefore, the document and manual revision numbers will not be the same. The Index Status Sheet will establish the revision status of each Manual or document issued.

3.6 When a revision is made to a procedure, the entire procedure will revert to that revision number, even if there are no editorial or format changes to that page.

3.6.1 Revisions to a Section/Paragraph of a procedure will be identified with a triangle appearing at the left edge of the page near the Section/Paragraph which has been affected and revised. Inside the triangle will appear the revision number for that current change. The triangle will appear only for those Sections/Paragraphs that have changed.

3.6.2 It will not be necessary to delete the triangle from the previous revision, even though it is generally recommended that signs of a previous revision be removed to avoid confusion. It will be acceptable to erase, white-out, or tape over signs of the previous revision, where that page has not been revised and is not being reproduced as a new document.

3.6.3 It will not be necessary to apply a revision number to the top of each of those pages that comprise the body of the procedure. The revision number and date need only appear at the top of the Title Page and Data Sheets.

3.6.4 No Change will be taken to mean, that no changes have occurred to that page and that the revision number indicates the current status of that page. No dates other than the original effective date will appear on individual pages. Only the Title Page and Data Sheets shall show revision status and date of that revision, along with the triangle at the bottom of the page.

3.6.5 No Editorial Change or Format Change will be taken to mean, that the text of that procedure has not changed and that the change affects the page number, section/paragraph number or that information has shifted from one page to another. This will be noted along side the triangle at the bottom of the page.

3.7 Where drawings are included in the manual, such as post-tensioning fabricated components, these drawings shall be controlled through the quality manual for that product, except where otherwise agreed to in writing. This system utilizes the drawings and procedures from a controlled quality manual for fabrication and inspection control of that component and shall accompany the purchase order to the vendor, where applicable.

## 4.0 RESPONSE

4.1 Once the revision is received by Exelon the Acknowledgement of Receipt or a facsimile, shall be returned to the Precision Surveillance Corporation, Quality Assurance Section.

4.2 Exelon comments shall be referred to the PSC Quality Assurance Section or those personnel responsible for contract coordination.

4.3 Exelon approval without comments shall be transmitted in writing to either party noted in Section 4.2 above, however verbal approval shall be sufficient to start work using the approved revision.

4.3.1 Section 4.2 or 4.3 above, may be replaced by other means of control which have been established and formally agreed to by PSC and Exelon.

## 5.0 EXELON CONTROL (SUGGESTED)

5.1 As a means of maintaining the controlled manual and revisions at Exelon's facility, it is recommended that the submitted documents be verified for accuracy of inclusion, by comparing them to the Revision Control Sheet. PSC is not immune to errors, regardless of the amount of controls imposed or implied.

## 6.0 EXPEDITING CONSTRUCTION

6.1 In order to expedite the construction schedule and with Exelon's approval, it may become necessary or advantageous to fabricate materials prior to the approval of the revision. All materials fabricated in this situation shall be tagged "Hold" and retained on that status until approval of the revision. At the time of approval the "Hold" tag shall be removed.

6.2 If, for some reason, the revision is not approved, the material fabricated or installed under the controls of the revised procedure shall be maintained on Hold status until the revision is approved. Adjustments to the material shall be made, where required, after approval.

## 7.0 VOID DOCUMENTS

7.1 Once approved, the document being revised shall be marked void and dated to reflect the revision date. This void copy will be removed from the manual and placed into a dead or void file for retention as part of the Quality Assurance records.

7.2 As a temporary measure, the void copy may be turned backwards in the manual, until removal to the file.

7.3 Items fabricated or installed with the use of the previous revisions will not require any subsequent change once fabricated or installed. The date of the document approval shall determine the point of fabrication change over and therefore, the applicable quality requirements.

7.4 PSC does not require that void documents be returned.

## 8.0 FORMS/DATA SHEETS

8.1 Any of the forms contained in this Surveillance I.S.I. Manual or any Quality Control Procedure used as a means of providing quality control or inspection documentation, are subject to change at any time without prior approval of Exelon, providing that the amount of information shown on the original form is not diminished in any way.

8.2 These revised forms shall be submitted for approval at the convenience of PSC with the next revision of that procedure that effects the change, but in no case later than 30 days from the first use of that form.

8.3 If the information required of the original or previous revision of that form is to be diminished in any way that form shall be submitted for approval prior to use.

8.4 Forms may be provided at any time where not shown in any procedure in order to provide the required quality control or inspection documentation, without prior approval and at the option of the PSC Quality Control or Quality Assurance Sections.

## 9.0 ATTACHMENTS

9.1 Revision Control Sheet

PSC
PRECISION SURVEILLANCE

N1091 PSC PROCEDURE QA 8.1
**REVISION CONTROL SHEET**
09/03/13
Revision 0
Page 1 of 1

Project: TMI NUCLEAR PLANT - UNIT 1 - 40th Year

Revision # ____________

## REVISION CONTROL SHEET

| Procedure # | Page # | Revision/ Date | Submitted Date | Procedure # | Page # | Revision/ Date | Submitted Date |
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# EXELON
# THREE MILE ISLAND
# UNIT 1 (40TH YEAR) PHYSICAL
# CONTAINMENT BUILDING TENDON SURVEILLANCE

PRECISION SURVEILLANCE CORPORATION
IN-SERVICE INSPECTION
QUALITY CONTROL PROCEDURE

## NONCONFORMANCES

| | | |
|---|---|---|
| Melissa Lara | *Q.C. INSPECTOR* | 09/03/13 |
| Prepared by | Title | Date |
| Gerald F. Bussone | *Q.A. MANAGER* | 09/03/13 |
| Approved by | Title | Date |
| Paul C. | *PRESIDENT* | 09/03/13 |
| Approved by | Title | Date |

## 1.0 NONCONFORMANCE REPORTING

1.1 Any item, service, activity or procedure not conforming to the approved drawings, specifications, instructions or other project requirements as related to the PSC contract for the project, shall be documented as a nonconformance. A non-conformance report shall be written by the authority responsible for quality, discovering the nonconformance, regardless of the location where the deficiency was discovered or the source of origin.

1.1.1 This reporting shall be completed on a timely basis, preferably immediately upon discovery and consultation. The reporting action should be within one working day from discovery.

1.2 All nonconforming items shall be removed to a segregated area.

1.3 The nonconformance report shall be distributed to the appropriate parties noted on the distribution list shown on the PSC Nonconformance/Corrective Action (NC/CA) Report Form, which is shown at the end of this procedure. A typical Nonconformance Report Index shall also be seen.

1.3.1 Exelon shall receive copies of those nonconformance reports that indicate a loss of control for the manufacturing process, field construction, or quality control system and where it has been determined by PSC Quality Assurance, Quality Control, and/or possibly Exelon, that a measure of input shall be required by Exelon to resolve the deficiency.

1.3.1.1 The Recommended Corrective Action for the nonconformance reports noted in Section 1.3.1 above, shall be submitted to Exelon for review and approval prior to the execution of that action, for all items to be dispositioned as "Repair" or Use-As-Is.

1.3.1.2 All nonconformance reports shall be submitted to Exelon, whether for review and/or approval.

1.4 Acceptance of the nonconforming item, after completion of the corrective action, shall be by inspection.

1.5 Once the corrective action has been determined, the Quality Control or Quality Assurance personnel shall make arrangements for the completion of the nonconformance, including verification. The completion of this action shall be documented in the Disposition area provided on the NC/CA Report Form.

1.5.1 Once the nonconformance has been corrected and the disposition completed on the NC/CA Report Form, the formal close-out of that report shall be documented in the NCR Index Log. All nonconformance reports shall be closed-out.

1.5.2 In some circumstances, the corrective action may be completed on another document, such as an Exelon nonconformance report. In that case, the PSC NC/CA Report may be closed-out immediately as a result of Exelon's document, and shall be so noted in the Index Log.

1.6 Only Quality Control or Quality Assurance personnel shall have the authority to return the nonconforming item to inventory or service, once disposition of the corrective action has been completed and accepted by that Quality authority.

1.7 In addition to the normal reporting system for Nonconforming Material and Services, supplemental reports shall be submitted for deficiencies whether a result of design, conformance, fabrication, or performance, that represent a significant breakdown in the Quality Assurance Program and, were they to remain uncorrected, could adversely affect the operation of the item at any time throughout the expected lifetime of the item. These written reports shall be prepared by the PSC Quality Assurance, Quality Control, and/or Engineering Department and submitted to Exelon documenting the cause of the deficiency and the formal corrective action to prevent repetition.

1.8 The Nonconformance Reports shall be retained in the appropriate Quality file on site.

## 2.0 DRAFTING THE REPORT

2.1 The following outline shall be used as a guide for developing the Nonconformance Report. Refer to the example at the end of this procedure.

2.2 The Nonconformance Report shall indicate the identification of the nonconforming item, the deficiency noted, preferably with reference to the requirement in violation, in the area marked Nonconformance on the NC/CA Report Form.

2.3 The Apparent Cause Known shall be entered onto the form, if it can be readily discerned. Overly restrictive or unworkable procedures or specifications may be listed as the cause, as well as changes in working conditions not considered by the procedures or specifications. If this cannot be satisfactorily resolved by the initiator of the report, then it shall be completed by Quality Assurance, Quality Control or the Engineering Department.

2.4 The area marked Recommended Corrective Action on the NC/CA Report Form shall indicate the action necessary to immediately correct the deficiency. Usually noted as Use-As-Is; Repair; Rework; Scrap; and any appropriate commentary to substantiate that action.

2.4.1 Where nonconforming items are to be corrected by repairing the stated deficiency, the repairs shall be accomplished through the use of an approved repair procedure. This may be shown directly on the NC/CA Report Form or attached to it as a separate document.

2.4.2 Nonconforming items shall be rejected, repaired, reworked or accepted for corrective action after evaluation by the PSC Quality Assurance, Quality Control, Engineering and/or Exelon.

2.5 Where possible, the Corrective Action to Prevent Recurrence area of the NC/CA Report Form, shall provide the long range action that may be instrumental in preventing recurrence of that deficiency entered onto the form.

2.6 The determination of Significant Condition status shall be performed by the Quality Assurance, Quality Control and/or the Engineering Department. The identification of significant conditions adverse to quality, their cause and the appropriate corrective action to resolve the condition shall be documented on the NC/CA Report Form or in a separate report as noted in Section 1.7 of this procedure.

2.6.1 A significant condition adverse to quality shall exist if one or more of the following elements are required:

2.6.1.1 A significant investigation is necessary to determine the cause.

2.6.1.2 Significant redesign, repair or rework of the item.

2.6.1.3 A significant evaluation of the QA/QC Program implementation.

2.6.1.4 Significant evaluation for determining generic implication.

## 3.0 NONCONFORMANCE REPORT NUMBERING

3.1 All Nonconformance Report Numbers shall be prefixed with the PSC project Contract Number.

3.2 All Field originated NCR's shall prefix the project Contract Number with the letter "F".

3.3 Non-project oriented NCR's shall be prefixed with QA and shall only be issued through the Quality Assurance Section.

3.4 All NCR's shall be assigned a sequential control number, to follow the prefix number, which shall be applied in ascending order from the previous report and originating with the number "1".

## 4.0 PROCESSING NONCONFORMANCE REPORTS

4.1 This is intended to provide PSC Field Quality Control personnel with the means of approving processing or closing out NCR's where they are not in close proximity to the home office.

4.2 The report may be drafted by independent action or with the assistance of the Engineering or Quality Assurance Sections. Where input has been provided by the assistance of others, the Quality Control person drafting the report shall print the name of that person assisting and the date in the respective area of that Section of the Nonconformance/Corrective Action Report Form. The report should be distributed as soon as it is drafted, unless the disposition of the corrective action takes place within 5 days after discovery of the deficiency; in this instance, the distribution will probably take place after the disposition is complete.

4.3 The PSC Approval for QA, QC and/or Engineering may be communicated by telephone to expedite corrective action. In which case the Quality Control person on site would print the name of the person approving that action and the date. Those NCR's could be initialed at a later date to formally complete the approval actions.

## 5.0 DOCUMENTATION

5.1 Included with this procedure are the various tags and control sheets described in this procedure.

## 6.0 ATTACHMENTS

6.1 Tags and Sample Logs (Example)

6.2 Sample NC/CA Report

6.3 NC/CAR Form

6.4 NCR Index Form

6.5 Hold Tag Index Log

6.6 Reject Tag Index Log

N1091 PSC PROCEDURE QA 9.0
**NONCONFORMANCES**
**TAGS AND SAMPLE LOGS**
09/03/13
Page 1 of 1
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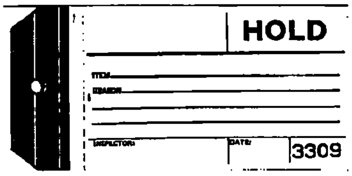
# NONCONFORMING MATERIALS, PARTS OR COMPONENTS

## TAGS

Shown below are typical examples of Hold, Reject and Acceptance tags. They may vary in appearance but, are representative of the format and information to be provided. All but the Acceptance tag, are two-part tags.

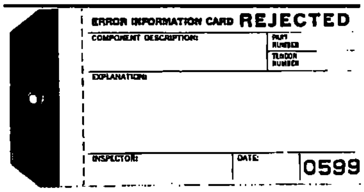


HOLD

ITEM:

REASON:

INSPECTOR: DATE: 3309



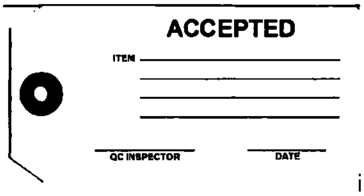
ERROR INFORMATION CARD **REJECTED**

COMPONENT DESCRIPTION: PART NUMBER

TENDON NUMBER

EXPLANATION:

INSPECTOR: DATE: 0599



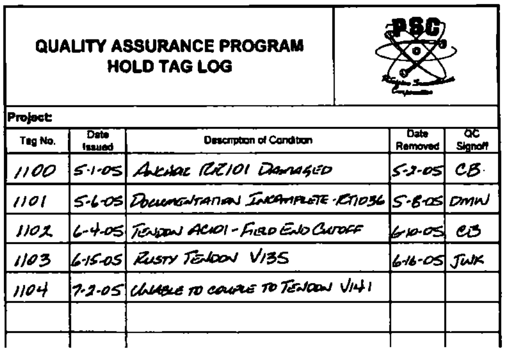
ACCEPTED

ITEM

QC INSPECTOR DATE

## SAMPLE LOG ENTRIES

Shown below are typical examples of entries made into each respective log. Note that some are cross-referenced such as HOLD 1100 to Reject 1700; and HOLD 1103 to Reject 1701.



**QUALITY ASSURANCE PROGRAM**
**HOLD TAG LOG**

Project:

| Tag No. | Date Issued | Description of Condition | Date Removed | QC Signoff |
|---|---|---|---|---|
| 1100 | 5-1-05 | ANCHOR RZ101 DAMAGED | 5-2-05 | CB |
| 1101 | 5-6-05 | DOCUMENTATION INCOMPLETE - RT1036 | 5-8-05 | DMW |
| 1102 | 6-4-05 | TENDON AC101 - FIELD END CUTOFF | 6-10-05 | CB |
| 1103 | 6-15-05 | RUSTY TENDON V135 | 6-16-05 | JWK |
| 1104 | 7-2-05 | UNABLE TO COUPLE TO TENDON V141 | | |
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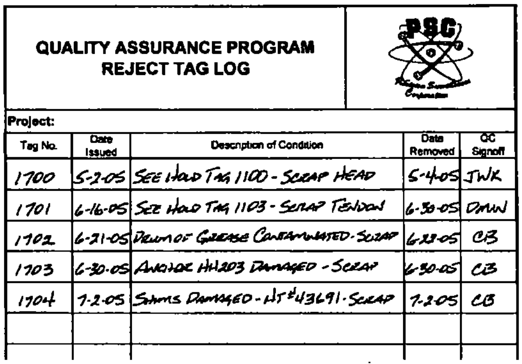

**QUALITY ASSURANCE PROGRAM**
**REJECT TAG LOG**

Project:

| Tag No. | Date Issued | Description of Condition | Date Removed | QC Signoff |
|---|---|---|---|---|
| 1700 | 5-2-05 | SEE HOLD TAG 1100 - SCRAP HEAD | 5-4-05 | JWK |
| 1701 | 6-16-05 | SEE HOLD TAG 1103 - SCRAP TENDON | 6-30-05 | DMW |
| 1702 | 6-21-05 | DRUM OF GREASE CONTAMINATED - SCRAP | 6-23-05 | CB |
| 1703 | 6-30-05 | ANCHOR HH203 DAMAGED - SCRAP | 6-30-05 | CB |
| 1704 | 7-2-05 | SHIMS DAMAGED - HT #43691 - SCRAP | 7-2-05 | CB |
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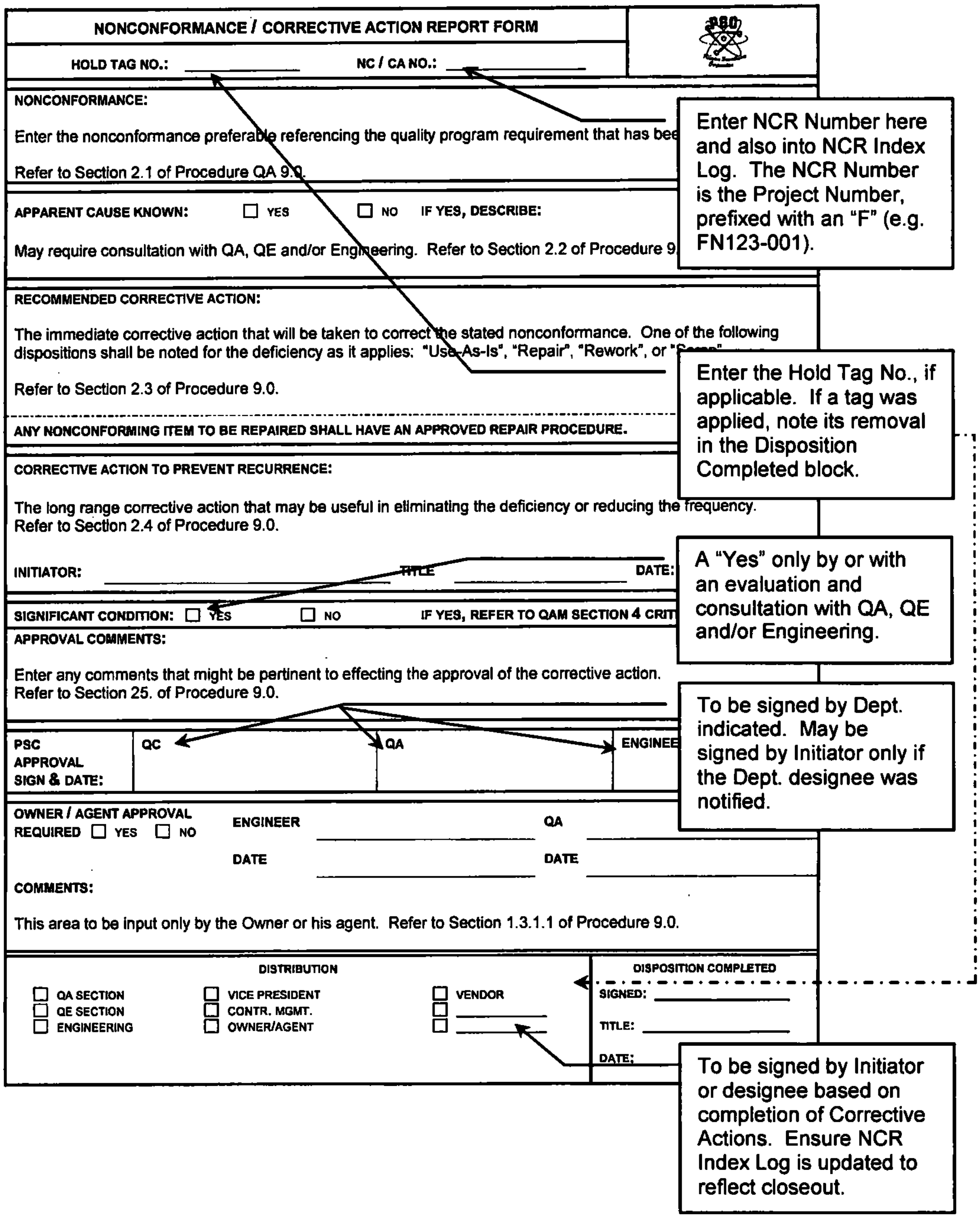
# NONCONFORMANCE/CORRECTIVE ACTION REPORT FORM - SAMPLE



**NONCONFORMANCE / CORRECTIVE ACTION REPORT FORM**

**HOLD TAG NO.:** ____________ **NC / CA NO.:** ____________

**NONCONFORMANCE:**

Enter the nonconformance preferable referencing the quality program requirement that has bee

Refer to Section 2.1 of Procedure QA 9.0.

**APPARENT CAUSE KNOWN:** ☐ YES ☐ NO **IF YES, DESCRIBE:**

May require consultation with QA, QE and/or Engineering. Refer to Section 2.2 of Procedure 9

**RECOMMENDED CORRECTIVE ACTION:**

The immediate corrective action that will be taken to correct the stated nonconformance. One of the following dispositions shall be noted for the deficiency as it applies: "Use-As-Is", "Repair", "Rework", or "

Refer to Section 2.3 of Procedure 9.0.

**ANY NONCONFORMING ITEM TO BE REPAIRED SHALL HAVE AN APPROVED REPAIR PROCEDURE.**

**CORRECTIVE ACTION TO PREVENT RECURRENCE:**

The long range corrective action that may be useful in eliminating the deficiency or reducing the frequency.
Refer to Section 2.4 of Procedure 9.0.

**INITIATOR:** ____________ **TITLE** ____________ **DATE:**

**SIGNIFICANT CONDITION:** ☐ YES ☐ NO **IF YES, REFER TO QAM SECTION 4 CRIT**

**APPROVAL COMMENTS:**

Enter any comments that might be pertinent to effecting the approval of the corrective action.
Refer to Section 25. of Procedure 9.0.

| | | | |
|---|---|---|---|
| **PSC APPROVAL SIGN & DATE:** | **QC** | **QA** | **ENGINEE** |

**OWNER / AGENT APPROVAL REQUIRED** ☐ YES ☐ NO
**ENGINEER** ____________ **QA** ____________
**DATE** ____________ **DATE** ____________

**COMMENTS:**

This area to be input only by the Owner or his agent. Refer to Section 1.3.1.1 of Procedure 9.0.

**DISTRIBUTION**

- ☐ QA SECTION
- ☐ QE SECTION
- ☐ ENGINEERING
- ☐ VICE PRESIDENT
- ☐ CONTR. MGMT.
- ☐ OWNER/AGENT
- ☐ VENDOR
- ☐ ____________
- ☐ ____________

**DISPOSITION COMPLETED**
**SIGNED:** ____________
**TITLE:** ____________
**DATE:**

Enter NCR Number here and also into NCR Index Log. The NCR Number is the Project Number, prefixed with an "F" (e.g. FN123-001).

Enter the Hold Tag No., if applicable. If a tag was applied, note its removal in the Disposition Completed block.

A "Yes" only by or with an evaluation and consultation with QA, QE and/or Engineering.

To be signed by Dept. indicated. May be signed by Initiator only if the Dept. designee was notified.

To be signed by Initiator or designee based on completion of Corrective Actions. Ensure NCR Index Log is updated to reflect closeout.

PRECISION SURVEILLANCE

N1091 PSC PROCEDURE QA 9.0
**NONCONFORMANCES**
**NC/CAR FORM**
09/03/13
Revision 0
Page ____ of ____

## *NONCONFORMANCE / CORRECTIVE ACTION REPORT FORM*

HOLD TAG NO.: ____________________ NC / CA NO.: ____________

**NONCONFORMANCE:**

**APPARENT CAUSE KNOWN:** ☐ YES ☐ NO **IF YES, DESCRIBE:**

**RECOMMENDED CORRECTIVE ACTION:**

**ANY NONCONFORMING ITEM TO BE REPAIRED SHALL HAVE AN APPROVED REPAIR PROCEDURE.**

**CORRECTIVE ACTION TO PREVENT RECURRENCE:**

**INITIATOR:** TITLE **DATE:**

**SIGNIFICANT CONDITION:** ☐ YES ☐ NO **IF YES, REFER TO QAM SECTION 15.**

**APPROVAL COMMENTS:**

| | | | |
|---|---|---|---|
| **PSC APPROVAL SIGN & DATE:** | ***QC*** | ***QA*** | **ENGINEERING** |

**EXELON APPROVAL REQUIRED** ☐ YES ☐ NO ENGINEER ____________________ DATE ____________

QA ____________________ DATE ____________

**COMMENTS:**

| DISTRIBUTION | | | DISPOSITION COMPLETED |
|---|---|---|---|
| ☐ QA SECTION | ☐ VICE PRESIDENT | ☐ VENDOR | **SIGNED:** |
| ☐ QE SECTION | ☐ CONTR. MGMT. | ☐ __________ | **TITLE:** |
| ☐ ENGINEERING | ☐ EXELON | ☐ __________ | **DATE:** |

43 QA 9.0 TMI.13 ISI

PRECISION SURVEILLANCE

N1091 PSC PROCEDURE QA 9.0
**NONCONFORMANCES**
**NONCONFORMANCE REPORT INDEX LOG**
09/03/13
Revision 0
Page ____ of ____

Project: TMI NUCLEAR PLANT UNIT 1 – 40th Year

## NONCONFORMANCE REPORT INDEX LOG

| NCR# | DESCRIPTION | DATE WRITTEN | DATE SUBMITTED | DATE APPROVED | DATE COMPLETE |
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43 QA 9.0 TMI.13 ISI

PRECISION SURVEILLANCE

N1091 PSC PROCEDURE QA 9.0
**NONCONFORMANCES**
**HOLD TAG INDEX LOG**
09/03/13
Revision 0
Page ____ of ____

Project: TMI NUCLEAR PLANT UNIT 1 – 40th Year

## HOLD TAG INDEX LOG

| TAG# | DATE ISSUED | DESCRIPTION OF CONDITION | DATE REMOVED | QC SIGNOFF |
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43 QA 9.0 TMI.13 ISI

PRECISION SURVEILLANCE

N1091 PSC PROCEDURE QA 9.0
**NONCONFORMANCES**
**REJECT TAG INDEX LOG**
09/03/13
Revision 0
Page ____ of ____

Project: TMI NUCLEAR PLANT UNIT 1 – 40th Year

## REJECT TAG INDEX LOG

| TAG# | DATE ISSUED | DESCRIPTION OF CONDITION | DATE REMOVED | QC SIGNOFF |
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43 QA 9.0 TMI.13 ISI

# EXELON
# THREE MILE ISLAND
# UNIT 1 (40TH YEAR) PHYSICAL CONTAINMENT BUILDING TENDON SURVEILLANCE

PRECISION SURVEILLANCE CORPORATION
IN-SERVICE INSPECTION
QUALITY CONTROL PROCEDURE

## CALIBRATION OF MEASURING AND TEST EQUIPMENT

| | | |
|---|---|---|
| Melissa Lara | *Q.A. MANAGER* | 09/03/13 |
| Prepared by | Title | Date |
| Gerald F. Bussone | *PROJECT MANAGER, P.E.* | 09/03/13 |
| Approved by | Title | Date |
| Paul C. | *PRESIDENT* | 09/03/13 |
| Approved by | Title | Date |

## 1.0 CALIBRATION REQUIREMENTS

1.1 This procedure will establish the requirements for calibration of the Quality Control Test and Measuring Equipment to be used for inspection, testing and evaluation, during the In-Service Inspections (Surveillance) of the Post-Tensioning System Tendons.

## 2.0 CONTROLS

2.1 All calibrated test and measuring equipment shall be controlled for issue by the PSC Quality Control or Quality Assurance Section. The area of issue shall be indicated on the calibration records. The calibration records shall be maintained by the PSC Quality Control or Quality Assurance Section.

2.2 PSC Quality Control personnel shall maintain a file or list of in-service devices requiring calibration, and periodically review those records to prevent any lapse in calibration.

2.3 The Quality Assurance Section shall review calibration records during audits of that operation being audited.

2.4 All calibrated equipment shall be documented and identified by a label, tag, or log sheet indicating the status of calibration. The control device shall identify the equipment, the date of calibration, date due for recalibration and the signature or initials of the person performing or verifying the calibration.

2.5 The identification control of the calibrated equipment shall be of such a nature so that the specific traceability of that device will not be lost; usually engraved or marked with a Quality Control code number.

2.6 Any calibrated device that has been damaged, adjusted or repaired before the recalibration due date, shall be recalibrated before initial use, to assure the prescribed accuracy.

2.7 There is no intent to apply calibration requirements on those devices such as tapelines, levels, etc. where normal commercial practices provide adequate accuracy, or where there is no need for accuracy.

2.8 Procedures shall be provided for the calibration of special testing, measuring, inspection devices or other equipment requiring calibration and shall be controlled by the Quality Assurance Section or included in the Surveillance I.S.I. Manual for the project.

2.9 The Rams which have been used for Monitoring Force, Detensioning or Retensioning operations for the In-Service Inspection of the Post-Tensioning System Tendons shall be verified for calibrated status after the completion of the work.

2.10 The documents for the calibration of Rams prior to starting the work and after completing the work shall be included with the Final Report for the In-Service Inspection.

## 3.0 OUT OF CALIBRATION

3.1 Devices out of calibration shall be processed as nonconformances. Devices out of calibration that are determined to have an adverse effect on quality shall have copies of that nonconformance report submitted to Executive Management for review, and comments where applicable.

3.1.1 Nonconformance Reports shall be drafted, submitted and distributed in accordance with the requirements of PSC Procedure QA 9.0.

3.2 Instruments that are found to be out of calibration shall be re-calibrated and a comparison made of the results of the new calibration and the out-of-calibration variance, if any. If no significant variation exists, the instrument shall be put back into service. In the event that a discrepancy exists, then the Engineering and/or Quality Assurance and Quality Control Sections shall make an evaluation of the discrepancy and the possible effect on the items processed with the out-of-calibration device, with regard to quality, accuracy or reliability. If it is determined that a serious problem exists, then the Quality Assurance Section shall determine what items checked with the out-of-calibration device shall be rechecked with an effective calibrated device.

3.3 Instruments that are found to be in excess of the required accuracy or tolerance band after being returned from Field Service, shall be controlled with Nonconformance Reports as required of Sections 3.1 and 3.2 of this Procedure.

## 4.0 TOOL AND GAUGE CONTROL

4.1 The calibration standards used to calibrate measuring and test equipment shall be traceable to the National Institute of Standards and Technology (NIST) and shall be controlled to an accuracy not to exceed a limit of 25% of the tolerance of the equipment being calibrated or the smallest used division of that instrument's scale, unless otherwise limited by "State-of-the Art" conditions. Pressure Gauges used for Post-Tensioning System operations shall be excluded from this requirement and shall be defined for accuracy in separate procedures.

4.1.1 For example, a micrometer that has a smallest scale reading of 0.001" shall be calibrated with a standard or device that has been calibrated to an accuracy or 0.00025" or less.

4.2 All measuring and test equipment used for Quality Control Inspections shall have subdivisions or increments for measurements that are equal to or smaller than the tolerance of the parameter being measured.

4.2.1 For example, a part needs to be controlled to a dimension of 9.365" with a tolerance of plus or minus 0.001". It would therefore be acceptable to perform that measurement with a device that is capable of measuring to 0.001" or smaller.

4.3 Calibrated Devices may be extended for the stated period of frequency, where that device has been calibrated and placed into storage, rather than into service. The original frequency period stated in Section 5.2, Equipment List, shall always be observed.

## 5.0 EQUIPMENT

5.1 The Equipment List shown in Section 5.2 of this Procedure contains those devices that are required for the In-Service Inspection or are used to calibrate devices that will be used during the In-Service Inspection. The required accuracy and frequency of calibration are stated for each device. It should be noted that the accuracy requirement is meant to be the tolerance band to which the device is being calibrated and not the original accuracy or the accuracy between calibration frequencies.

5.1.1 The term "DISS" in the Accuracy Column is defined as "Division of that Instrument's Smallest Scale".

5.1.2 Where an asterisk "*" follows the accuracy dimension, this is meant to be that the dimension shown shall be verified with a Micrometer that reads to 0.0001".

5.1.3 The procedures that are used to calibrate the various types of equipment, gauges or instruments used during the In-Service Inspection, will accompany this procedure in the Surveillance I.S.I. Manual. These procedures provide information relative to the calibration of each device and may be used for purposes of calibrating these devices in the field, should that become necessary.

## 5.2 EQUIPMENT LIST

| DEVICE | FREQUENCY | ACCURACY |
|---|---|---|
| Load Cell (3000 Kips)<br>Load Cell (Approx 50 Kips)<br><br>Rams/Jacks<br>(Stressing, Testing, etc.) | 5 Years<br>8 Years<br><br>Beginning & End<br>(B & E) of Project | ± .1% FS Entire System<br>± .1% FS Entire System<br><br>Calculated to within<br>± 0.01 square" for Ram Area |
| Dead Weight Tester<br>Heise Digital Gauge | 5 Years<br>3 Years | ± 0.10% FS<br>± 0.10% FS |
| Pressure Gauge-Master (1/4%)<br>Pressure Gauge-Stressing (1/4%)<br>Pressure Gauges (1/2%)<br>(Not used for Stressing) | 1 Year<br>1 Year<br>1 Year | ± 30 psi<br>± 30 psi of Heise<br>± 55 psi of Heise |
| Micrometer<br>Micrometer-Checking Bar Standard | 6 months<br>1 Year | ± 1 DISS<br>± 0.0001" |
| <u>Thickness</u> <u>(Feeler)</u> <u>Gauge</u><br>Under 0.005"<br>0.005" and Over<br>(* Verified with a 0.0001" micrometer) | <br>1 Year<br>1 Year | <br>± 0.0005"*<br>± 0.001" |
| Steel Ruler | 1 Year | ± 0.01" |
| Thermometer | 1 Year | ± 1 DISS |
| Optical Comparator | 1 Year | ± 0.001" |
| Dial Indicator | 1 Year | ± 1 DISS |

## 6.0 DOCUMENTATION

6.1 The various types of documents generated for calibration and/or status of calibrations will be described in the General Procedures for Calibration or contained within that procedure for a particular device. Others may be added as the need arises. Quality Control personnel shall prepare or assist in the preparation of these records. A copy of the calibration record shall accompany the calibrated device to the field.

# EXELON
# THREE MILE ISLAND
# UNIT 1 (40TH YEAR) PHYSICAL
# CONTAINMENT BUILDING TENDON SURVEILLANCE

PRECISION SURVEILLANCE CORPORATION
IN-SERVICE INSPECTION
QUALITY CONTROL PROCEDURE

## VERIFICATION OF CALIBRATION STATUS OF HYDRAULIC PRESSURE GAUGES

| | | |
|---|---|---|
| Melissa Lara | *Q.C. INSPECTOR* | 09/03/13 |
| Prepared by | Title | Date |
| Gerald F. Bussone | *Q.A. MANAGER* | 09/03/13 |
| Approved by | Title | Date |
| Paul C. | *PRESIDENT* | 09/03/13 |
| Approved by | Title | Date |

## 1.0 FIELD VERIFICATION OF PRESSURE GAUGES

1.1 The following procedure shall be used to verify the calibration of hydraulic pressure gauges during field operations. These gauges may be used in stressing operations with the rams or other devices that require a measure of accuracy to produce quality results. Frequency and Accuracy of Calibration shall be controlled as stated in Section 5.2 of Procedure QA 10.0 Equipment List. The Verification frequency shall be controlled as stated in Section 2.5 of this Procedure, while the Verification Accuracy shall be controlled as stated in Sections 3.6 or 3.7.

## 2.0 GENERAL

2.1 Prior to being used for any work, all gauges shall be calibrated with the use of a Dead Weight Tester or the Heise Digital electronic pressure indicator.

2.2 In addition to the pressure gauges used during the surveillance, one gauge, designated as the Master Gauge or a Heise Digital Gauge, shall be set aside for purposes of Calibration Verification during the process of the work. Prior to use the Master Gauge or Heise Digital Gauge used for Calibration Verification shall have been calibrated per PSC Procedure Q12.8.C-W with a dead weight tester traceable to the NIST.

2.3 PSC Quality Control personnel shall maintain the controls for distribution and recall of each Pressure Gauge being used on site.

2.4 A Pressure Gauge may be verified for calibration or accuracy at shorter frequencies than stated in Section 5.2 of Procedure QA 10.0. It is important that verification be performed any time that the gauge has been damaged, subjected to some physical abuse or there is some reason to suspect its accuracy.

2.5 Pressure Gauges used for Detensioning or Retensioning (Stressing) tendons of Post-Tensioning Tendon Systems during In-Service Inspections of Nuclear Power Plants, shall be Verified for Calibrated status at least once a day during the operational use of those gauges.

## 3.0 VERIFICATION OF CALIBRATION

3.1 Clean and remove any dirt, grease or residue that could affect the accuracy of the calibration or use of the pressure gauge.

3.2 At the option of the PSC Quality Control Section it shall be acceptable to use a Heise Digital Pressure Indicating Gauge for Calibration Verification of Pressure Gauges, rather than a Master Gauge.

3.3 Attach the Pressure Gauge to the Calibration Pump of the Heise Indicator or Master Gauge.

3.4 Close the back pressure valves before pressurizing the system.

3.5 Increase the hydraulic pressure to the point of the desired reading on the Pressure Gauge, usually 1,000 psi plus or minus 100 psi increments. Take a reading of the Pressure Gauge and the Heise Indicator and document both on the Pressure Gauge Calibration Form.

3.6 MASTER GAUGE (1/4% Accuracy)

3.6.1 Where a Master gauge is used for verification of calibration, the master gauge and field gauge to be calibrated shall be connected to a common line (manifold) on a hydraulic pump. The pump shall be pressurized in no greater than 1,000 psi increments, plus or minus 100 psi, to the highest overstress pressure that shall be encountered during stressing activities; for example, 7,600 psi overstress will require calibration on that gauge to at least 7,600 psi. It shall be acceptable to go to 8,000 psi.

3.6.2 The accuracy of a gauge verified in this manner shall be acceptable, if it reads to within 50 psi of any reading on the Master Gauge.

3.7 HEISE DIGITAL GAUGE

3.7.1 A Pressure Gauge may be verified for calibration by connecting that gauge and the Heise Digital Gauge to a common line, which is in turn connected to a hydraulic pump and pressurized to the same values noted in 3.6.1 above.

3.7.2 The verification accuracy of that Pressure Gauge shall be acceptable if it reads to within 30 psi of the Heise Digital Gauge reading for a 1/4 percent accuracy gauge or 55 psi for 1/2 percent accuracy gauge. As a 1/2 percent gauge cannot be accurately interpolated to increments of 5 psi it will be acceptable to take the reading to some point equal to or above 50 psi but not to exceed 60 psi.

3.7.3 Pressure Gauges with an accuracy of 1/2 percent or greater shall not be used for Monitoring Force, Detensioning or Retensioning operations of the Post-Tensioning Tendon System during In-Service Inspections.

3.8 With the Verification and Documentation of the Pressure Gauge being acceptable, the pump and gauge shall be depressurized and prepared for disassembly.

## 4.0 UNACCEPTABLE CONDITIONS

4.1 If a Pressure Gauge fails to meet the accuracy requirements of Section 3.6.2 or 3.7.2 after being used for Stressing or Detensioning operations, it shall be necessary to draft a Nonconformance Report in accordance with the requirements of Section 3 of Procedure QA 10.0, to control that Gauge and any Tendons worked with that Gauge.

4.2 Any Pressure Gauge not capable of meeting the stated accuracy requirements of Section 3.6.2 or 3.7.2 for the method of calibration being used, shall be returned to the PSC shop for adjustment or repair. Any repaired or adjusted Gauge shall be recalibrated before use.

4.3 ZERO ALIGNMENT (Zero Beating)

4.3.1 On occasion, the Pressure Gauge Indicating Needle may not be in precise alignment with the Zero mark on the Gauge Face, necessitating realignment. Before calibration the needle is to be realigned to the zero mark, with the realignment completed the Verification shall be performed and documented.

## 5.0 ACCURACY VARIATIONS

5.1 Even though Pressure Gauges that have been calibrated or verified for calibration, variations in excess of the requirements of Sections 3.6.2 and 3.7.2 may be detected between calibrations or verifications. In an effort to explain and control this deficiency, this Section shall be reviewed before the Verification of any Pressure Gauges.

5.2 The accuracy of the calibration of Pressure Gauges or the verification of calibration is highly dependent on the accuracy of the reading of the location of the Pressure Indicating Needle on the Gauge Face. While there is an attempt to precisely align the needle with the Gauge Face Indicating Line, it is nearly impossible to maintain that control. In an effort to explain any variations that could be noted between calibrations or verifications, it is recommended that a notation be added to the Calibration Document to signify that the intended increment was not precisely obtained. At that increment it would be noted that the value actually achieved was plus or minus an extrapolated pressure noted during the calibration.

5.2.1 For example: If the target increment on the gauge Face was intended to be 2,000 psi and the Indicating Needle was somewhat over the 2,000 psi line, perhaps enough to interpret as 10 psi, the notation on the Calibration Record would read:

2,000 psi +10

5.2.2 The requirements for Stressing or Detensioning Tendons do not require the Pressure to be read any finer than 10 psi during the In-Service Inspections. The Hydraulic Ram Calibration Procedure takes the reading error into account for Stressing or Detensioning along with any other errors that may occur as a result of calibration or gauge reading, thereby maintaining the accuracy or integrity of the work being performed. It is therefore necessary to document any minor variations during calibration or verification activities, so as to maintain the integrity of the accuracy of the Pressure Gauges.

## 6.0 DOCUMENTATION

6.1 A gauge Calibration Record form shall be prepared for each gauge being calibrated or verified. All pertinent information as required by the form shall be posted during calibration or verification.

6.2 Calibration or verification documents shall be retained in the appropriate jobsite Quality file.

## 7.0 ATTACHMENTS

7.1 Gauge Calibration Record Form.

N1091 PSC PROCEDURE QA 10.1
**GAUGE CALIBRATION RECORD FORM**
09/03/13
Page ___ of ___
Revision 0

Project: TMI NUCLEAR PLANT UNIT 1 – 40th Year
Job # N1091

## GAUGE CALIBRATION VERIFICATION RECORD

DATE CHECKED ______
GAUGE I.D. ______
MASTER GAUGE I.D. ______
REMARKS ______
______
______

QC SIGN OFF ______

| MASTER GAUGE (PSI) | JACK GAUGE (PSI) |
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Project: TMI NUCLEAR PLANT UNIT 1 – 40th Year
Job # N1091

## GAUGE CALIBRATION VERIFICATION RECORD

DATE CHECKED ______
GAUGE I.D. ______
MASTER GAUGE I.D. ______
REMARKS ______
______
______

QC SIGN OFF ______

| MASTER GAUGE (PSI) | JACK GAUGE (PSI) |
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# EXELON
# THREE MILE ISLAND
# UNIT 1 (40TH YEAR) PHYSICAL
# CONTAINMENT BUILDING TENDON SURVEILLANCE

PRECISION SURVEILLANCE CORPORATION
IN-SERVICE INSPECTION
QUALITY CONTROL PROCEDURE

## QUALITY CONTROL INSPECTION

| | | |
|---|---|---|
| Melissa Lara | *Q.C. INSPECTOR* | 09/03/13 |
| Prepared by | Title | Date |
| Gerald F. Bussone | *Q.A. MANAGER* | 09/03/13 |
| Approved by | Title | Date |
| Paul C. | *PRESIDENT* | 09/03/13 |
| Approved by | Title | Date |

## 1.0 QUALITY CONTROL INSPECTIONS

1.1 Where Precision Surveillance Corporation is not acting as the General Contractor for the Post-Tensioning operations, Quality Control Inspections shall be performed by the organization responsible for the quality control function of that portion of the work they are performing, as stated in PSC Procedure QA 4.0 of this manual, or as agreed to in the contract documents.

1.2 It is PSC's intent to provide the Quality Control activities for the Surveillance Inspection of the Post-Tensioning Tendon System as agreed to in the contract documents and as stated in the Surveillance I.S.I. Manual.

1.3 Quality Control documents shall NOT BE SIGNED until all information for the inspections or tests for which that document is being generated have been entered onto that document.

1.3.1 Partially completed inspection or tests, those where the operation cannot be completed on the same day, shall be initialed and dated by the Inspector for those items that have been completed and require documentation.

1.3.2 Partially completed inspections or tests, those where the operation is interrupted by a temporary condition such as lunch or a break and where the operation shall be completed the same day, may be initialed completed by the Inspector to that point, for those items that have been completed and require documentation.

1.4 Quality Control documents that are being reviewed for completeness but were not witnessed by the reviewer shall be signed for that review ONLY AFTER completion of the review and NOT BEFORE.

1.5 A Quality Control document is defined as any document or record that contains a Quality Control Inspector signature requirement.

1.6 All inspections shall be documented on the appropriate inspection form for those operations witnessed on that day. All inspection documents shall be signed or initialed, dated and retained in the appropriate Quality file at the jobsite.

1.7 Quality Control Documentation shall be completed and turned in for review as soon as possible after completion of that Inspection Test or Evaluation.

1.8 Reviews of Quality Control Documentation should be completed within 24 hours of receipt or sooner to verify that the information is accurate and complete. Errors or deficiencies shall be resolved without delay.

1.9 There are a number of Quality Control Documents that may not be completed in one day or require posting to another document. It is advisable to make reproductions of these documents and use these to complete whatever actions are necessary, while retaining the original document, even though incomplete, in a Quality Control file. The additional information can be entered onto the original document until completed. Leave the reproduced copies attached to the back of that document until the review is completed, at which time the reproductions may be disposed of.

1.10 It may be necessary to generate more than one original copy of a Quality Control Document for an Inspection or Test on a tendon. This shall be acceptable just so the total quantity of pages and the page number appear on each document.

## 2.0 INSPECTION

2.1 The term Inspection is meant to include:

2.2 The witnessing of an operation that generates Quality Control Data which is documented by the Inspector.

2.3 The performance of some operation by the Inspector, such as measuring or other Quality Control Data, which is documented by the Inspector.

# EXELON
# THREE MILE ISLAND
# UNIT 1 (40TH YEAR) PHYSICAL CONTAINMENT BUILDING TENDON SURVEILLANCE

## PRECISION SURVEILLANCE CORPORATION
## IN-SERVICE INSPECTION
## QUALITY CONTROL PROCEDURE

## AUDITS

| | | |
|---|---|---|
| Melissa Lara | *Q.C. INSPECTOR* | 09/03/13 |
| Prepared by | Title | Date |
| Gerald F. Bussone | *Q.A. MANAGER* | 09/03/13 |
| Approved by | Title | Date |
| Paul C. [illegible] | *PRESIDENT* | 09/03/13 |
| Approved by | Title | Date |

## 1.0 AUDITS

1.1 Surveillance operations shall be audited as required by the project specifications or as agreed to in the contract documents, to verify conformance with the approved job related manuals and procedures.

1.2 Audits shall be performed by qualified personnel of the Precision Surveillance Corporation Quality Assurance Section and who shall be independent of the area being audited.

1.3 Audits shall be performed using a checklist prepared prior to the audit, with the results documented on a Jobsite Audit Summary Sheet and a commentary noted on an Audit Finding Report form or similar type documents.

1.4 Audits shall be performed on a random basis and shall be scheduled when a variety of operations are being performed or as a specific activity occurs.

1.5 Subsequent audits shall provide a review of previously noted deficiencies or program non-compliance to ensure appropriate action has been taken to resolve those areas of concern.

1.6 Copies of the audit report shall be maintained in the appropriate jobsite quality files and distributed in accordance with the project specifications or distribution list on the audit checklist.

1.7 The audits shall be performed as early in the life of the In-Service Inspection, as is practical, and must consider the limitations of the scaffolding or platforms.

1.8 The elements to be audited shall be commensurate with the status and importance associated with the In-Service Inspection activities.

1.9 Exelon has the right of access for the performance of quality audit.

1.9.1 Any findings noted as a result of an Exelon audit shall be addressed by Precision Surveillance Corporation on a timely basis with corrective action as approved by Exelon.

PSC PRECISION SURVEILLANCE

N1091 PSC PROCEDURE QA 10.1
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Project: TMI NUCLEAR PLANT UNIT 1 – 40th Year

Job # N1091

## GAUGE CALIBRATION VERIFICATION RECORD

DATE CHECKED 9-23-2013
GAUGE I.D. CC138756
MASTER GAUGE I.D. 44083
REMARKS None

QC SIGN OFF WRR 9-23-2013

| MASTER GAUGE (PSI) | JACK GAUGE (PSI) |
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Project: TMI NUCLEAR PLANT UNIT 1 – 40th Year

Job # N1091

## GAUGE CALIBRATION VERIFICATION RECORD

DATE CHECKED 9-24-13
GAUGE I.D. CC-138756
MASTER GAUGE I.D. 44083
REMARKS NONE

QC SIGN OFF CGW 9-24-13

| MASTER GAUGE (PSI) | JACK GAUGE (PSI) |
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PRECISION SURVEILLANCE

**N1091 PSC PROCEDURE QA 10.1**
**GAUGE CALIBRATION RECORD FORM**
09/03/13
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Project: TMI NUCLEAR PLANT UNIT 1 – 40th Year

Job # N1091

## GAUGE CALIBRATION VERIFICATION RECORD

DATE CHECKED 9-27-13
GAUGE I.D. CC-138756
MASTER GAUGE I.D. 44083
REMARKS NONE

| MASTER GAUGE (PSI) | JACK GAUGE (PSI) |
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QC SIGN OFF CGW 9-27-13

Project: TMI NUCLEAR PLANT UNIT 1 – 40th Year

Job # N1091

## GAUGE CALIBRATION VERIFICATION RECORD

DATE CHECKED 10-1-2013
GAUGE I.D. CC 138756
MASTER GAUGE I.D. 44083
REMARKS None

| MASTER GAUGE (PSI) | JACK GAUGE (PSI) |
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QC SIGN OFF WRR 10-1-2013

PRECISION SURVEILLANCE

N1091 PSC PROCEDURE QA 10.1
GAUGE CALIBRATION RECORD FORM
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Project: TMI NUCLEAR PLANT UNIT 1 – 40th Year

Job # N1091

## GAUGE CALIBRATION VERIFICATION RECORD

DATE CHECKED 10-2-2013
GAUGE I.D. CC138755
MASTER GAUGE I.D. 44083
REMARKS None

QC SIGN OFF W. Bruce Robb

| MASTER GAUGE (PSI) | JACK GAUGE (PSI) |
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Project: TMI NUCLEAR PLANT UNIT 1 – 40th Year

Job # N1091

## GAUGE CALIBRATION VERIFICATION RECORD

DATE CHECKED 10-3-2013
GAUGE I.D. CC138755
MASTER GAUGE I.D. 44083
REMARKS None

QC SIGN OFF W. Bruce Robb

| MASTER GAUGE (PSI) | JACK GAUGE (PSI) |
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PRECISION SURVEILLANCE

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Project: TMI NUCLEAR PLANT UNIT 1 – 40th Year
Job # N1091

## GAUGE CALIBRATION VERIFICATION RECORD

DATE CHECKED 10-8-2013
GAUGE I.D. CC 138755
MASTER GAUGE I.D. 44083
REMARKS None

QC SIGN OFF

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Project: TMI NUCLEAR PLANT UNIT 1 – 40th Year
Job # N1091

## GAUGE CALIBRATION VERIFICATION RECORD

DATE CHECKED 10-9-13
GAUGE I.D. CC-138755
MASTER GAUGE I.D. 44083
REMARKS NONE

QC SIGN OFF

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PSC PRECISION SURVEILLANCE

N1091 PSC PROCEDURE QA 10.1
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Job # N1091

## GAUGE CALIBRATION VERIFICATION RECORD

DATE CHECKED 10-9-13
GAUGE I.D. CC-138756
MASTER GAUGE I.D. 44083
REMARKS NONE

QC SIGN OFF

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Project: TMI NUCLEAR PLANT UNIT 1 – 40th Year

Job # N1091

## GAUGE CALIBRATION VERIFICATION RECORD

DATE CHECKED
GAUGE I.D.
MASTER GAUGE I.D. 44083
REMARKS

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Job # N1091

## GAUGE CALIBRATION VERIFICATION RECORD

DATE CHECKED 10-14-2013
GAUGE I.D. CC138756
MASTER GAUGE I.D. 44083~~7~~WRR 10-14-13
REMARKS None

| MASTER GAUGE (PSI) | JACK GAUGE (PSI) |
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QC SIGN OFF W. R. Roble

Project: TMI NUCLEAR PLANT UNIT 1 – 40th Year

Job # N1091

## GAUGE CALIBRATION VERIFICATION RECORD

DATE CHECKED 10-14-2013
GAUGE I.D. CC138755
MASTER GAUGE I.D. 44083
REMARKS None

| MASTER GAUGE (PSI) | JACK GAUGE (PSI) |
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QC SIGN OFF W. R. Roble

PRECISION SURVEILLANCE

N1091 PSC PROCEDURE QA 10.1
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Project: TMI NUCLEAR PLANT UNIT 1 – 40th Year

Job # N1091

## GAUGE CALIBRATION VERIFICATION RECORD

DATE CHECKED 10·15·2013
GAUGE I.D. CC138755
MASTER GAUGE I.D. 44083
REMARKS None

QC SIGN OFF W. R. Robb

| MASTER GAUGE (PSI) | JACK GAUGE (PSI) |
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Project: TMI NUCLEAR PLANT UNIT 1 – 40th Year

Job # N1091

## GAUGE CALIBRATION VERIFICATION RECORD

DATE CHECKED 10-15-2013
GAUGE I.D. CC138756
MASTER GAUGE I.D. 44083
REMARKS None

QC SIGN OFF W. R. Robb

| MASTER GAUGE (PSI) | JACK GAUGE (PSI) |
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PRECISION SURVEILLANCE

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Job # N1091

## GAUGE CALIBRATION VERIFICATION RECORD

DATE CHECKED 10-16-13
GAUGE I.D. CC138756
MASTER GAUGE I.D. 44083
REMARKS None

QC SIGN OFF W. R.

| MASTER GAUGE (PSI) | JACK GAUGE (PSI) |
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Project: TMI NUCLEAR PLANT UNIT 1 – 40th Year

Job # N1091

## GAUGE CALIBRATION VERIFICATION RECORD

DATE CHECKED 10-16-13
GAUGE I.D. CC138756
MASTER GAUGE I.D. 44083
REMARKS None

QC SIGN OFF W. R.

| MASTER GAUGE (PSI) | JACK GAUGE (PSI) |
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Job # N1091

## GAUGE CALIBRATION VERIFICATION RECORD

DATE CHECKED 10-17-13
GAUGE I.D. CC138755
MASTER GAUGE I.D. 44083
REMARKS None

QC SIGN OFF W. Bruce Robbins

| MASTER GAUGE (PSI) | JACK GAUGE (PSI) |
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Project: TMI NUCLEAR PLANT UNIT 1 – 40th Year

Job # N1091

## GAUGE CALIBRATION VERIFICATION RECORD

DATE CHECKED 10-17-13
GAUGE I.D. CC138756
MASTER GAUGE I.D. 44083
REMARKS None

QC SIGN OFF W. Bruce Robbins

| MASTER GAUGE (PSI) | JACK GAUGE (PSI) |
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PRECISION SURVEILLANCE

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Project: TMI NUCLEAR PLANT UNIT 1 – 40th Year

Job # N1091

## GAUGE CALIBRATION VERIFICATION RECORD

DATE CHECKED 10-18-2013
GAUGE I.D. CC138755
MASTER GAUGE I.D. 44083
REMARKS None

QC SIGN OFF W. R. Robb

| MASTER GAUGE (PSI) | JACK GAUGE (PSI) |
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Project: TMI NUCLEAR PLANT UNIT 1 – 40th Year

Job # N1091

## GAUGE CALIBRATION VERIFICATION RECORD

DATE CHECKED 10-21-2013
GAUGE I.D. CC138756
MASTER GAUGE I.D. 44083
REMARKS None

QC SIGN OFF W. R. Robb

| MASTER GAUGE (PSI) | JACK GAUGE (PSI) |
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45 QA 10.1 TMI.13 ISI

PSC
PRECISION SURVEILLANCE

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Project: TMI NUCLEAR PLANT UNIT 1 – 40th Year  Job # N1091

## GAUGE CALIBRATION VERIFICATION RECORD

DATE CHECKED 10-28-2013
GAUGE I.D. CC138756
MASTER GAUGE I.D. 44083
REMARKS None

QC SIGN OFF W. R.

| MASTER GAUGE (PSI) | JACK GAUGE (PSI) |
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Project: TMI NUCLEAR PLANT UNIT 1 – 40th Year  Job # N1091

## GAUGE CALIBRATION VERIFICATION RECORD

DATE CHECKED 10-28-2013
GAUGE I.D. CC138755
MASTER GAUGE I.D. 44083
REMARKS None

QC SIGN OFF W. R.

| MASTER GAUGE (PSI) | JACK GAUGE (PSI) |
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**PSC**
PRECISION SURVEILLANCE

**N1091 PSC PROCEDURE QA 10.1**
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Job # N1091

## GAUGE CALIBRATION VERIFICATION RECORD

DATE CHECKED 10-29-2013
GAUGE I.D. CC138756
MASTER GAUGE I.D. 44083
REMARKS None

| MASTER GAUGE (PSI) | JACK GAUGE (PSI) |
|---|---|
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| 3000 | 2990 |
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QC SIGN OFF W. Bruce

Project: TMI NUCLEAR PLANT UNIT 1 – 40th Year

Job # N1091

## GAUGE CALIBRATION VERIFICATION RECORD

DATE CHECKED 10-29-2013
GAUGE I.D. CC138755
MASTER GAUGE I.D. 44083
REMARKS None

| MASTER GAUGE (PSI) | JACK GAUGE (PSI) |
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QC SIGN OFF W. Bruce

PSC PRECISION SURVEILLANCE

N1091 PSC PROCEDURE QA 10.1
**GAUGE CALIBRATION RECORD FORM**
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Project: TMI NUCLEAR PLANT UNIT 1 – 40th Year

Job # N1091

## GAUGE CALIBRATION VERIFICATION RECORD

DATE CHECKED 11-1-13
GAUGE I.D. CC138755
MASTER GAUGE I.D. 44083
REMARKS None

| MASTER GAUGE (PSI) | JACK GAUGE (PSI) |
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QC SIGN OFF W. R. Robl

Project: TMI NUCLEAR PLANT UNIT 1 – 40th Year

Job # N1091

## GAUGE CALIBRATION VERIFICATION RECORD

DATE CHECKED 11-4-13
GAUGE I.D. CC138755
MASTER GAUGE I.D. 44083
REMARKS None

| MASTER GAUGE (PSI) | JACK GAUGE (PSI) |
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QC SIGN OFF W. R. Robl

PSC
PRECISION SURVEILLANCE

N1091 PSC PROCEDURE QA 10.1
**GAUGE CALIBRATION RECORD FORM**
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Project: TMI NUCLEAR PLANT UNIT 1 – 40th Year

Job # N1091

## GAUGE CALIBRATION VERIFICATION RECORD

DATE CHECKED 11-5-2013
GAUGE I.D. CC138755
MASTER GAUGE I.D. 44083
REMARKS None

| MASTER GAUGE (PSI) | JACK GAUGE (PSI) |
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QC SIGN OFF W.R. Robb

Project: TMI NUCLEAR PLANT UNIT 1 – 40th Year

Job # N1091

## GAUGE CALIBRATION VERIFICATION RECORD

DATE CHECKED 11-7-2013
GAUGE I.D. CC138755
MASTER GAUGE I.D. 44083
REMARKS None

| MASTER GAUGE (PSI) | JACK GAUGE (PSI) |
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QC SIGN OFF W.R. Robb

PSC
PRECISION SURVEILLANCE

**N1091 PSC PROCEDURE QA 10.1**
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Project: TMI NUCLEAR PLANT UNIT 1 – 40th Year

Job # N1091

## GAUGE CALIBRATION VERIFICATION RECORD

DATE CHECKED 11-14-13
GAUGE I.D. CC138755
MASTER GAUGE I.D. 44083
REMARKS None

| MASTER GAUGE (PSI) | JACK GAUGE (PSI) |
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QC SIGN OFF W. R.

Project: TMI NUCLEAR PLANT UNIT 1 – 40th Year

Job # N1091

## GAUGE CALIBRATION VERIFICATION RECORD

DATE CHECKED 11-15-13
GAUGE I.D. CC138755
MASTER GAUGE I.D. 44083
REMARKS None

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QC SIGN OFF W. R.

PRECISION SURVEILLANCE

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Project: TMI NUCLEAR PLANT UNIT 1 – 40th Year

Job # N1091

## GAUGE CALIBRATION VERIFICATION RECORD

DATE CHECKED 11-18-13
GAUGE I.D. CC138755
MASTER GAUGE I.D. 44083
REMARKS None

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QC SIGN OFF W.R.

Project: TMI NUCLEAR PLANT UNIT 1 – 40th Year

Job # N1091

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REMARKS None

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QC SIGN OFF W.R.

PSC
PRECISION SURVEILLANCE

N1091 PSC PROCEDURE QA 10.1
GAUGE CALIBRATION RECORD FORM
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Project: TMI NUCLEAR PLANT UNIT 1 – 40th Year

Job # N1091

## GAUGE CALIBRATION VERIFICATION RECORD

DATE CHECKED 11-20-2013
GAUGE I.D. CC138755
MASTER GAUGE I.D. 44083
REMARKS NONE

| MASTER GAUGE (PSI) | JACK GAUGE (PSI) |
|---|---|
| 1000 | 990 |
| 2000 | 1990 |
| 3000 | 3000 |
| 4000 | 4000 |
| 5000 | 5000 |
| 6000 | 6000 |
| 7000 | 7000 |
| | |
| | |

QC SIGN OFF W. R.

Project: TMI NUCLEAR PLANT UNIT 1 – 40th Year

Job # N1091

## GAUGE CALIBRATION VERIFICATION RECORD

DATE CHECKED 11-20-2013
GAUGE I.D. CC138756
MASTER GAUGE I.D. 44083
REMARKS NONE

| MASTER GAUGE (PSI) | JACK GAUGE (PSI) |
|---|---|
| 1000 | 990 |
| 2000 | 1990 |
| 3000 | 2990 |
| 4000 | 3990 |
| 5000 | 5000 |
| 6000 | 6000 |
| 7000 | 7000 |
| | |
| | |

QC SIGN OFF W. R.

PRECISION SURVEILLANCE

**N1091 PSC PROCEDURE QA 9.0**
**NONCONFORMANCES**
**NONCONFORMANCE REPORT INDEX LOG**
**09/03/13**
**Revision 0**
**Page ____ of ____**

Project: TMI NUCLEAR PLANT UNIT 1 – 40th Year

## NONCONFORMANCE REPORT INDEX LOG

| NCR# | DESCRIPTION | DATE WRITTEN | DATE SUBMITTED | DATE APPROVED | DATE COMPLETE |
|---|---|---|---|---|---|
| NCR-N1091-001 | 2 Protruding wires found on tendon# H 24-15 Buttress 4 Shop end. | 9-27-13 | 9-27-13 | | |
| NCR-N1091-002 | 1 Additional Missing wire at the Gallery/Field End of V-136 | 10-2-13 | 10-2-13 | | |
| NCR N1091-003 | Locked off V-136 at 1414 kips. Over 70% of guts. | 10-8-13 | 10-8-13 | | |
| NCR N1091-004 | 1" GAP ON TOP OF SHIMS ON D143 SOUTH/SHOP END | 10-9-13 | 10-9-13 | | |
| NCR N1091-005 | Excessive shim gap at buttress 1 of tendon H13-08 | 10-31-13 | 10-31-13 | | |
| NCR N1091-006 | over 10% on grease refill of tendon D-143. | 11-13-13 | 11-13-13 | | |
| NCR N1091-007 | over 10% on grease refill of tendon D-146 | 11-13-13 | 11-14-13 | | |
| NCR N1091-008 | Over 10% on grease refill of tendon D-237 | 11-14-13 | 11-14-13 | | |
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PSC
PRECISION SURVEILLANCE

N1091 PSC PROCEDURE QA 9.0
NONCONFORMANCES
NC/CAR FORM
09/03/13
Revision 0
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## NONCONFORMANCE / CORRECTIVE ACTION REPORT FORM

**HOLD TAG NO.:** N/A **NC / CA NO.:** NCR-N1091-001

**NONCONFORMANCE:** Per PSC proceedure SQ8.0 sec. 13.5 when 1 or more protruding wires that have not been previously documented are detected during inspection, the client shall be notified by A NCR. Two protruding wires were found on tendon # H24-15 butt. 4 shop end. Both wires are protruding approx 0.25".

**APPARENT CAUSE KNOWN:** ☐ YES ☒ NO **IF YES, DESCRIBE:**

**RECOMMENDED CORRECTIVE ACTION:** Client to determine.

**ANY NONCONFORMING ITEM TO BE REPAIRED SHALL HAVE AN APPROVED REPAIR PROCEDURE.**

**CORRECTIVE ACTION TO PREVENT RECURRENCE:** Client to determine.

**INITIATOR:** **TITLE** **DATE:**

**SIGNIFICANT CONDITION:** ☐ YES ☒ NO **IF YES, REFER TO QAM SECTION 15.**

**APPROVAL COMMENTS:**

| | | | |
|---|---|---|---|
| **PSC APPROVAL SIGN & DATE:** | **QC** 9-27-13 | **QA** J Bussone 9/30/13 | **ENGINEERING** 9/30/13 |

**EXELON APPROVAL REQUIRED** ☒ YES ☐ NO **ENGINEERING** ________ **DATE** ________

**QA** ________ **DATE** ________

**COMMENTS:**

| DISTRIBUTION | | | DISPOSITION COMPLETED |
|---|---|---|---|
| ☒ QA SECTION | ☐ VICE PRESIDENT | ☐ VENDOR | SIGNED: |
| ☐ QE SECTION | ☐ CONTR. MGMT. | ☒ Site File | TITLE: |
| ☒ ENGINEERING | ☒ EXELON | ☐ ________ | DATE: |

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PSC PRECISION SURVEILLANCE

N1091 PSC PROCEDURE SQ 8.0
ANCHORAGE INSPECTION
Data Sheet 8.0B
09/03/13
Page 1 of 1
Revision

Project: TMI 2013 TENDON SURVEILLANCE ☒ UNIT 1

(7.3)Tendon No.: 24H15 Tendon End: BUTT 4 ☒ Shop

## ANCHORAGE INSPECTION CRITERIA

☒ As-Found ☐ Post De-Tensioning / Pre-Wire Removal ☐ Post Re-Tensioning — Q.C. Signoff

### 9.0 & 10.0 - CORROSION & CRACK INSPECTION

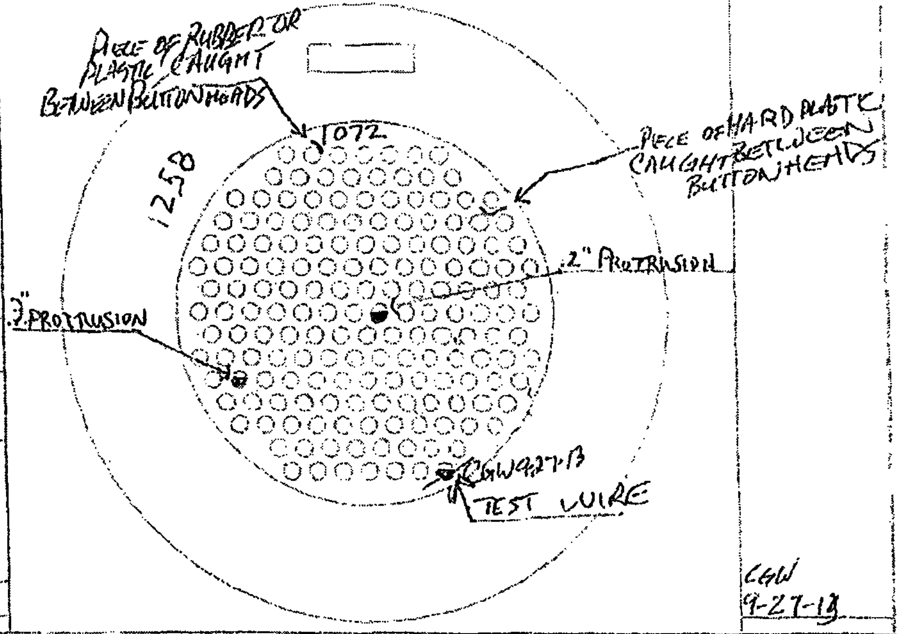
| | | | | | | |
|---|---|---|---|---|---|---|
| (9.2) Buttonheads | Level: A [1] | (10.1) Cracks | ☐ Yes [2] | ☒ No | ☐ N/A | |
| (9.2) Anchorhead | Level: A [1] | (10.1) Cracks | ☐ Yes [2] | ☒ No | ☐ N/A | |
| (9.2) Bushing | Level: A [1] | (10.1) Cracks | ☐ Yes [2] | ☒ No | ☐ N/A | |
| (9.2) Shims | Level: A [1] | (10.1) Cracks | ☐ Yes [2] | ☒ No | ☐ N/A | CGW |
| (9.2) Bearing Plate | Level: A [1] | (10.1) Cracks | ☐ Yes [2] | ☒ No | ☐ N/A | 9-27-13 |

[1] – Corrosion Level of C requires a NCR. [2] – Compose a sketch of the cracks on Sketch Sheet 8.0 and initiate a NCR.

### 11.0 - BUTTONHEAD INSPECTION

| | |
|---|---|
| ◗ | Offsize (Malformed) |
| ▼ | Protruding/unseated wire/buttonheads |
| Ø | Broken/missing wire/buttonheads |
| ● | Previously identified as missing |
| ⌀ | Discontinuous – removed this surveillance |
| ⊗ | wire(s) being removed during this surveillance for testing |

(11.2) Anchorhead I.D. 1072
Located on Sketch: ☒ Yes ☐ No
Bushing I.D. 1258
Located on Sketch: ☒ Yes ☐ No
(11.4) Missing Buttonheads Found:
☐ Yes ☐ No Quantity: N/A
Additional Information: Shim stack ht: 2" 1 2" SHIM



CGW
9-27-13

(12.2) Number of Protruding Buttonheads (▼): 2 (8.3) Illumination source QC 11-026 FLASHLIGHT
(12.3) Number of Missing Buttonheads (Ø, ⌀): 0
(12.4) Total of Protruding + Missing Buttonheads: 2 (12.6) Continuity Test Requested ? ☐ Yes ☒ No
(12.5) Total # of Effective Buttonheads Seated: 167 Wires Identified? ☐ Yes ☐ No N/A
(12.7) Overall Results ☐ Acceptable ☒ Un-Acceptable Customer Notified NCR#: NCR-N1091-001 CGW 9-27-13

QC Reviewed: W. Lance Robb Level: II Date: 9-27-2013

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PRECISION SURVEILLANCE

N1091 PSC PROCEDURE QA 9.0
NONCONFORMANCES
NC/CAR FORM
09/03/13
Revision 0
Page ____ of ___

## NONCONFORMANCE / CORRECTIVE ACTION REPORT FORM

HOLD TAG NO.: N/A    NC / CA NO.: NCE-N1091-002

NONCONFORMANCE: 1 additional missing wire/buttonhead that was not previously reported. Per. PSC proceedure SQ. 8.0 sec. 13.6 when 1 or more missing wires or buttonheads are detected Ex~~x~~elon Engineering is to be notified by a NCE This is at the gallery/field end of tendon # V136. WRR 10-2-13

APPARENT CAUSE KNOWN: ☐ YES ☒ NO    IF YES, DESCRIBE:

RECOMMENDED CORRECTIVE ACTION: Client to determine.

ANY NONCONFORMING ITEM TO BE REPAIRED SHALL HAVE AN APPROVED REPAIR PROCEDURE.

CORRECTIVE ACTION TO PREVENT RECURRENCE: Client to determine.

INITIATOR:    TITLE    DATE:

SIGNIFICANT CONDITION: ☐ YES ☒ NO    IF YES, REFER TO QAM SECTION 15.

APPROVAL COMMENTS:

| | | | |
|---|---|---|---|
| PSC APPROVAL SIGN & DATE: | QC W. Rance 10-2-2013 | QA G Bussone 10/2/13 | ENGINEERING 10/2/13 |

EXELON APPROVAL REQUIRED ☐ YES ☐ NO    ENGINEER ____________ DATE ____________

QA ____________ DATE ____________

COMMENTS:

| DISTRIBUTION | | | DISPOSITION COMPLETED |
|---|---|---|---|
| ☐ QA SECTION | ☐ VICE PRESIDENT | ☐ VENDOR | SIGNED: |
| ☐ QE SECTION | ☐ CONTR. MGMT. | ☐ ________ | TITLE: |
| ☐ ENGINEERING | ☐ EXELON | ☐ ________ | DATE: |

43 QA 9.0 TMI 13 (S)

PSC PRECISION SURVEILLANCE

N1091 PSC PROCEDURE SQ 8.0
ANCHORAGE INSPECTION
Data Sheet 8.0A
09/03/13
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Revision 0

Project: TMI 2013 TENDON SURVEILLANCE ☒ UNIT 1

(7.3)Tendon No.: V-136 Tendon End: GALLERY ☒ Field

## ANCHORAGE INSPECTION CRITERIA

☒ As-Found ☐ Post De-Tensioning / Pre-Wire Removal ☐ Post Re-Tensioning — Q.C. Signoff

### 9.0 & 10.0 - CORROSION & CRACK INSPECTION

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| (9.2) Buttonheads | Level: A [1] | (10.1) Cracks | ☐ Yes [2] | ☒ No | ☐ N/A | |
| (9.2) Anchorhead | Level: A [1] | (10.1) Cracks | ☐ Yes [2] | ☒ No | ☐ N/A | |
| (9.2) Shims | Level: A [1] | (10.1) Cracks | ☐ Yes [2] | ☒ No | ☐ N/A | CGW<br>10-2-13 |
| (9.2) Bearing Plate | Level: B [1] | (10.1) Cracks | ☐ Yes [2] | ☒ No | ☐ N/A | |

[1] – Corrosion Level of C requires a NCR. [2] Compose a sketch of the cracks on Sketch Sheet 8.0 and initiate a NCR.

### 11.0 - BUTTONHEAD INSPECTION

| | |
|---|---|
| ◗ | Offsize (Malformed) |
| ◡ | Protruding/unseated wire/buttonheads |
| Ø | Broken/missing wire/buttonheads |
| ● | Previously identified as missing |
| $\boxed{Ø}$ | Discontinuous – removed this surveillance. |
| ⊗ | wire(s) removed during this surveillance for testing |

(11.2) Anchorhead I.D. FY4R4

Located on Sketch: ☒ Yes ☐ No

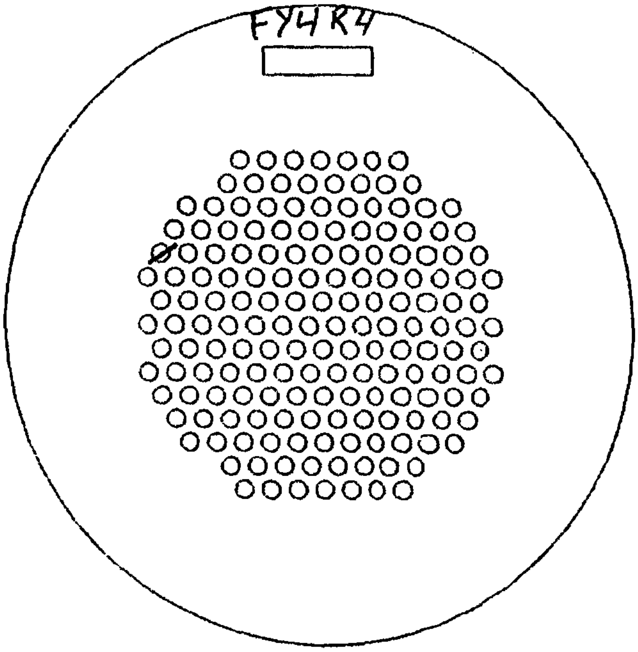
(11.4) Missing Buttonheads Found:

☐ Yes ☒ No Quantity: 0

SEARCHED GREASE IN CAP

Additional Information:

Shim stack ht. -4.1" (2 2")



CGW
10-2-13

(12.2) Number of Protruding Buttonheads (◡): 0 (8.3) Illumination source QC 11-026 FLASHLIGHT

(12.3) Number of Missing Buttonheads (Ø, $\boxed{Ø}$): 1

(12.4) Total of Protruding + Missing Buttonheads: 1 (12.6) Continuity Test Requested? ☐ Yes ☐ No

(12.5) Total # of Effective Buttonheads Seated: 168 Wires Identified? ☐ Yes ☐ No

(12.7) Overall Results ☐ Acceptable ☒ Un-Acceptable Customer Notified NCR#: NCR-N1091-002 CGW 10-2-13

QC Reviewed: Level: Date:

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PSC
PRECISION SURVEILLANCE

N1091 PSC PROCEDURE QA 9.0
NONCONFORMANCES
NC/CAR FORM
09/03/13
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## NONCONFORMANCE / CORRECTIVE ACTION REPORT FORM

HOLD TAG NO.: N/A    NC / CA NO.: NCR-N1091-003

NONCONFORMANCE: V-136 tendon WAS locked off At 1414 kips which is over 70% of guts. Per PSC proceedure SQ 11.0 sec. 9.8.3 Lock off force is not to exceed 70% of G.U.T.S. (1394 kips for A 169 wire tendon, or 8.25 kips per wire.

APPARENT CAUSE KNOWN: ☒ YES ☐ NO IF YES, DESCRIBE:
Mistake by Quality control inspector.

RECOMMENDED CORRECTIVE ACTION: Client to determine.

ANY NONCONFORMING ITEM TO BE REPAIRED SHALL HAVE AN APPROVED REPAIR PROCEDURE.

CORRECTIVE ACTION TO PREVENT RECURRENCE:

INITIATOR: TITLE DATE:

SIGNIFICANT CONDITION: ☐ YES ☐ NO IF YES, REFER TO QAM SECTION 15.

APPROVAL COMMENTS:

| | | | |
|---|---|---|---|
| PSC APPROVAL SIGN & DATE: | QC W. Rance Robbins 10-8-2013 | QA Bussone 10/8/13 | ENGINEERING 10/9/13 |

EXELON APPROVAL REQUIRED ☒ YES ☐ NO    ENGINEER ____________ DATE ____________

QA ____________ DATE ____________

COMMENTS:

| DISTRIBUTION | | | DISPOSITION COMPLETED |
|---|---|---|---|
| ☒ QA SECTION | ☒ VICE PRESIDENT | ☐ VENDOR | SIGNED: |
| ☐ QE SECTION | ☐ CONTR. MGMT. | ☒ Site File | TITLE: |
| ☒ ENGINEERING | ☒ EXELON | ☐ | DATE: |

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**N1091 PSC PROCEDURE SQ 9.0**
**MONITOR TENDON FORCE**
**DATA SHEET 9.0**
**09/03/13**
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**Revision 0**

Project: TMI 40TH YEAR TENDON SURVEILLANCE ☒ Unit 1

(7.6)Tendon No.: V-136 Tendon End: Top ☒ Shop ☐ Field

| LIFT-OFF INSPECTION CRITERIA | Q.C. Signoff |
|---|---|
| (9.3) Temp. of Concrete: 84 °F Thermometer No.: ST-102 Recal Date: 10-29-13<br>Ambient Temp.: 80 °F Thermometer No.: PK104 Recal Date: 10-29-13 | WRR 10-2-13 |
| (9.4) Anchorhead and Stressing Adapter Threads: ☒ Acceptable ☐ Unacceptable<br>(9.5) Number of Effective Wires: 168<br>(9.6) Anchorhead and Stressing Adapter Engagement/Alignment: ☒ Acceptable ☐ Unacceptable | WRR 10-2-13 |
| (9.7) RAM ID: 9400 Recal Date: end of job RAM Area: 231.947 K = -0.269<br>Gauge ID: CC138755 Recal Date: Daily on use Daily Check: OK | WRR 10-2-13 |
| (9.8) Shim Stack Height: #1 15 in. #2 15 in. Ruler ID: R94 Recal Date: 11-9-13<br>Individual Shims: Stack #1: 4,4,4,½,¼,2 in. Stack #2: 4,4,4,½,¼,2 in. | WRR 10-2-13 |
| (9.9) Lift-off Overstress Force (LOSF): 1592 kips Pressure: 6867.76 psi<br>(9.10) PF: 1306 kips 5634.19 psi 95% PF: 1241 kips 5353.83 psi 90% PF: 1175 kips 5069.16 psi | WRR 10-2-13 |
| (9.11.5) As-Found Lift-Off (9.11.13) Circled Values<br>Stack #1: 1) 5750 psi Stack #2: 1) 5760 psi 1) 5760 psi<br>2) 5750 psi 2) 5760 psi 2) 5760 psi<br>3) 5750 psi 3) 5760 psi 3) 5760 psi<br>(9.11.13) End Average Force (this end): 1335.17 kips Average: 5760 psi | WRR 10-2-13 |
| (9.11.14) End Avg. Force (other end): N/A kips (9.11.15) Average Liftoff (ALV) 1335.17 kips<br>(9.11.16) Liftoff (ALV) Acceptance Criteria:<br>a) ☒ Acceptable – ALV is ≥ 95% PF.<br>b) ☐ Adjacent Tendons to be stressed – ALV is < 95%PF but ≥ 90%PF. Document on a NCR.<br>c) ☐ Unacceptable – ALV is < 90%PF. Document on a NCR.<br>NCR Required ☐ Yes ☒ No Customer Notified NCR No.: N/A | WRR 10-2-13 |
| (9.11.17) Adjacent Tendon Lift-Offs (*Note: Use a separate Data Sheet 9.0 to document Liftoff forces.*)<br>a) Adj Tendon: ___ This Tendon: ___ Adj Tendon: ___ ☐ Acceptable – ALV > 95% of PF, The original scope tendon SHALL be restored to within -0/+6% of PF, but in no case, no greater than 0.70 GUTS as determined for the number of effective wires. N/A<br>EXELON Notified: ☐ Yes ☐ No Name/Date: | WRR 10-2-13 |
| b) Adj Tendon: ___ Adj Tendon: ___ ☐ Unacceptable – ALV < 95% of PF for either tendon. Document the condition on a NCR.<br>Customer Notified NCR No.: N/A | WRR 10-2-13 |
| c) Adj Tendon: ___ Adj Tendon: ___ ☐ Unacceptable – ALV < 90% of PF for either tendon. Document the condition on a NCR.<br>Customer Notified NCR No.: N/A | WRR 10-2-13 |

QC Reviewed: ________ Level: ______ Date: ______

PSC PRECISION SURVEILLANCE

**N1091 PSC PROCEDURE SQ 11.0**
**RETENSION TENDONS**
**DATA SHEET SQ 11.0**
09/03/13
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Revision 0

Project: TMI 40TH YEAR TENDON SURVEILLANCE ☒ Unit 1 ☐ Unit 2

(9.3)Tendon No.: V-136 Tendon End: TOP ☒ Shop ☐ Field

(9.4) Temp. of Concrete: 81 °F Thermometer No.: ST 102 Recal Date: 10-29-13

Ambient Temp.: 85 °F Thermometer No.: PK-104 Recal Date: 10-29-13

(9.5) Anchorhead and Stressing Adapter Threads: ☒ Acceptable ☐ Unacceptable

## RETENSIONING DOCUMENTATION

**QC Signoffs**

(9.6) Number of Effective Wires: 167 (from Data Sht. 8.0) See data sheet SQ 8.0 from gallery end.

(9.7) Anchorhead and Stressing Adapter Engagement/Alignment: ☒ Acceptable ☐ Unacceptable

(9.7.3) RAM ID: 9400 Recal Date: End of Job RAM Area: 231.847 K -0.269

Gauge ID: CC138755 Recal Date: Daily on use Daily Check: OK

WRR 10-2-13

**Calculated Force for Elongation Measurement and Retensioning using formula below**

***NOTE:*** *Stress during Lift-Off should not exceed 9.425 kips per effective wire or 1592 kips for a 169 wire tendon.*

| | | | |
|---|---|---|---|
| (9.8.4) PTF = 197 kips | Pressure: 850.86 psi | | |
| Step 1 = 800 kips | Pressure: 3451.71 psi | Elongation: 4.84 in. | |
| Step 2 = 1200 kips | Pressure: 5176.99 psi | Elongation: 8.05 in. | |
| LOF = 1335.17 kips | Pressure: 5760.00 psi | | |
| OSF = 1568 kips | Pressure: 67~~4~~64.24 psi<br>WRR 10-2-13 | Elongation: 11 in. | WRR 10-2-13 |

$$P = \frac{(F - K)}{A} \times 1000$$

Key:
F = Force (kips)
A = Ram Area ($in^2$)
P = Gauge Pressure (psi)
K = Constant factor (kips)
(CAUTION: "K" constants can be either positive or negative.)

NOTE: We removed 1 set of 1/4" shims and added 1 set of 1/8" shims at the top end.
We added 1 set of 1" shims at the bottom/gallery end.

HT#s 1/8"-R1657
WRR 10-2-13 ~~1/2~~ 1"-9F702F

QC Reviewed: ______ Level: ______ Date: ______

PRECISION SURVEILLANCE

**N1091 PSC PROCEDURE SQ 11.0**
**RETENSION TENDONS**
**DATA SHEET SQ 11.0**
**09/03/13**
**Page 2 of 2**
**Revision** [illegible]

Project: TMI 40TH YEAR TENDON SURVEILLANCE ☒ Unit 1 ☐ Unit 2

(9.3)Tendon V-136 Tendon End: Top ☒ Shop ☐ Field

**Actual Observed Force and Elongation Measurements using formula below** | **QC Signoffs**

(9.9.4.1) PTF = 196.80 kips Pressure: 850 psi ① Elongation: 3.95 in.

(9.9.5.1) Step 1 799.60 kips Pressure: 3450 psi Elongation: 9.2 in.

(9.9.6.1) Step 2 1200.70 kips Pressure: 5180 psi Elongation: 12.8 in.

(9.9.7.1) OSF = 1567.02 kips Pressure: 6760 psi ② Elongation: 16.0 in.

WRR 10-2-13

231.847 Area K = -0.269

$$F = \frac{A \times P}{1000} + K$$

(9.9.8) ② – ① = 12.05 in. Elongation Value (this end)

(9.9.9) N/A in. Elongation Value (opposite end)

(9.9.10) 12.05 in. TOTAL Tendon Elongation Value

(9.9.12.1) Elongation 9.54 % Ruler ID: R-94 Recal Date: 11-9-13

(9.9.12.3) Elongation Results ☒ Acceptable ☐ Unacceptable

Customer Notified NCR No: N/A

| Options | Original Lift-off Values from Data Sheet SQ 9.0 | | |
|---|---|---|---|
| A | Lift-off < Predicted Force | ☐ | Use Predicted Force - 0 + 6% |
| B | Lift-off > Predicted Force | ☒ | Use Lift-off - 0 + 6% |
| C | Lift-off > 67% GUTS | ☐ | Use 70% + 0 - 3% GUTS (effective wires) |
| D | Lift-off > 70% GUTS | ☐ | Use 70% + 0 - 3% GUTS (effective wires) |

| (9.10.5) LOF Acceptable Range | Min | | Max | |
|---|---|---|---|---|
| As found lift-off/or predicted (highest): | 1335.17 | kips | 1415.28 | kips |
| From: | 5760 | psi | To: 6105.60 | psi |

WRR 10-2-13

(9.10.6) Actual Lift-Off

| | | | | | | (9.10.8) Circled Values | |
|---|---|---|---|---|---|---|---|
| Stack #1: | 1) | 6090 psi | Stack #2: | 1 | 6100 psi | 1) | 6100 psi |
| | 2) | 6090 psi | | 2 | 6100 psi | 2) | 6100 psi |
| | 3) | 6090 psi | | 3 | 6100 psi | 3) | 6100 psi |

(9.10.8) Force (this end): 1414.00 kips Actual Average: 6100 psi

(9.10.9) Force (opposite end): N/A kips (9.10.10)Tendon ALV Force 1414 kips

(9.10.11) ALV Acceptable: ☒ Yes ☐ No Customer Notified NCR No.: N/A

(9.10.15) Additional broken/missing wires: ☒ No ☐ Yes Amount: 0

(9.10.16) Additional Protruding/Unseated wires: ☒ No ☐ Yes Amount: 0

9F702F
1/8 R1657

If Yes – Customer Notified NCR No.: N/A

(9.10.17) Final Shim Stack Height: #1: 4,4,4,1/2,1/8,2 in. #2: 4,4,4,1/2,1/4,2 in.

WRR 10-2-13

QC Reviewed: ______ Level: ______ Date: ______

PRECISION SURVEILLANCE

N1091 PSC PROCEDURE QA 9.0
NONCONFORMANCES
NC/CAR FORM
09/03/13
Revision 0
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## NONCONFORMANCE / CORRECTIVE ACTION REPORT FORM

**HOLD TAG NO.:** N/A **NC / CA NO.:** NCR-N1091-004

**NONCONFORMANCE:** EXCESSIVE SHIM GAP FOUND AT AS FOUND INSPECTION OF TENDON D-143 SOUTH/SHOP END. SHIM GAP MEASURED 1 INCH WIDE ON TOP SIDE OF SHIM STACK. PER PSC PROCEDURE SQ 8.0 SEC. 12.7 EXELON ENGINEERING SHALL BE NOTIFIED BY A NCR.

**APPARENT CAUSE KNOWN:** ☐ YES ☒ NO **IF YES, DESCRIBE:**
POSSIBLY CENTERHOLE OF SHIMS IS TOO SMALL, SHIMS APPEAR TO BE AGAINST THE WIRE BUNDLE

**RECOMMENDED CORRECTIVE ACTION:**
CLIENT TO DETERMINE

**ANY NONCONFORMING ITEM TO BE REPAIRED SHALL HAVE AN APPROVED REPAIR PROCEDURE.**

**CORRECTIVE ACTION TO PREVENT RECURRENCE:**

**INITIATOR:** TITLE **DATE:**

**SIGNIFICANT CONDITION:** ☐ YES ☒ NO **IF YES, REFER TO QAM SECTION 15.**

**APPROVAL COMMENTS:** AS FOUND GAP WAS 1" WIDE, AS LEFT WAS .5" AT TOP .25" AT BOTTOM, CLOSED AS MUCH AS POSSIBLE.

| | | | |
|---|---|---|---|
| **PSC APPROVAL SIGN & DATE:** | **QC** 10-9-13 | **QA** G Bussone 10/9/13 | **ENGINEERING** 10/9/13 |

**EXELON APPROVAL REQUIRED** ☐ YES ☐ NO ENGINEER ______ DATE ______
QA ______ DATE ______

**COMMENTS:**

**DISTRIBUTION**
☒ QA SECTION ☐ VICE PRESIDENT ☐ VENDOR
☐ QE SECTION ☐ CONTR. MGMT. ☒ SITE FILE
☒ ENGINEERING ☒ EXELON ☐ ______

**DISPOSITION COMPLETED**
SIGNED:
TITLE:
DATE:

43 QA 9.0 TMI.13 ISI

PRECISION SURVEILLANCE

N1091 PSC PROCEDURE QA 9.0
NONCONFORMANCES
NC/CAR FORM
09/03/13
Revision 0
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## NONCONFORMANCE / CORRECTIVE ACTION REPORT FORM

HOLD TAG NO.: N/A

NC / CA NO.: NCR-N1091-005

NONCONFORMANCE: Excessive shim gap on the buttress 1 end of H13-08, The gap measures 1" at the top side. Per PSC proceedure S.Q.8.0 sec. 12.7 the client is to be notified by a NCR.

APPARENT CAUSE KNOWN: ☐ YES ☒ NO IF YES, DESCRIBE:

RECOMMENDED CORRECTIVE ACTION: Client to determine.

ANY NONCONFORMING ITEM TO BE REPAIRED SHALL HAVE AN APPROVED REPAIR PROCEDURE.

CORRECTIVE ACTION TO PREVENT RECURRENCE: Client to determine.

INITIATOR: TITLE DATE:

SIGNIFICANT CONDITION: ☐ YES ☒ NO IF YES, REFER TO QAM SECTION 15.

APPROVAL COMMENTS:

| | | | |
|---|---|---|---|
| PSC APPROVAL SIGN & DATE: | QC W. Ramer Robb<br>10-31-2013 | QA Bussone 10/31/13 | ENGINEERING 10/31/13 |

EXELON APPROVAL REQUIRED ☐ YES ☐ NO ENGINEER ________ DATE ________

QA ________ DATE ________

COMMENTS:

| DISTRIBUTION | | | DISPOSITION COMPLETED |
|---|---|---|---|
| ☒ QA SECTION | ☐ VICE PRESIDENT | ☐ VENDOR | SIGNED: |
| ☐ QE SECTION | ☒ CONTR. MGMT. | ☒ Site File | TITLE: |
| ☒ ENGINEERING | ☒ EXELON | ☐ ________ | DATE: |

43 QA 9.0 TMI.13 ISI

PSC PRECISION SURVEILLANCE

N1091 PSC PROCEDURE SQ 8.0
**ANCHORAGE INSPECTION**
Data Sheet 8.0B
09/03/13
Page 1 of 1
Revision C

Project: TMI 2013 TENDON SURVEILLANCE ☒ UNIT 1

(7.3)Tendon No.: H 13-08 Tendon End: Buttress 1 ☒ Shop

## ANCHORAGE INSPECTION CRITERIA

☒ As-Found ☐ Post De-Tensioning / Pre-Wire Removal ☐ Post Re-Tensioning

Q.C. Signoff

**9.0 & 10.0 - CORROSION & CRACK INSPECTION**

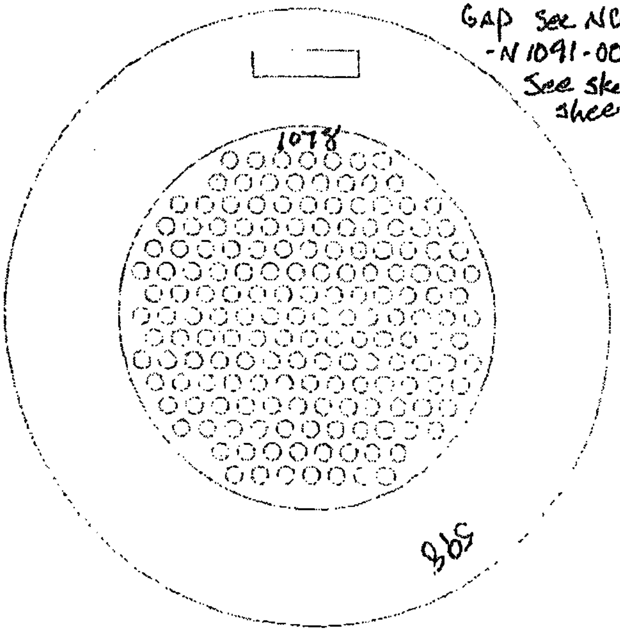
| | | | | | | | |
|---|---|---|---|---|---|---|---|
| (9.2) Buttonheads | Level: A (1) | (10.1) Cracks | ☐ Yes (2) | ☑ No | ☐ N/A | |
| (9.2) Anchorhead | Level: A (1) | (10.1) Cracks | ☐ Yes (2) | ☑ No | ☐ N/A | |
| (9.2) Bushing | Level: A (1) | (10.1) Cracks | ☐ Yes (2) | ☑ No | ☐ N/A | |
| (9.2) Shims | Level: A (1) | (10.1) Cracks | ☐ Yes (2) | ☑ No | ☐ N/A | |
| (9.2) Bearing Plate | Level: A (1) | (10.1) Cracks | ☐ Yes (2) | ☑ No | ☐ N/A | WRR 10-31-13 |

(1) – Corrosion Level of C requires a NCR. (2) – Compose a sketch of the cracks on Sketch Sheet 8.0 and initiate a NCR.

**11.0 - BUTTONHEAD INSPECTION**

| | |
|---|---|
| ◗ | Offsize (Malformed) |
| ▼ | Protruding/unseated wire/buttonheads |
| Ø | Broken/missing wire/buttonheads |
| ● | Previously identified as missing |
| ⍉ | Discontinuous -- removed this surveillance |
| ⊗ | wire(s) being removed during this surveillance for testing |

(11.2) Anchorhead I.D. 1078
Located on Sketch: ☑ Yes ☐ No
Bushing I.D. 598
Located on Sketch: ☑ Yes ☐ No
(11.4) Missing Buttonheads Found:
☐ Yes ☐ No Quantity:
Additional Information: Shim stack ht. - 6.6 (4, 2, ½)



Excessive shim GAP See NCR# -N1091-005 See sketch sheet

WRR 10-31-13

(12.2) Number of Protruding Buttonheads (▼): 0
(12.3) Number of Missing Buttonheads (Ø, ⍉): 0
(12.4) Total of Protruding + Missing Buttonheads: 0
(12.5) Total # of Effective Buttonheads Seated: 169
(8.3) Illumination source cal# QC-11-018 w/a Flashlight
(12.6) Continuity Test Requested ? ☐ Yes ☒ No
Wires Identified? ☑ Yes ☐ No N/A
(12.7) Overall Results ☐ Acceptable ☒ Un-Acceptable
Customer Notified NCR#: N1091-005

WRR 10-31-13

QC Reviewed: ______ Level: ______ Date: ______

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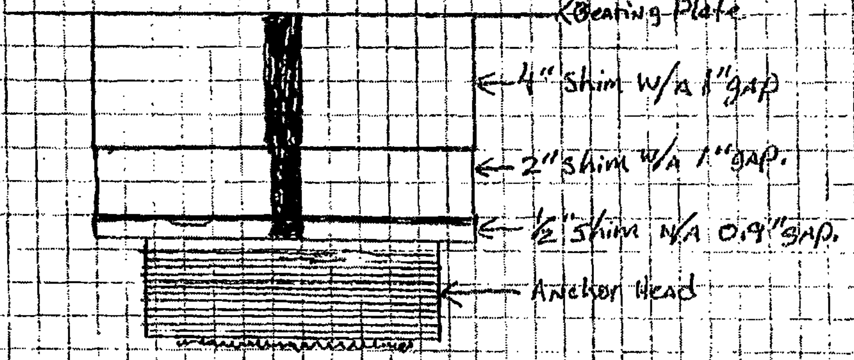
N1091 PSC PROCEDURE SQ 8.0
**ANCHORAGE INSPECTION**
**Sketch Sheet 8.0**
09/03/13
Page 1 of 1
Revision 0

Project: Exelon 2012 TENDON SURVEILLANCE ☒ UNIT 1

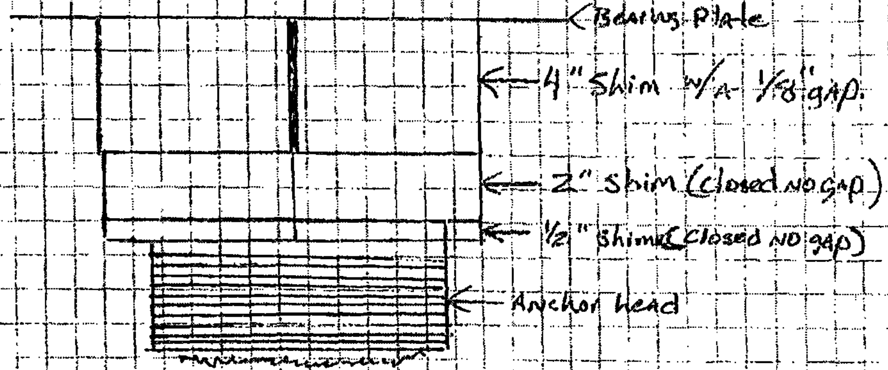
Tendon No.: H13-08 Tendon End: Buttress 1 ☒ Shop ☐ Field

(10.2) Sketch each crack as it appears in the anchorheads/bushings, shims and bearing plates. Identify each Unit by number; record the location of the anchorhead or bushing identification and apply to the sketch. Use as many Sketch Sheets as necessary being sure to list the page number below and to apply a Sketch Number to each unit with cracks. Ensure a Nonconformance Report in accordance with Procedure QA 9.0, NONCONFORMANCES, for Exelon approval.

TOP VIEW H13-08



BOTTOM VIEW H13-08



QC Inspector: W. Vance Robb Level: II Date: 10-31-13

QC Reviewed: Level: Date:

## 7.0 PREREQUISITES

7.1 The Anchorage Cleanup will be completed.

7.2 The tendon will be in a stressed condition.

7.3 *QCD* – Document the tendon identification and tendon end on Data Sheet 8.0A or 8.0B, ANCHORAGE INSPECTION.

## 8.0 ANCHORAGE INSPECTION

8.1 The tendon anchorage, including the anchorhead, bearing plate, stressing shims, buttonheads and wires of all selected tendons shall be visually inspected (Detailed Visual Examination) for signs of corrosion, cracking, missing wires, protruding buttonheads and signs of deformation.

8.2 This inspection is to be performed with light conditions supplemented by auxiliary light sources if needed.

8.3 *QCD* – Record the illumination source used on Data Sheet 8.0A or 8.0B as applicable.

8.4 For Detailed Visual Examinations, access must be sufficient to place the eye within 24 inches, at an angle not less than 30° to the surface.

8.4.1 Mirrors may be used to improve the angle of vision.

8.5 *QCD* - The gap between shim halves for the first set of shims under anchorhead shall not exceed an average of 0.25". A maximum gap of 0.50" is acceptable at one gap location if other side of shim halves is in contact. The remaining shims are allowed a maximum gap of 0.50" at each location of shim halves. Exelon Engineering shall be notified by a Nonconformance Report if the average shim gap exceeds 0.25". A gap of 0.50" on one side and 0" on the other side is acceptable.

PSC PRECISION SURVEILLANCE

N1091 PSC PROCEDURE QA 9.0
NONCONFORMANCES
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## NONCONFORMANCE / CORRECTIVE ACTION REPORT FORM

HOLD TAG NO.: N/A

NC / CA NO.: NCR-N1091-006

NONCONFORMANCE: On tendon D-143 the grease loss to grease replaced difference exceeds 10%. The Actual difference is 59.94%. Per PSC procedure S.Q 12.1 sec. 15.1 the client is to be notified by A NCR.

APPARENT CAUSE KNOWN: ☐ YES ☒ NO IF YES, DESCRIBE:

RECOMMENDED CORRECTIVE ACTION: Client to determine.

ANY NONCONFORMING ITEM TO BE REPAIRED SHALL HAVE AN APPROVED REPAIR PROCEDURE.

CORRECTIVE ACTION TO PREVENT RECURRENCE: Client to determine.

INITIATOR: TITLE DATE:

SIGNIFICANT CONDITION: ☐ YES ☐ NO IF YES, REFER TO QAM SECTION 15.

APPROVAL COMMENTS:

| | | | |
|---|---|---|---|
| PSC APPROVAL SIGN & DATE: | QC N. Rance Robbins<br>11-13-13 | QA G Bussone 11/13/13 ~~11/14/13~~<br>GGB 11/13/13 | ENGINEERING 11/13/13 |

EXELON APPROVAL REQUIRED ☒ YES ☐ NO ENGINEER ______ DATE ______

QA ______ DATE ______

COMMENTS:

| DISTRIBUTION | | | DISPOSITION COMPLETED |
|---|---|---|---|
| ☒ QA SECTION | ☐ VICE PRESIDENT | ☐ VENDOR | SIGNED: |
| ☐ QE SECTION | ☒ CONTR. MGMT. | ☒ Site File | TITLE: |
| ☒ ENGINEERING | ☒ EXELON | ☐ ______ | DATE: |

43 QA 9.0 TML13 ISI

PRECISION SURVEILLANCE

N1091 PSC PROCEDURE SQ 12.1
GREASE REPLACEMENT
Data Sheet 12.1a – Pressure Pumping
09/03/13
Page 1 of 1
Revision 0

Project: TMI 40th YEAR TENDON SURVEILLANCE Tendon No.: D-143

## GREASE REPLACEMENT

QC SIGNOFFS

(8.4) Grease Used ☒ NEW ☐ OLD - TEST DATE: ☐ ACCEPTABLE ☐ APPROVAL LETTER DATED: WRR 11-12-13

**8.0 PREREQUISITES**

(8.5) Total Grease Loss from Data Sheet 6.0 for South tendon end: 15.5 gal. WRR 11-12-13

(8.6) Total Grease Loss from Data Sheet 6.0 for East tendon end: 4.0 gal. WRR 11-12-13

(8.7) Estimated grease losses from leaks for South tendon end: 0 gal. WRR 11-12-13

(8.8) Estimated grease losses from leaks for East tendon end: 0 gal. WRR 11-12-13

(8.9) TOTAL Tendon Grease Loss: 19.5 gal. WRR 11-12-13

**12.0 INITIAL PRESSURE PUMPING**

(12.6) Ambient Temp.: 36 °F Thermometer ID: PK-A Recal Date: 10-11-14

(12.7) Grease Temp.: 200 °F Thermometer ID: PK-A Recal Date: 10-11-14

(12.9) Initial Grease Height (a) 43.5 in. (12.14) Final Grease Height (b) 3 in.

(12.16) Total amount of Grease Pumped: 71.69 gal. (a – b) x 1.77 into the South end

(12.18) Quantity of Waste Grease: 1.0 gal. (12.17) Was Exit Achieved? ☒ Yes ☐ No

(12.19) Total Grease Replaced this end: 70.69 gal. If no, Pressure Held for N/A psi N/A min WRR 11-12-13

**13.0 HAND PUMPING – SECOND END (if necessary)**

N/A

(13.6) Ambient Temp.: °F Thermometer ID: Recal Date:

(13.7) Grease Temp.: °F Thermometer ID: Recal Date:

(13.9) Initial Grease Height (a) in. (13.12) Final Grease Height (b) in.

(13.14) Total amount of Grease added: gal. (a – b) x 1.77 into the end

(13.16) Quantity of Waste Grease: gal. (13.15) ☐ Poured ☐ Hand Pumped

(13.17) Total Grease Replaced this end: gal.

**14.0 CALCULATION OF PRESSURE PUMPING**

(14.1) Total Tendon Grease Replaced: 70.69 gal. *(12.19 + 13.17)*

(14.2) Net Tendon Duct Grease Volume: 85.4 gal. *Refer to SQ 12.2 – GREASE VOLUMES for the Tendon Net Duct Volume*

(14.3) Percent Difference: $\frac{\text{Total Tendon Replaced (14.1) - Total Tendon Loss (8.9)}}{\text{Net Tendon Duct Grease Volume (14.2)}} \times 100$ = 59.94 % Difference WRR 11-12-13

(14.4) Grease Leaks: ☐ Yes ☒ No WRR 11-12-13

(14.5) Refill Acceptable: ☐ Yes *(less than 10%)* ☒ No *(greater than 10%)* WRR 11-12-13

If No – Customer Notified NCR No.: WRR 11-12-13

(14.6) Comments: None

QC Reviewed: R A Pay Level: II Date: 11/13/13

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PSC
PRECISION SURVEILLANCE

N1091 PSC PROCEDURE QA 9.0
NONCONFORMANCES
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Page ____ of ___

## NONCONFORMANCE / CORRECTIVE ACTION REPORT FORM

HOLD TAG NO.: N/A

NC / CA NO.: NCR-N1091-007

NONCONFORMANCE: On tendon D146 the grease loss to grease replaced difference exceeds 10%. The actual difference is 58.84%. Per PSC procedure SQ 12.1 sec. 15.1 the client is to be notified by a NCR.

APPARENT CAUSE KNOWN: ☐ YES ☒ NO IF YES, DESCRIBE:

RECOMMENDED CORRECTIVE ACTION: Client to determine.

ANY NONCONFORMING ITEM TO BE REPAIRED SHALL HAVE AN APPROVED REPAIR PROCEDURE.

CORRECTIVE ACTION TO PREVENT RECURRENCE: Client to determine.

INITIATOR: ______ TITLE ______ DATE: ______

SIGNIFICANT CONDITION: ☐ YES ☐ NO IF YES, REFER TO QAM SECTION 15.

APPROVAL COMMENTS:

| | | | |
|---|---|---|---|
| PSC APPROVAL SIGN & DATE: | QC W. Vance [illegible] 11-13-13 | QA G Bussone 11/14/13 | ENGINEERING 11/14/13 |

EXELON APPROVAL REQUIRED ☐ YES ☐ NO

ENGINEER ______ DATE ______

QA ______ DATE ______

COMMENTS:

| DISTRIBUTION | | | DISPOSITION COMPLETED |
|---|---|---|---|
| ☒ QA SECTION | ☐ VICE PRESIDENT | ☐ VENDOR | SIGNED: |
| ☐ QE SECTION | ☒ CONTR. MGMT. | ☒ Site File | TITLE: |
| ☒ ENGINEERING | ☒ EXELON | ☐ ______ | DATE: |

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PRECISION SURVEILLANCE

N1091 PSC PROCEDURE SQ 12.1
GREASE REPLACEMENT
Data Sheet 12.1a – Pressure Pumping
09/03/13
Page 1 of 1
Revision 0

Project: TMI 40th YEAR TENDON SURVEILLANCE   Tendon No.: D146

## GREASE REPLACEMENT

QC SIGNOFFS

(8.4) Grease Used ☒ NEW ☐ OLD - TEST DATE: ☐ ACCEPTABLE ☐ APPROVAL LETTER DATED: — WRR 10-21-13

**8.0 PREREQUISITES**

(8.5) Total Grease Loss from Data Sheet 6.0 for South tendon end: 11.5 gal. — WRR 10-21-13

(8.6) Total Grease Loss from Data Sheet 6.0 for East tendon end: 4.0 gal. — WRR 10-21-13

(8.7) Estimated grease losses from leaks for South tendon end: 0 gal. — WRR 10-21-13

(8.8) Estimated grease losses from leaks for East tendon end: 0 gal. — WRR 10-21-13

(8.9) TOTAL Tendon Grease Loss: 15.5 gal. — WRR 10-21-13

**12.0 INITIAL PRESSURE PUMPING**

(12.6) Ambient Temp.: 37 °F Thermometer ID: PK-A Recal Date: 10-11-14

(12.7) Grease Temp.: 220 °F Thermometer ID: PK-A Recal Date: 10-11-14

(12.9) Initial Grease Height (a) 62.75 in. (12.14) Final Grease Height (b) 26.5 in.

(12.16) Total amount of Grease Pumped: 64.16 gal. (a – b) x 1.77 into the South end

(12.18) Quantity of Waste Grease: 1.0 gal. (12.17) Was Exit Achieved? ☒ Yes ☐ No

(12.19) Total Grease Replaced this end: 63.16 gal. If no, Pressure Held for N/A psi N/A min — WRR 11-13-13

**~~13.0~~ HAND PUMPING – SECOND END (if necessary)**

N/A

(13.6) Ambient Temp.: °F Thermometer ID: Recal Date:

(13.7) Grease Temp.: °F Thermometer ID: Recal Date:

(13.9) Initial Grease Height (a) in. (13.12) Final Grease Height (b) in.

(13.14) Total amount of Grease added: gal. (a – b) x 1.77 into the end

(13.16) Quantity of Waste Grease: gal. (13.15) ☐ Poured ☐ Hand Pumped

(13.17) Total Grease Replaced this end: gal.

**14.0 CALCULATION OF PRESSURE PUMPING**

(14.1) Total Tendon Grease Replaced: 63.16 gal. *(12.19 + 13.17)*

(14.2) Net Tendon Duct Grease Volume: 81.0 gal. *Refer to SQ 12.2 – GREASE VOLUMES, for the Tendon Net Duct Volume*

(14.3) Percent Difference: $\frac{\text{Total Tendon Replaced (14.1) - Total Tendon Loss (8.9)}}{\text{Net Tendon Duct Grease Volume (14.2)}} \times 100 =$ 58.84 % Difference — WRR 11-13-13

(14.4) Grease Leaks: ☐ Yes ☒ No — WRR 11-13-13

(14.5) Refill Acceptable: ☐ Yes *(less than 10%)* ☒ No *(greater than 10%)* — WRR 11-13-13

If No – Customer Notified NCR No.: N1091-0087 — WRR 11-13-13

WRR 11-13-13

(14.6) Comments: None

QC Reviewed: Level: Date:

31 SQ 12.1 TMI.13 ISI

PSC
PRECISION SURVEILLANCE

N1091 PSC PROCEDURE QA 9.0
NONCONFORMANCES
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Page ____ of ___

## NONCONFORMANCE / CORRECTIVE ACTION REPORT FORM

HOLD TAG NO.: N/A

NC / CA NO.: NCR-N1091-008

NONCONFORMANCE: On tendon D-237 the grease loss to grease replaced difference exceeds 10%. The actual difference is 48.08%. Per PSC procedure SQ 12.1 sec. 15.1 the client is to be notified by A NCR.

APPARENT CAUSE KNOWN: ☐ YES ☒ NO IF YES, DESCRIBE:

RECOMMENDED CORRECTIVE ACTION: Client to determine.

ANY NONCONFORMING ITEM TO BE REPAIRED SHALL HAVE AN APPROVED REPAIR PROCEDURE.

CORRECTIVE ACTION TO PREVENT RECURRENCE: Client to determine.

INITIATOR: TITLE DATE:

SIGNIFICANT CONDITION: ☐ YES ☐ NO IF YES, REFER TO QAM SECTION 15.

APPROVAL COMMENTS:

| | | | |
|---|---|---|---|
| PSC APPROVAL SIGN & DATE: | QC W. Bruce Robb 11-14-2013 | QA A Bussone 11/14/13 | ENGINEERING 11/14/13 |

EXELON APPROVAL REQUIRED ☐ YES ☐ NO

ENGINEERER ____________ DATE ____________

QA ____________ DATE ____________

COMMENTS:

| DISTRIBUTION | | | DISPOSITION COMPLETED |
|---|---|---|---|
| ☒ QA SECTION | ☐ VICE PRESIDENT | ☐ VENDOR | SIGNED: |
| ☐ QE SECTION | ☒ CONTR. MGMT. | ☒ Site File | TITLE: |
| ☒ ENGINEERING | ☒ EXELON | ☐ ____ | DATE: |

43 QA 9.0 TML13 ISI

PRECISION SURVEILLANCE

N1091 PSC PROCEDURE SQ 12.1
GREASE REPLACEMENT
Data Sheet 12.1a – Pressure Pumping
09/03/13
Page 1 of 1
Revision 0

Project: TMI 40th YEAR TENDON SURVEILLANCE  Tendon No.: D237

## GREASE REPLACEMENT

QC SIGNOFFS

(8.4) Grease Used ☒ NEW ☐ OLD - TEST DATE: ☐ ACCEPTABLE ☐ APPROVAL LETTER DATED: — WRR 11-13-13

### 8.0 PREREQUISITES

(8.5) Total Grease Loss from Data Sheet 6.0 for West tendon end: 16.0 gal. — WRR 11-13-13

(8.6) Total Grease Loss from Data Sheet 6.0 for S. East tendon end: 4.75 gal. — WRR 11-13-13

(8.7) Estimated grease losses from leaks for West tendon end: -0- gal. — WRR 11-13-13

(8.8) Estimated grease losses from leaks for S. East tendon end: 0 gal. — WRR 11-13-13

(8.9) TOTAL Tendon Grease Loss: 20.75 gal. — WRR 11-13-13

### 12.0 INITIAL PRESSURE PUMPING

(12.6) Ambient Temp.: 30 °F Thermometer ID: PK-A Recal Date: 10-11-14

(12.7) Grease Temp.: 220 °F Thermometer ID: PK-A Recal Date: 10-11-14

(12.9) Initial Grease Height (a) 64 in. (12.14) Final Grease Height (b) 26.5 in.

(12.16) Total amount of Grease Pumped: 66.37 gal. (a – b) x 1.77 into the West end

(12.18) Quantity of Waste Grease: 1.0 gal. (12.17) Was Exit Achieved? ☒ Yes ☐ No

(12.19) Total Grease Replaced this end: 65.37 gal. If no, Pressure Held for N/A psi N/A min

WRR 11-14-13

### 13.0 HAND PUMPING – SECOND END (if necessary)

N/A

(13.6) Ambient Temp.: °F Thermometer ID: Recal Date:

(13.7) Grease Temp.: °F Thermometer ID: Recal Date:

(13.9) Initial Grease Height (a) in. (13.12) Final Grease Height (b) in.

(13.14) Total amount of Grease added: gal. (a – b) x 1.77 into the end

(13.16) Quantity of Waste Grease: gal. (13.15) ☐ Poured ☐ Hand Pumped

(13.17) Total Grease Replaced this end: gal.

### 14.0 CALCULATION OF PRESSURE PUMPING

(14.1) Total Tendon Grease Replaced: 65.37 gal. *(12.19 + 13.17)*

(14.2) Net Tendon Duct Grease Volume: 92.8 gal. *Refer to SQ 12.2 – GREASE VOLUMES, for the Tendon Net Duct Volume*

(14.3) Percent Difference: $\frac{\text{Total Tendon Replaced (14.1) - Total Tendon Loss (8.9)}}{\text{Net Tendon Duct Grease Volume (14.2)}} \times 100 =$ 48.0% % Difference — WRR 11-14-13

(14.4) Grease Leaks: ☐ Yes ☒ No — WRR 11-14-13

(14.5) Refill Acceptable: ☐ Yes *(less than 10%)* ☒ No *(greater than 10%)* — WRR 11-14-13

If No -- Customer Notified NCR No.: N1091 - 008 — WRR 11-14-13

(14.6) Comments: None

QC Reviewed: Level: II Date: 11/14/13

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PSC
PRECISION SURVEILLANCE

N1091 PSC PROCEDURE QA 7.0
**FIELD CHANGE REQUEST INDEX LOG**
09/03/13
Page ___ of ___
Revision 0

Project: TMI NUCLEAR PLANT - UNIT 1 – 40th Year

## FIELD CHANGE REQUEST INDEX LOG

| FCR# | DESCRIPTION | DATE WRITTEN | DATE APPROVED | DATE REV. |
|---|---|---|---|---|
| N1091-001 | Due to ~~siesmic~~ seismic inst. in the area of D-143 S.E. end. It will be inaccessable for nam. work. WRR 10-17-13 | 10-17-13 | | |
| N1091-002 | Add duct volumes for H24-47 and N13-08 | 11-4-13 | | |
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PSC
PRECISION SURVEILLANCE

**N1091 PSC PROCEDURE QA 7.0**
**FIELD CHANGE REQUEST FORM**
**09/03/13**
**Page 1 of 1**
**Revision 0**

**SPECIAL FIELD REVISION CONTROL** **FIELD CHANGE REQUEST NO.:** FCR -N1091-001

**REQUEST BY:** Dustin Estep **TITLE:** PSC sup. **DATE:** 10-17-13
**ORIGINATOR:** W. Rance Robbins **TITLE** PSC Q.C. **DATE:** 10-17-13

**PROCEDURE NUMBER:** S.Q. 2.0 **REV NO.:** 0 **PROCEDURE TITLE** Surveillance Scope.

**AFFECTED SECTION:** Table 1 **REVISION TO MANUAL REQUIRED:** ☐ YES ☒ NO

**NCR REQUIRED:** ☐ YES ☒ NO **NCR NUMBER:** N/A **HOLD TAG NO..** N/A

**DETAILED DESCRIPTION OF EXISTING CONDITION: (USE EXTRA PAGES OR WRITE ON BACK)**
Due to siesmic equipment located adjacent to D-143 tendon, at the east end, it will be inaccessable for ram work.

**RECOMMENDED CHANGE:** Change to D-146.

| | | | |
|---|---|---|---|
| **PSC APPROVAL SIGN & DATE:** | **QA** J Bussone 10/17/13 | **QC** W. Rance Robbins 10-17-2013 | **ENGINEERING** 10/17/13 |

**EXELON APPROVAL OR COMMENTS:**
Engineering Data provided to PSC via email 10/17/13.
Formal transmittal to follow via TODI 5971-2013-033.

**APPROVED SITE QA AUTHORITY:** **TITLE:** Eng. Programs **DATE** 10/17/13

**DISPOSITION PSC QC:** **HOLD TAG APPLIED:** _____ **HOLD TAG REMOVED:**
**QC INSPECTOR:** _____ **DATE:** _____

**DISTRIBUTION**

☐ EXELON QA
☒ QA PSC
☒ ENGINEERING PSC
☒ EXELON ENGINEERING
☒ PROJECT MGR. PSC
☐ EXELON QC
☒ QC PSC
☒ Site File.
☐ _____

40 QA 7.0 (M) 13 (3)

## Gerald Bussone

| | |
|---|---|
| **From:** | Nick Darlage |
| **Sent:** | Thursday, October 17, 2013 3:39 PM |
| **To:** | Gerald Bussone; Paul Smith; Christopher Cox; William Robbins; Dustin Estep |
| **Subject:** | FW: Preliminary Tendon Data: FCR Response from TMI |
| **Attachments:** | FCR N1091-001.pdf; ATT00001.txt |

**Nick Darlage**
Precision Surveillance Corporation

**From:** Grimm, Michael:(GenCo-Nuc) [mailto:Michael.Grimm@exeloncorp.com]
**Sent:** Thursday, October 17, 2013 3:26 PM
**To:** Stein, Howard:(GenCo-Nuc); Nick Darlage; Taylor, Sean Ryan:(GenCo-Nuc); Espenshade, Marvin H:(GenCo-Nuc)
**Subject:** RE: Preliminary Tendon Data: FCR Response from TMI

Nick,

Attached is the signed FCR. You will receive a TODI formally transmitting the values in this email chain tomorrow.

Thanks,

Mike

Michael Grimm
Reactor Vessel Internals/ISI Programs Engineer, EIT

ExelonGeneration.

Three Mile Island
2625 River Road, Middletown, PA 17057
Office: 717 [illegible]
michael.grimm@exeloncorp.com www.exeloncorp.com

**From:** Stein, Howard:(GenCo-Nuc)
**Sent:** Thursday, October 17, 2013 3:59 PM
**To:** Nick Darlage; Grimm, Michael:(GenCo-Nuc); Taylor, Sean Ryan:(GenCo-Nuc); Espenshade, Marvin H:(GenCo-Nuc)
**Subject:** RE: Preliminary Tendon Data: FCR Response from TMI
**Importance:** High

Mike-

Please see Nick's comment below.

Thanks,
Howard

**From:** Nick Darlage [mailto:ndarlage@pscnuclear.com]
**Sent:** Thursday, October 17, 2013 3:22 PM
**To:** Stein, Howard:(GenCo-Nuc)
**Subject:** RE: Preliminary Tendon Data

Thanks Howard.

Can we get Mike to Sign that FCR and reference this information within his response?

Thank you,

**Nick Darlage**
Precision Surveillance Corporation

**From:** Stein, Howard:(GenCo-Nuc) [mailto:Howard.Stein@exeloncorp.com]
**Sent:** Thursday, October 17, 2013 2:15 PM
**To:** Nick Darlage
**Subject:** FW: Preliminary Tendon Data

Here is info Nick!

**From:** Grimm, Michael:(GenCo-Nuc)
**Sent:** Thursday, October 17, 2013 2:12 PM
**To:** Stein, Howard:(GenCo-Nuc)
**Subject:** Preliminary Tendon Data

Howard,

Please distribute this information so we can start on D-146. We need to get the TODI signed off and we have not been able to get the right people yet this morning. Will get by end of day. Work can proceed at risk with the information below.

**Tendon Stressing Data:**

| Tendon Number | Normalization Factor | Predicted Force (Kips) | 95% Predicted Force (Kips) | 90% Predicted Force (Kips) |
|---|---|---|---|---|
| D-141 | 47 | 1059 | 1006 | 953 |
| D-146 | -4 | 1110 | 1055 | 999 |
| D-149 | 52 | 1055 | 1002 | 950 |

**Tendon Net Duct Volume:**

| Tendon Number | Net Duct Volume (GAL) | 10% Net Duct Volume (GAL) |
|---|---|---|
| D-141 | 80.6 | 8.06 |
| D-146 | 81 | 8.1 |
| D-149 | 75.84* | 7.58* |

***Tendon D-149 installation cards are not included in electronic files and are not readily available. The net duct volume provided is the minimum value per calculation C-1101-153-E410-033 Revision 0, *Dome Tendon Grease Void Calculations.***

Thanks,

Mike

Michael Grimm
Reactor Vessel Internals/ISI Programs Engineer, EIT

ExelonGeneration.

Three Mile Island
2625 River Road, Middletown, PA 17057
Office: 717 948 8306
michael.grimm@exeloncorp.com www.exeloncorp.com

**TODI 5971-2013-033**

# THREE MILE ISLAND
# TRANSMITTAL OF DESIGN INFORMATION

| | | |
|---|---|---|
| ☒ SAFETY RELATED<br>☐ AUGMENTED<br>☐ NON SAFETY RELATED | Originating Organization<br>**TMI Programs Engineering** | ID# 5971-2013-033<br>Revision 0<br>Page 1 of 2 |

To: *Nick Darlage*
*PSC*
*3468 Watling St.*
*East Chicago, IN 46312*

Subject: **Replacement Tendon Engineering Data**

| | | |
|---|---|---|
| Michael Grimm | | 10/18/13 |
| Prepared by | Signature | Date |
| Sean Taylor | Sean Taylor | 10/18/13 |
| Reviewed by | Signature | Date |
| Greg Ciraula | | 10/18/13 |
| Approved by | Signature | Date |

Status of Information:
☒ Verified
☐ Unverified
☐ Engineering Judgement

Action Tracking # for Method and Schedule of Verification for Unverified DESIGN INFORMATION : N/A

Description of Information:

**TMI is currently performing the 40th Year Tendon Surveillance on Unit 1. During surveillance activities a tendon (D-143) in the current inspection population was identified to be inaccessible due to interferences from installed plant equipment. Engineering data, including the stressing information and net duct grease volumes of the replacement tendon (D-146) and its adjacent (D-149 and D-141) is being transmitted for revision of the PSC inspection manual.**

Purpose of Information:

**TMI is currently performing the 40th year tendon surveillance on Unit 1. To support the continued performance of the surveillance TMI is supplying PSC with engineering data for the replacement tendon (D-146) and its adjacent (D-149 and D-141). This information will be incorporated into a revision of the PSC Inspection manual. This TODI submittal provides information from AR EVAL A2238266-04, *Tendon Net Duct Volume Technical Evaluation*, and the stressing data for D-146 and its adjacents (D-149 and D-141) taken from calculation C-1101-153-E410-046 Revision 0.**

**Tendon Stressing Data:**

| Tendon Number | Normalization Factor | Predicted Force (Kips) | 95% Predicted Force (Kips) | 90% Predicted Force (Kips) |
|---|---|---|---|---|
| D-141 | 47 | 1059 | 1006 | 953 |
| D-146 | -4 | 1110 | 1055 | 999 |
| D-149 | 52 | 1055 | 1002 | 950 |

**Tendon Net Duct Volume:**

| Tendon Number | Net Duct Volume (GAL) | 10% Net Duct Volume (GAL) |
|---|---|---|
| D-141 | 80.6 | 8.06 |
| D-146 | 81 | 8.1 |
| D-149 | 75.84* | 7.58* |

***Tendon D-149 installation cards are not included in electronic files and are not readily available. The net duct volume provided is the minimum value per calculation C-1101-153-E410-033 Revision 0, *Dome Tendon Grease Void Calculations*.**

**PSC to sign and confirm receipt of this information:**

**Receipt:** HBussone PSC QA Manager **Date:** 10/18/13

**References:**
1) CC-AA-310, *Transmittal of Design Information*
2) C-1101-153-E410-046, *Tendon Force Predictions*
3) C-1101-153-E410-033, *Dome Tendon Grease Void Calculation*
4) Technical Evaluation A2238266-04, *Tendon Net Duct Volume*

Supplemental Distribution: E - Mail: ndarlage@psctendon.com Hard Copy: EDMS

PSC
PRECISION SURVEILLANCE

N1091 PSC PROCEDURE QA 7.0
FIELD CHANGE REQUEST FORM
09/03/13
Page 1 of 1
Revision 0

SPECIAL FIELD REVISION CONTROL FIELD CHANGE REQUEST NO.: FCR - N1091 - 002

REQUEST BY: Dustin Estep TITLE: PSC Sup. DATE: 11-4-2013

ORIGINATOR: W. Rance Robbins TITLE PSC QC. DATE: 11-4-2013

PROCEDURE NUMBER: SQ 12.2 REV NO.: 0 PROCEDURE TITLE Grease Volums

AFFECTED SECTION: 2.2 Table 7-1 REVISION TO MANUAL REQUIRED: ☐ YES ☒ NO

NCR REQUIRED: ☐ YES ☒ NO NCR NUMBER: N/A HOLD TAG NO.: N/A

DETAILED DESCRIPTION OF EXISTING CONDITION: (USE EXTRA PAGES OR WRITE ON BACK)

Need grease duct volume for H24-47, gasket repair tendon, And H 13-08, which was deemed inaccessable and replaced with H 13-10 then droped from the scope.

RECOMMENDED CHANGE: Add net duct volumes for the two tendons listed above.

| | | | |
|---|---|---|---|
| PSC APPROVAL SIGN & DATE: | QA G Bussone 11/4/13 | QC W. Rance Robbins 11-4-2013 | ENGINEERING 11/4/13 |

EXELON APPROVAL OR COMMENTS:

APPROVED SITE QA AUTHORITY: ____________ TITLE: ____________ DATE: ________

DISPOSITION PSC QC: HOLD TAG APPLIED: ________ HOLD TAG REMOVED: ________

QC INSPECTOR: ____________ DATE: ________

DISTRIBUTION

☐ EXELON QA
☒ QA PSC
☒ ENGINEERING PSC
☒ EXELON ENGINEERING
☒ PROJECT MGR. PSC
☐ EXELON QC
☒ QC PSC
☒ site file
☐ ________

40 QA 7.0 TMI.13 ISI

# THREE MILE ISLAND
# TRANSMITTAL OF DESIGN INFORMATION

☒ SAFETY RELATED
☐ AUGMENTED
☐ NON SAFETY RELATED

Originating Organization
TMI Programs Engineering

ID# 5971-2013-037
Revision 0
Page 1 of 2

To: *Nick Darlage*
*PSC*
*3468 Watling St.*
*East Chicago, IN 46312*

Subject: **Additional Grease Voids for 40th Year Tendon Surveillance**

Michael Grimm — Prepared by
Signature: 
Date: 10/31/13

Sean Taylor — Reviewed by
Signature: Sean Taylor
Date: 10/31/13

Mark Torborg — Approved by
Signature: 
Date: 11/03/13

Status of Information:
☒ Verified
☐ Unverified
☐ Engineering Judgement

Action Tracking # for Method and Schedule of Verification for Unverified DESIGN INFORMATION : N/A

Description of Information:

**TMI is currently performing the 40th Year Tendon Surveillance on Unit 1. Surveillance activities for repair of the tendon end cap for H24-47 and the visual examination of H13-08 were not transmitted under the previous TODIs (5971-2013-032 and 033).**

Purpose of Information:

**TMI is currently performing the 40th year tendon surveillance on Unit 1. To support the continued performance of the surveillance TMI is supplying PSC with additional grease void volumes for use on tendon H24-47 and H13-08. H24-47 was added to the outage to repair a leaking end cap. H13-08 was in the original outage scope and was removed due to inaccessibility. The tendon is having a visual examination performed and the grease void information was not previously transmitted.**

**Tendon Net Duct Volume:**

| Tendon Number | Net Duct Volume (GAL) | 10% Net Duct Volume (GAL) |
|---|---|---|
| H24-47 | 110.1 | 11.01 |
| H13-08 | 110.7 | 11.07 |

# TODI 5971-2013-037

**PSC to sign and confirm receipt of this information:**

**Receipt:** ______________________________ **Date:** ______________

**References:**

1) CC-AA-310, *Transmittal of Design Information*
2) C-1101-153-E410-032, *Horizontal Tendon Grease Void Calculation*
3) Technical Evaluation A2238266-02, *Tendon Net Duct Volume*
4) Technical Evaluation A2238266-04, *Tendon Net Duct Volume*

Supplemental Distribution: E - Mail: ndarlage@psctendon.com Hard Copy: EDMS

**From:** **Marvin H: Espenshade** Marvin.Espenshade@exeloncorp.com
**Subject:** FW: Grease Void Info
**Date:** October 31, 2013, 12:13 PM
**To:** Dustin Estep destep@pscnuclear.com

---

**From:** Grimm, Michael:(GenCo-Nuc)
**Sent:** Thursday, October 31, 2013 11:24 AM
**To:** Espenshade, Marvin H:(GenCo-Nuc)
**Cc:** Stein, Howard:(GenCo-Nuc); hthill@hthpe.com; Taylor, Sean Ryan:(GenCo-Nuc)
**Subject:** Grease Void Info

Butch,

Please pass this info on to Rance. I will send the TODI out with this information once signed. Just want to make sure you guys have it.

| Tendon Number | Net Duct Volume (GAL) | 10% Net Duct Volume (GAL) |
|---|---|---|
| H24-47 | 110.1 | 11.01 |
| H13-08 | 110.7 | 11.07 |

Thanks,

Mike

# VISUAL EXAMINATION – GENERAL VISUAL EXAMINATION

Project TMI Unit 1 Surveillance # 40TH Year 2013
Inspection Area: Buttress 1 (outside)
Equipment Used Binoculars

## Concrete Surface Condition

| Containment Surface (Findings and Description) | NI | IO | RI |
|---|---|---|---|
| -Hairline cracks * | ☐ | ☒ | ☐ |
| - Degraded grout patches * | ☐ | ☒ | ☐ |
| - Minor popouts / bugholes * | ☐ | ☒ | ☐ |
| - slight spalling @ embed plate * | ☐ | ☒ | ☐ |
| - abandoned expansion anchors | ☐ | ☒ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| * Previously reported | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |

***(Use as many sketch sheets (page 2) as needed to report any Recordable Indication (RI) or Information Only (IO) findings for the purpose of documentation and orientation.)***

## Recordable Indications to be Examined For (PSC Procedure 8.4)

Leaching or Chemical Attack
Abrasion or Erosion Degradation
Popouts and Voids
Cracks
Scaling
Spalls
Corrosion Staining on the Concrete Surface
Exposed Reinforcing Steel
Surface Patches or Repairs

Deterioration of any Concrete Coating (if applicable)
Tendon Grease on Exposed Concrete Surfaces
Corrosion on Grease Cans, Bearing Plates or Anchorage
*Excessive Corrosion on Exposed Embedded Metal Surfaces
*Detached Embedments or Loose Bolting
*Indication of Degradation Due to Vibration
**(* The owner/agent must be notified for these noted conditions.)**

Comments and Disposition by Responsible Engineer ☒ Acceptable ☐ Unacceptable
Comments:

Inspector & Level: II Date: 11/13/13
Responsible Engineer: , P.E. Date: 19 FEB 14
ANII: Date: 4/15/14

PSC
PRECISION SURVEILLANCE

**CONCRETE EXTERIOR**
**DATA SHEET SQ 8.4**
09/03/13
Page 1 of 1
Revision 0

# VISUAL EXAMINATION – GENERAL VISUAL EXAMINATION

Project TMI Unit 1 Surveillance # 40TH Year 2013
Inspection Area: Buttress 2
Equipment Used Binoculars; Test Chart SN OC11-026

## Concrete Surface Condition

| Containment Surface (Findings and Description) | NI | IO | RI |
|---|---|---|---|
| Hair line cracks * | ☐ | ■ | ☐ |
| Exposed embed plates * | ☐ | ■ | ☐ |
| Degraded grout patches * | ☐ | ■ | ☐ |
| Minor bugholes / popouts * | ☐ | ■ | ☐ |
| Abandoned expansion anchors | ☐ | ■ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| * Previously reported conditions – essentally | ☐ | ☐ | ☐ |
| remain the same | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |

***(Use as many sketch sheets (page 2) as needed to report any Recordable Indication (RI) or Information Only (IO) findings for the purpose of documentation and orientation.)***

Recordable Indications to be Examined For (PSC Procedure 8.4)

Leaching or Chemical Attack
Abrasion or Erosion Degradation
Popouts and Voids
Cracks
Scaling
Spalls
Corrosion Staining on the Concrete Surface
Exposed Reinforcing Steel
Surface Patches or Repairs

Deterioration of any Concrete Coating (if applicable)
Tendon Grease on Exposed Concrete Surfaces
Corrosion on Grease Cans, Bearing Plates or Anchorage
*Excessive Corrosion on Exposed Embedded Metal Surfaces
*Detached Embedments or Loose Bolting
*Indication of Degradation Due to Vibration
**(* The owner/agent must be notified for these noted conditions.)**

Comments and Disposition by Responsible Engineer ☑ Acceptable ☐ Unacceptable
Comments:

Inspector & Level: / II Date: 11/15/13
Responsible Engineer: , P.E. Date: 19 FEB 14
ANII: Date: 4/15/14

20 SQ 8.4.TMI.13 ISI

## VISUAL EXAMINATION – GENERAL VISUAL EXAMINATION

Project TMI Unit 1 Surveillance # 40TH Year 2013
Inspection Area: Buttress 3 outside
Equipment Used Binoculars

### Concrete Surface Condition

| Containment Surface (Findings and Description) | NI | IO | RI |
|---|---|---|---|
| Hairline cracks – previously reported | ☐ | ■ | ☐ |
| Degraded grout patches – previously reported | ☐ | ■ | ☐ |
| Abandoned expansion anchors | ☐ | ■ | ☐ |
| Minor corrosion to exposed embed plates – | ☐ | ■ | ☐ |
| previously reported | ☐ | ☐ | ☐ |
| Minor popouts / bugholes | ☐ | ■ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |

***(Use as many sketch sheets (page 2) as needed to report any Recordable Indication (RI) or Information Only (IO) findings for the purpose of documentation and orientation.)***

Recordable Indications to be Examined For (PSC Procedure 8.4)

| | |
|---|---|
| Leaching or Chemical Attack | Deterioration of any Concrete Coating (if applicable) |
| Abrasion or Erosion Degradation | Tendon Grease on Exposed Concrete Surfaces |
| Popouts and Voids | Corrosion on Grease Cans, Bearing Plates or Anchorage |
| Cracks | *Excessive Corrosion on Exposed Embedded Metal Surfaces |
| Scaling | *Detached Embedments or Loose Bolting |
| Spalls | *Indication of Degradation Due to Vibration |
| Corrosion Staining on the Concrete Surface | **(* The owner/agent must be notified for these noted conditions.)** |
| Exposed Reinforcing Steel | |
| Surface Patches or Repairs | |

Comments and Disposition by Responsible Engineer ☒ Acceptable ☐ Unacceptable
Comments:

Inspector & Level: / II Date: 11/18/13
Responsible Engineer: / P.E. Date: 19 Feb 14
ANII: Date: 4/15/14

20 SQ 8.4,TMI.13 ISI

PSC
PRECISION SURVEILLANCE

**CONCRETE EXTERIOR**
**DATA SHEET SQ 8.4**
09/03/13
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Revision 0

Ral
12/3

# VISUAL EXAMINATION – GENERAL VISUAL EXAMINATION

Project TMI Unit 1 Surveillance # 40TH Year 2013
Inspection Area: Buttress 3 outside
Equipment Used Tape measure; feeler gage F78 due cal 9/30/14 and Test Chart S/N OC11-026

Concrete Surface Condition

| Containment Surface (Findings and Description) | NI | IO | RI |
|---|---|---|---|
| Embed plate pulled away from face of concrete | ☐ | ☐ | ■ |
| Cracking and degraded grout patch at construction | ☐ | ■ | ☐ |
| seam | ☐ | ☐ | ☐ |
|  | ☐ | ☐ | ☐ |
|  | ☐ | ☐ | ☐ |
| Initial examination was performed remotely with | ☐ | ☐ | ☐ |
| the aid of binoculars. Locations requiring | ☐ | ☐ | ☐ |
| direct VT-1C were performed on suspect | ☐ | ☐ | ☐ |
| locations as noted above. | ☐ | ☐ | ☐ |
|  | ☐ | ☐ | ☐ |
|  | ☐ | ☐ | ☐ |
|  | ☐ | ☐ | ☐ |
|  | ☐ | ☐ | ☐ |
|  | ☐ | ☐ | ☐ |
|  | ☐ | ☐ | ☐ |
|  | ☐ | ☐ | ☐ |

***(Use as many sketch sheets (page 2) as needed to report any Recordable Indication (RI) or Information Only (IO) findings for the purpose of documentation and orientation.)***

Recordable Indications to be Examined For (PSC Procedure 8.4)

Leaching or Chemical Attack
Abrasion or Erosion Degradation
Popouts and Voids
Cracks
Scaling
Spalls
Corrosion Staining on the Concrete Surface
Exposed Reinforcing Steel
Surface Patches or Repairs

Deterioration of any Concrete Coating (if applicable)
Tendon Grease on Exposed Concrete Surfaces
Corrosion on Grease Cans, Bearing Plates or Anchorage
*Excessive Corrosion on Exposed Embedded Metal Surfaces
*Detached Embedments or Loose Bolting
*Indication of Degradation Due to Vibration
**(* The owner/agent must be notified for these noted conditions.)**

Comments and Disposition by Responsible Engineer ☐ Acceptable ☐ Unacceptable SEE BELOW
Comments: EMBED PLATE RI REQUIRES FURTHER EXAMINATION + EVALUATION

Inspector & Level: II Date: 12/3/13
Responsible Engineer: P.E. Date: 19 FEB 14
ANII: Date: 4/15/14

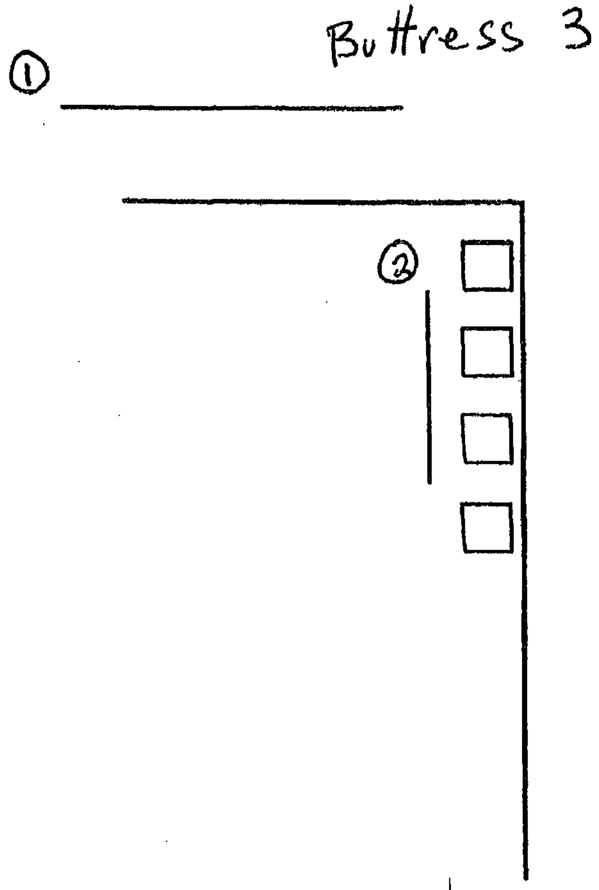
20 SQ 8.4.TMI.13 ISI

**CONCRETE EXTERIOR**
**SKETCH SHEET 8.4**
09/03/13
Page ~~1~~ of ~~1~~ 2 oF
Revision 0

RAP 12/3

| | |
|---|---|
| Project: | TMI 2013 40TH YEAR TENDON SURVEILLANCE |
| Inspection Area: | Buttress 3 |

1. Sketch or attach photographs to provide documentation or additional details as necessary.



Comments:
① cracking and grout degradation @ construction seam
② Embed is pulled away from face of concrete

QC Inspector: RAP    Level: II    Date: 12/3/13

20 SQ 8.4.TMI.13 ISI

PSC
PRECISION SURVEILLANCE

**CONCRETE EXTERIOR**
**DATA SHEET SQ 8.4**
09/03/13
Page 1 of 1
Revision 0

# VISUAL EXAMINATION – GENERAL VISUAL EXAMINATION

Project TMI Unit 1 Surveillance # 40TH Year 2013
Inspection Area: Buttress 4
Equipment Used Binoculars

## Concrete Surface Condition

| Containment Surface (Findings and Description) | NI | IO | RI |
|---|---|---|---|
| - Degraded grout patches * | ☐ | ☒ | ☐ |
| - Hair line cracks * | ☐ | ☒ | ☐ |
| - Category A corrosion at embed plates * | ☐ | ☒ | ☐ |
| - Minor bug holes | ☐ | ☒ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| * Previously reported | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |

***(Use as many sketch sheets (page 2) as needed to report any Recordable Indication (RI) or Information Only (IO) findings for the purpose of documentation and orientation.)***

## Recordable Indications to be Examined For (PSC Procedure 8.4)

Leaching or Chemical Attack
Abrasion or Erosion Degradation
Popouts and Voids
Cracks
Scaling
Spalls
Corrosion Staining on the Concrete Surface
Exposed Reinforcing Steel
Surface Patches or Repairs

Deterioration of any Concrete Coating (if applicable)
Tendon Grease on Exposed Concrete Surfaces
Corrosion on Grease Cans, Bearing Plates or Anchorage
*Excessive Corrosion on Exposed Embedded Metal Surfaces
*Detached Embedments or Loose Bolting
*Indication of Degradation Due to Vibration
**(* The owner/agent must be notified for these noted conditions.)**

Comments and Disposition by Responsible Engineer ☒ Acceptable ☐ Unacceptable
Comments:

Inspector & Level: / II Date: 11/13/13
Responsible Engineer: , P.E. Date: 19 FEB 14
ANII: Date: 4/15/14

20 SQ 8.4.TMI.13 ISI

**CONCRETE EXTERIOR**
**DATA SHEET SQ 8.4**
09/03/13
Page 1 of ~~1~~ 2
Revision 0

RAP
12/3/13

## VISUAL EXAMINATION – GENERAL VISUAL EXAMINATION

Project TMI Unit 1 Surveillance # 40TH Year 2013
Inspection Area: Buttress 4 and adjacent areas (East & West side) outside
Equipment Used Tape measure; feeler gage F78 due cal 9/30/14 and Test Chart S/N OC11-026

### Concrete Surface Condition

| Containment Surface (Findings and Description) | NI | IO | RI |
|---|---|---|---|
| Degraded grout patches @ construction seam ① | ☐ | ☒ | ☐ |
| Embed plate flaking | ☐ | ☐ | ☒ |
| Degraded grout patches @ embed plates ① | ☐ | ☒ | ☐ |
| Embed plates pulled away from face of concrete ① | ☐ | ☐ | ☒ |
| Face of ring girder has random / intermittent | ☐ | ☐ | ☐ |
| scaling / spalling of concrete and grout | ☐ | ☒ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| Initial examination was performed remotely with | ☐ | ☐ | ☐ |
| the aid of binoculars. Locations requiring | ☐ | ☐ | ☐ |
| direct VT-1C were performed on suspect | ☐ | ☐ | ☐ |
| locations as noted above. | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |

***(Use as many sketch sheets (page 2) as needed to report any Recordable Indication (RI) or Information Only (IO) findings for the purpose of documentation and orientation.)***

### Recordable Indications to be Examined For (PSC Procedure 8.4)

Leaching or Chemical Attack
Abrasion or Erosion Degradation
Popouts and Voids
Cracks
Scaling
Spalls
Corrosion Staining on the Concrete Surface
Exposed Reinforcing Steel
Surface Patches or Repairs

Deterioration of any Concrete Coating (if applicable)
Tendon Grease on Exposed Concrete Surfaces
Corrosion on Grease Cans, Bearing Plates or Anchorage
*Excessive Corrosion on Exposed Embedded Metal Surfaces
*Detached Embedments or Loose Bolting
*Indication of Degradation Due to Vibration
**(* The owner/agent must be notified for these noted conditions.)**

Comments and Disposition by Responsible Engineer SEE BELOW ☐Acceptable ☐Unacceptable
Comments: EMBED PLATE RI'S REQUIRE FURTHER EXAMINATION & EVALUATION

Inspector & Level: / II Date: 12/3/13
Responsible Engineer: , P.E. Date: 19 FEB 14
ANII: Date: 4/5/14

20 SQ 8.4.TMI.13 ISI

**CONCRETE EXTERIOR SKETCH SHEET 8.4**
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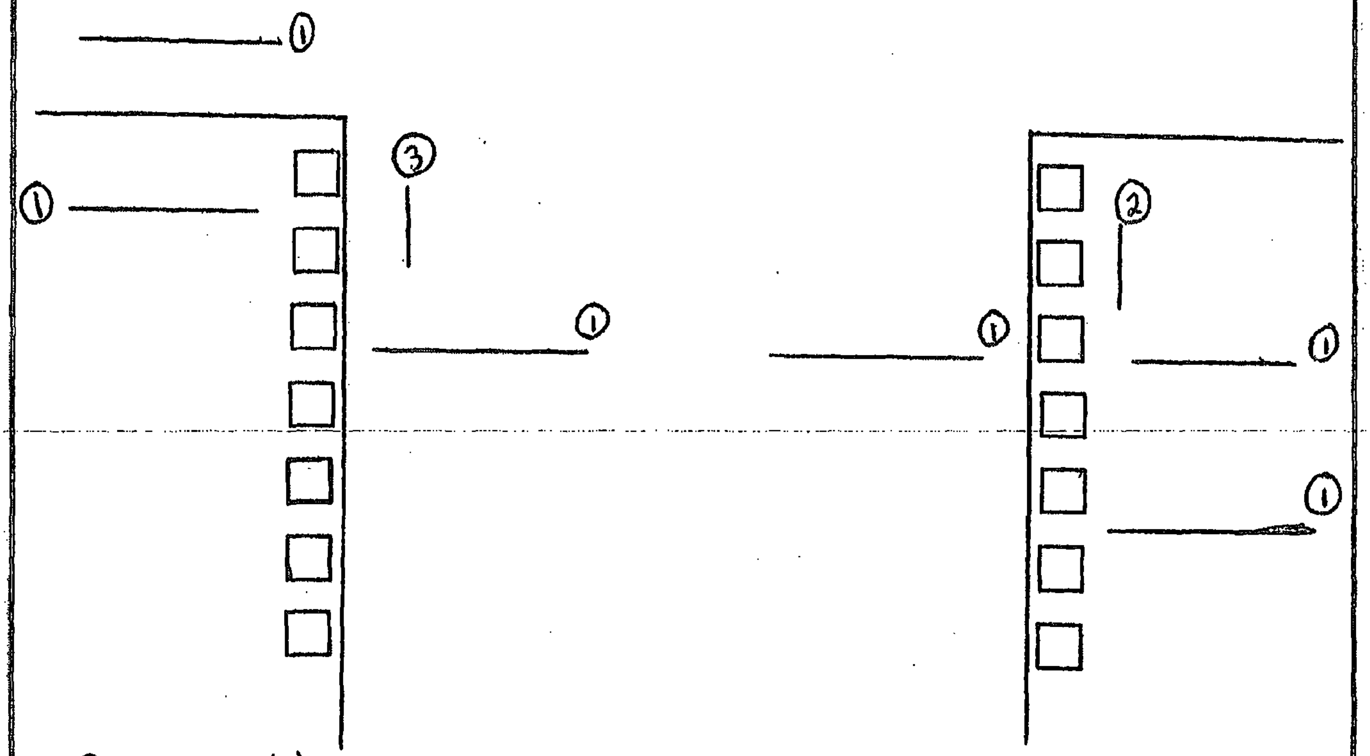
| | |
|---|---|
| Project: | TMI 2013 40TH YEAR TENDON SURVEILLANCE |
| Inspection Area: | Buttress 4 |

1. Sketch or attach photographs to provide documentation or additional details as necessary.

Buttress 4



① Construction seam cracks
② Embed protruding from face
③ Embed flaking

Comments:

| | | | | | |
|---|---|---|---|---|---|
| QC Inspector: | Ronald a P | Level: | II | Date: | 12/3/13 |

20 SQ 8.4.TMI.13 ISI

## VISUAL EXAMINATION – GENERAL VISUAL EXAMINATION

Project TMI Unit 1 Surveillance # 40TH Year 2013
Inspection Area: Containment tendons – Buttress 5 (outside)
Equipment Used Binoculars

### Concrete Surface Condition

| Containment Surface (Findings and Description) | NI | IO | RI |
|---|---|---|---|
| Buttress 5 face is inaccessible due to ventilation | ☐ | ☐ | ☐ |
| stack | ☐ | ☒ | ☐ |
| Small cracks noted < 0.010 in width | ☐ | ☒ | ☐ |
| Degraded grout patches | ☐ | ☒ | ☐ |
| Minor oil stains | ☐ | ☒ | ☐ |
| Small bug holes | ☐ | ☒ | ☐ |
| Exposed embed plates with slight oxidation/no degradation | ☐ | ☒ | ☐ |
| noted. | ☐ | ☐ | ☐ |
|  | ☐ | ☐ | ☐ |
| Note: Conditions noted were previously | ☐ | ☐ | ☐ |
| reported. No apparent changes noted. | ☐ | ☐ | ☐ |
|  | ☐ | ☐ | ☐ |
|  | ☐ | ☐ | ☐ |
|  | ☐ | ☐ | ☐ |
|  | ☐ | ☐ | ☐ |
|  | ☐ | ☐ | ☐ |

***(Use as many sketch sheets (page 2) as needed to report any Recordable Indication (RI) or Information Only (IO) findings for the purpose of documentation and orientation.)***

Recordable Indications to be Examined For (PSC Procedure 8.4)

Leaching or Chemical Attack
Abrasion or Erosion Degradation
Popouts and Voids
Cracks
Scaling
Spalls
Corrosion Staining on the Concrete Surface
Exposed Reinforcing Steel
Surface Patches or Repairs

Deterioration of any Concrete Coating (If applicable)
Tendon Grease on Exposed Concrete Surfaces
Corrosion on Grease Cans, Bearing Plates or Anchorage
*Excessive Corrosion on Exposed Embedded Metal Surfaces
*Detached Embedments or Loose Bolting
*Indication of Degradation Due to Vibration
**(* The owner/agent must be notified for these noted conditions.)**

Comments and Disposition by Responsible Engineer ☒ Acceptable ☐ Unacceptable
Comments:

Inspector & Level: II Date: 10/31/13
Responsible Engineer: P.E. Date: 19 Feb 14
ANII: Date: 4/15/14

Procedure: SQ 8.4 Rev 0

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## VISUAL EXAMINATION – GENERAL VISUAL EXAMINATION

Project TMI Unit 1 Surveillance # 40TH Year 2013
Inspection Area: Buttress 6 (outside)
Equipment Used Binoculars

### Concrete Surface Condition

| Containment Surface (Findings and Description) | NI | IO | RI |
|---|---|---|---|
| - Hairline cracks | ☐ | ■ | ☐ |
| - Minor bugholes and popouts | ☐ | ■ | ☐ |
| - Degraded grout patches * | ☐ | ■ | ☐ |
| - Abandoned expansion anchors | ☐ | ■ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| * Previously reported | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |

***(Use as many sketch sheets (page 2) as needed to report any Recordable Indication (RI) or Information Only (IO) findings for the purpose of documentation and orientation.)***

Recordable Indications to be Examined For (PSC Procedure 8.4)

Leaching or Chemical Attack
Abrasion or Erosion Degradation
Popouts and Voids
Cracks
Scaling
Spalls
Corrosion Staining on the Concrete Surface
Exposed Reinforcing Steel
Surface Patches or Repairs

Deterioration of any Concrete Coating (if applicable)
Tendon Grease on Exposed Concrete Surfaces
Corrosion on Grease Cans, Bearing Plates or Anchorage
*Excessive Corrosion on Exposed Embedded Metal Surfaces
*Detached Embedments or Loose Bolting
*Indication of Degradation Due to Vibration
**(* The owner/agent must be notified for these noted conditions.)**

Comments and Disposition by Responsible Engineer ☒ Acceptable ☐ Unacceptable
Comments:

Inspector & Level: II Date: 11/12/13
Responsible Engineer: P.E. Date: 19 FEB 14
ANII: Date: 4/15/14

**CONCRETE EXTERIOR
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## VISUAL EXAMINATION – GENERAL VISUAL EXAMINATION

Project TMI Unit 1 Surveillance # 40TH Year 2013
Inspection Area: Between Buttress 2 and 1
Equipment Used Binoculars ; Test Chart SN OC11-026

### Concrete Surface Condition

| Containment Surface (Findings and Description) | NI | IO | RI |
|---|---|---|---|
| Degraded grout patches * | ☐ | ☒ | ☐ |
| Hairline cracks * | ☐ | ☒ | ☐ |
| Popouts and bugholes * | ☐ | ☒ | ☐ |
| Very slight spalling @ embed plates * | ☐ | ☒ | ☐ |
| Slight leeching/efflorescence * | ☐ | ☒ | ☐ |
| Exposed embed plate * | ☐ | ☒ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| * These conditions were previously reported | ☐ | ☐ | ☐ |
| and remain essentially the same. | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |

***(Use as many sketch sheets (page 2) as needed to report any Recordable Indication (RI) or Information Only (IO) findings for the purpose of documentation and orientation.)***

Recordable Indications to be Examined For (PSC Procedure 8.4)

Leaching or Chemical Attack
Abrasion or Erosion Degradation
Popouts and Voids
Cracks
Scaling
Spalls
Corrosion Staining on the Concrete Surface
Exposed Reinforcing Steel
Surface Patches or Repairs

Deterioration of any Concrete Coating (if applicable)
Tendon Grease on Exposed Concrete Surfaces
Corrosion on Grease Cans, Bearing Plates or Anchorage
*Excessive Corrosion on Exposed Embedded Metal Surfaces
*Detached Embedments or Loose Bolting
*Indication of Degradation Due to Vibration
**(* The owner/agent must be notified for these noted conditions.)**

Comments and Disposition by Responsible Engineer ☒ Acceptable ☐ Unacceptable
Comments:

Inspector & Level: / II Date: 11/15/13
Responsible Engineer: P.E. Date: 19 FEB 14
ANII: Date: 4/15/14

# VISUAL EXAMINATION – GENERAL VISUAL EXAMINATION

Project TMI Unit 1 Surveillance # 40TH Year 2013
Inspection Area: Between Buttress 3 and 2 (outside)
Equipment Used Binoculars; Test Chart SN OC11-026

## Concrete Surface Condition

| Containment Surface (Findings and Description) | NI | IO | RI |
|---|---|---|---|
| Hairline cracks * | ☐ | ☒ | ☐ |
| Exposed embed plate * | ☐ | ☒ | ☐ |
| Very slight leeching/efflorescence * | ☐ | ☒ | ☐ |
| Grout patches degraded * | ☐ | ☒ | ☐ |
| spalling @ embed plates * | ☐ | ☒ | ☐ |
| Abandoned expansion anchors * | ☐ | ☒ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| * Previously reported conditions remain | ☐ | ☐ | ☐ |
| essentially the same | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |

***(Use as many sketch sheets (page 2) as needed to report any Recordable Indication (RI) or Information Only (IO) findings for the purpose of documentation and orientation.)***

## Recordable Indications to be Examined For (PSC Procedure 8.4)

Leaching or Chemical Attack
Abrasion or Erosion Degradation
Popouts and Voids
Cracks
Scaling
Spalls
Corrosion Staining on the Concrete Surface
Exposed Reinforcing Steel
Surface Patches or Repairs

Deterioration of any Concrete Coating (if applicable)
Tendon Grease on Exposed Concrete Surfaces
Corrosion on Grease Cans, Bearing Plates or Anchorage
*Excessive Corrosion on Exposed Embedded Metal Surfaces
*Detached Embedments or Loose Bolting
*Indication of Degradation Due to Vibration
**(* The owner/agent must be notified for these noted conditions.)**

Comments and Disposition by Responsible Engineer ☒ Acceptable ☐ Unacceptable
Comments:

Inspector & Level: / II Date: 11/15/13
Responsible Engineer: , P.E. Date: 19 Feb 14
ANII: Date: 4/15/14

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# VISUAL EXAMINATION – GENERAL VISUAL EXAMINATION

Project TMI Unit 1 Surveillance # 40TH Year 2013
Inspection Area: Between Buttress 3-4 outside
Equipment Used Binoculars

## Concrete Surface Condition

| Containment Surface (Findings and Description) | NI | IO | RI |
|---|---|---|---|
| -Hairline cracking | ☐ | ☒ | ☐ |
| -Category A corrosion of embed plates | ☐ | ☒ | ☐ |
| - Exposed expansion anchors - abandoned | ☐ | ☒ | ☐ |
| - Degraded grout patches * | ☐ | ☒ | ☐ |
| - Minor popouts/ bugholes | ☐ | ☒ | ☐ |
| - Spalls - minor @ ring girder * | ☐ | ☒ | ☐ |
| - Minor leeching / efflorescence * | ☐ | ☒ | ☐ |
| - Cracking above Fuel Handling Bld remains | ☐ | ☒ | ☐ |
| Unchanged from previous report | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| * Previously reported | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |

***(Use as many sketch sheets (page 2) as needed to report any Recordable Indication (RI) or Information Only (IO) findings for the purpose of documentation and orientation.)***

Recordable Indications to be Examined For (PSC Procedure 8.4)

Leaching or Chemical Attack
Abrasion or Erosion Degradation
Popouts and Voids
Cracks
Scaling
Spalls
Corrosion Staining on the Concrete Surface
Exposed Reinforcing Steel
Surface Patches or Repairs

Deterioration of any Concrete Coating (if applicable)
Tendon Grease on Exposed Concrete Surfaces
Corrosion on Grease Cans, Bearing Plates or Anchorage
*Excessive Corrosion on Exposed Embedded Metal Surfaces
*Detached Embedments or Loose Bolting
*Indication of Degradation Due to Vibration
**(* The owner/agent must be notified for these noted conditions.)**

Comments and Disposition by Responsible Engineer ☒ Acceptable ☐ Unacceptable
Comments:

Inspector & Level: II Date: 11/13/13
Responsible Engineer: Date: 19 FEB 14
ANII: Date: 4/15/14

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## VISUAL EXAMINATION – GENERAL VISUAL EXAMINATION

Project TMI Unit 1 Surveillance # 40TH Year 2013
Inspection Area: Between Buttress 4-5 (outside)
Equipment Used Binoculars

### Concrete Surface Condition

| Containment Surface (Findings and Description) | NI | IO | RI |
|---|---|---|---|
| Hairline cracks | ☐ | ■ | ☐ |
| - Degraded grout patches * | ☐ | ■ | ☐ |
| - Slight leeching/efflorescence * | ☐ | ■ | ☐ |
| - Minor popouts/bugholes | ☐ | ■ | ☐ |
| - Category A corrosion on Embed plates | ☐ | ■ | ☐ |
| - Cracks above Fuel handling bldg remain | ☐ | ☐ | ☐ |
| unchanged from previous reports | ☐ | ■ | ☐ |
|  | ☐ | ☐ | ☐ |
|  | ☐ | ☐ | ☐ |
| * Previously reported | ☐ | ☐ | ☐ |
|  | ☐ | ☐ | ☐ |
|  | ☐ | ☐ | ☐ |
|  | ☐ | ☐ | ☐ |
|  | ☐ | ☐ | ☐ |
|  | ☐ | ☐ | ☐ |
|  | ☐ | ☐ | ☐ |

***(Use as many sketch sheets (page 2) as needed to report any Recordable Indication (RI) or Information Only (IO) findings for the purpose of documentation and orientation.)***

### Recordable Indications to be Examined For (PSC Procedure 8.4)

- Leaching or Chemical Attack
- Abrasion or Erosion Degradation
- Popouts and Voids
- Cracks
- Scaling
- Spalls
- Corrosion Staining on the Concrete Surface
- Exposed Reinforcing Steel
- Surface Patches or Repairs
- Deterioration of any Concrete Coating (if applicable)
- Tendon Grease on Exposed Concrete Surfaces
- Corrosion on Grease Cans, Bearing Plates or Anchorage
- *Excessive Corrosion on Exposed Embedded Metal Surfaces
- *Detached Embedments or Loose Bolting
- *Indication of Degradation Due to Vibration

**(* The owner/agent must be notified for these noted conditions.)**

Comments and Disposition by Responsible Engineer ☒Acceptable ☐Unacceptable
Comments:

Inspector & Level: II Date: 11/14/13
Responsible Engineer: Date: 19 Feb 14
ANII: Date: 4/15/14

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## VISUAL EXAMINATION – GENERAL VISUAL EXAMINATION VT-1C

Project TMI Unit 1 Surveillance # 40TH Year 2013
Inspection Area: Containment between Buttress 5 & 6 (outside)
Equipment Used natural lighting, camera, Test chart SN OC11-026

### Concrete Surface Condition

| Containment Surface (Findings and Description) | NI | IO | RI |
|---|---|---|---|
| 1) Hairline cracks | ☐ | ☒ | ☐ |
| 2) Abandoned expansion anchors with Category A corrosion | ☐ | ☒ | ☐ |
| 3) Embed plates that are exposed to the environment | ☐ | ☒ | ☐ |
| exhibit category A corrosion | ☐ | ☒ | ☐ |
| 4) Small bugholes | ☐ | ☒ | ☐ |
| 5) Grout patches/repair areas exhibit continued degradation | ☐ | ☒ | ☐ |
| which was previously reported | ☐ | ☒ | ☐ |
| 6) Embed plates are detached - not flush with concrete | ☐ | ☐ | ☐ |
| surface. | ☐ | ☐ | ☒ |
| 7) Grout patch over equipment opening remains | ☐ | ☒ | ☐ |
| unchanged | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |

***(Use as many sketch sheets (page 2) as needed to report any Recordable Indication (RI) or Information Only (IO) findings for the purpose of documentation and orientation.)***

### Recordable Indications to be Examined For (PSC Procedure 8.4)

Leaching or Chemical Attack
Abrasion or Erosion Degradation
Popouts and Voids
Cracks
Scaling
Spalls
Corrosion Staining on the Concrete Surface
Exposed Reinforcing Steel
Surface Patches or Repairs

Deterioration of any Concrete Coating (if applicable)
Tendon Grease on Exposed Concrete Surfaces
Corrosion on Grease Cans, Bearing Plates or Anchorage
*Excessive Corrosion on Exposed Embedded Metal Surfaces
*Detached Embedments or Loose Bolting
*Indication of Degradation Due to Vibration
**(* The owner/agent must be notified for these noted conditions.)**

Comments and Disposition by Responsible Engineer SEE BELOW ☐ Acceptable ☐ Unacceptable
Comments: EMBED PLATE RI REQUIRES FURTHER EXAMINATION & EVALUATION

Inspector & Level: R. A. / II Date: 11/14/13
Responsible Engineer: , P.E. Date: 19 FEB 14
ANII: Date: 4/15/14

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① SGR construction repair patch is coated with a shiny curing compound which is transparent and does not interfere/prohibit 100% examination. All other concrete surfaces are not coated. Condition remains unchanged.

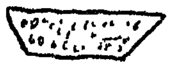
② Embed plate (vertical) that is 4" wide and 2' feet from west side of Buttress 5 has the following condition(s):

a) 7 tendons down from top the embed plate is pulled away from the face of the containment wall approx 1/4". Concrete has spalled on the Left hand side of the embed plate.

b) 13 tendons down from top - repair patch is spalling 9"L x 5"w x 1/2"D.

c) 21 tendons down from top - the embed plate has pulled away from the concrete face approx. 1/4".

③ Crack just below ring girder is 7"x 2"x 1/2"d.

④ spalled area  — noted ≈ 1/2" in depth

⑤ Vertical embed plate that is 4" wide and 2' feet from east side of Buttress 6, the following conditions are noted!

a) one location-embed plate concrete has degraded on Rt side. and cracks at repair area noted.

b) 2nd location - cracking/spalling of repair area @ embed plate.

c) 3rd location - embed plate has pulled away from face of concrete - concrete has separated from embed plate.

d) 4th location - concrete has separated from embed plate and embed plate is not flush with face of concrete.

e) 5th location - repair patch cracking and concrete separated from embed plate.

f) 6th location – concrete has separated from embed plate and embed plate is not flush with concrete surface.

g) 7th location – concrete has separated from embed plate and embed plate is not flush with face of concrete.

General Observations: Previously reported

a) hair cracks

b) abandoned expansion anchors have Category A corrosion

c) Embed plates that are exposed to the environment have Category A corrosion.

d) Grout patches / repair areas exhibit continued degrading

e) small bug holes

These conditions have been previously reported.

---

Note: Outside the scope of ASME Section XI IWE:

a) meteorological / electrical boxes exhibit significant degradation (material loss due to weathering) and provide ~~no~~ RAP 11/14/13 little to no protection.

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## VISUAL EXAMINATION – GENERAL VISUAL EXAMINATION

Project TMI unit 1 Surveillance # 40TH Year 2013
Inspection Area: Between Buttress 1 and 6 (outside)
Equipment Used Binoculars; Test Chart SN OC11-026

### Concrete Surface Condition

| Containment Surface (Findings and Description) | NI | IO | RI |
|---|---|---|---|
| Hairline cracks * | ☐ | ☒ | ☐ |
| Degraded grout patches * | ☐ | ☒ | ☐ |
| Popouts and bugholes – minor * | ☐ | ☒ | ☐ |
| Abandoned expansion anchors * | ☐ | ☒ | ☐ |
|  | ☐ | ☐ | ☐ |
|  | ☐ | ☐ | ☐ |
|  | ☐ | ☐ | ☐ |
|  | ☐ | ☐ | ☐ |
|  | ☐ | ☐ | ☐ |
| * Previously reported conditions | ☐ | ☐ | ☐ |
|  | ☐ | ☐ | ☐ |
|  | ☐ | ☐ | ☐ |
|  | ☐ | ☐ | ☐ |
|  | ☐ | ☐ | ☐ |
|  | ☐ | ☐ | ☐ |
|  | ☐ | ☐ | ☐ |

***(Use as many sketch sheets (page 2) as needed to report any Recordable Indication (RI) or Information Only (IO) findings for the purpose of documentation and orientation.)***

### Recordable Indications to be Examined For (PSC Procedure 8.4)

Leaching or Chemical Attack
Abrasion or Erosion Degradation
Popouts and Voids
Cracks
Scaling
Spalls
Corrosion Staining on the Concrete Surface
Exposed Reinforcing Steel
Surface Patches or Repairs

Deterioration of any Concrete Coating (if applicable)
Tendon Grease on Exposed Concrete Surfaces
Corrosion on Grease Cans, Bearing Plates or Anchorage
*Excessive Corrosion on Exposed Embedded Metal Surfaces
*Detached Embedments or Loose Bolting
*Indication of Degradation Due to Vibration
**(* The owner/agent must be notified for these noted conditions.)**

Comments and Disposition by Responsible Engineer ☒ Acceptable ☐ Unacceptable
Comments:

Inspector & Level: / II Date: 11/15/13
Responsible Engineer: P.E. Date: 19 FEB 14
ANII: Date: 4/15/14

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## VISUAL EXAMINATION – GENERAL VISUAL EXAMINATION

Project TMI Unit 1 Surveillance # 40TH Year 2013
Inspection Area: Containment Dome
Equipment Used Test card S/N OC11-026 – natural lighting

### Concrete Surface Condition

| Containment Surface (Findings and Description) | NI | IO | RI |
|---|---|---|---|
| Minor cracking – previously reported – no change | ☐ | ■ | ☐ |
| Water seepage on dome embeds – no change from previous | ☐ | ■ | ☐ |
| data Category A – no degradation noted | ☐ | ☐ | ☐ |
| Minor cracking on repair areas – no change from | ☐ | ■ | ☐ |
| previous data | ☐ | ☐ | ☐ |
| Angle iron supports are rusting | ☐ | ■ | ☐ |
| Rain, weathering has exposed aggregate | ☐ | ■ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |

***(Use as many sketch sheets (page 2) as needed to report any Recordable Indication (RI) or Information Only (IO) findings for the purpose of documentation and orientation.)***

### Recordable Indications to be Examined For (PSC Procedure 8.4)

| | |
|---|---|
| Leaching or Chemical Attack | Deterioration of any Concrete Coating (if applicable) |
| Abrasion or Erosion Degradation | Tendon Grease on Exposed Concrete Surfaces |
| Popouts and Voids | Corrosion on Grease Cans, Bearing Plates or Anchorage |
| Cracks | *Excessive Corrosion on Exposed Embedded Metal Surfaces |
| Scaling | *Detached Embedments or Loose Bolting |
| Spalls | *Indication of Degradation Due to Vibration |
| Corrosion Staining on the Concrete Surface | **(* The owner/agent must be notified for these noted conditions.)** |
| Exposed Reinforcing Steel | |
| Surface Patches or Repairs | |

Comments and Disposition by Responsible Engineer ☒ Acceptable ☐ Unacceptable
Comments:

Inspector & Level: II Date: 11/13/13
Responsible Engineer: , P.E. Date: 19 FEB 14
ANII: Date: 4/15/14

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# VISUAL EXAMINATION – GENERAL VISUAL EXAMINATION

Project TMI Unit 1 Surveillance # 40TH Year 2013
Inspection Area: Behind missle shield
Equipment Used Binoculars, test chart SN OC11-026

## Concrete Surface Condition

| Containment Surface (Findings and Description) | NI | IO | RI |
|---|---|---|---|
| Hairline cracking | ☐ | ☒ | ☐ |
| Abandoned expansion anchors | ☐ | ☒ | ☐ |
| Minor leeching/efflorescence in several locations | ☐ | ☒ | ☐ |
| Bugholes and popouts (minor) | ☐ | ☒ | ☐ |
| Spalls and scaling minor at several locations | ☐ | ☒ | ☐ |
| Degraded grout patches (minor) | ☐ | ☒ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |

***(Use as many sketch sheets (page 2) as needed to report any Recordable Indication (RI) or Information Only (IO) findings for the purpose of documentation and orientation.)***

## Recordable Indications to be Examined For (PSC Procedure 8.4)

Leaching or Chemical Attack
Abrasion or Erosion Degradation
Popouts and Voids
Cracks
Scaling
Spalls
Corrosion Staining on the Concrete Surface
Exposed Reinforcing Steel
Surface Patches or Repairs

Deterioration of any Concrete Coating (if applicable)
Tendon Grease on Exposed Concrete Surfaces
Corrosion on Grease Cans, Bearing Plates or Anchorage
*Excessive Corrosion on Exposed Embedded Metal Surfaces
*Detached Embedments or Loose Bolting
*Indication of Degradation Due to Vibration
**(* The owner/agent must be notified for these noted conditions.)**

Comments and Disposition by Responsible Engineer ☒ Acceptable ☐ Unacceptable
Comments:

Inspector & Level: / II Date: 11/18/13
Responsible Engineer: , P.E. Date: 19 FEB 14
ANII: Date: 4/15/14

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## VISUAL EXAMINATION – GENERAL VISUAL EXAMINATION

Project TMI Surveillance # 40TH Year 2013
Inspection Area: Turbine Bldg Elevations 305', 322', 338', 355', 380' ①
Equipment Used Flashlight, light attached to hard hat, beacon light, and binoculars, Test chart SN OC11-026

Concrete Surface Condition

| Containment Surface (Findings and Description) | NI | IO | RI |
|---|---|---|---|
| | ☐ | ☐ | ☐ |
| See attached pages for specific details. | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |

***(Use as many sketch sheets (page 2) as needed to report any Recordable Indication (RI) or Information Only (IO) findings for the purpose of documentation and orientation.)***

Recordable Indications to be Examined For (PSC Procedure 8.4)

Leaching or Chemical Attack
Abrasion or Erosion Degradation
Popouts and Voids
Cracks
Scaling
Spalls
Corrosion Staining on the Concrete Surface
Exposed Reinforcing Steel
Surface Patches or Repairs

Deterioration of any Concrete Coating (if applicable)
Tendon Grease on Exposed Concrete Surfaces
Corrosion on Grease Cans, Bearing Plates or Anchorage
*Excessive Corrosion on Exposed Embedded Metal Surfaces
*Detached Embedments or Loose Bolting
*Indication of Degradation Due to Vibration
**(* The owner/agent must be notified for these noted conditions.)**

Comments and Disposition by Responsible Engineer ☒ Acceptable ☐ Unacceptable
Comments:

Inspector & Level: / Level II Date: 11/12/13
Responsible Engineer: , P.E. Date: 19 FEB 14
ANII: Date: 4/15/14

① This examination was performed from floors, roofs, platforms, walkways, ladders and other permanent vantage points. This examination was performed on 11/4/13 through 11/8/13, specific examination results are provided where rooms are identified on the doorway, otherwise general area comments are provided.

Note: In all instances the conditions noted / observed are reported as "Information Only." No "Reportable Indications" (RI) were noted.

≃ 281' Elevation - Door I-10~~8~~7 RGP 11/12/13

a) Walls are painted — minor chipping
b) abandoned expansion anchors
c) grout repairs

≃ 281' Elevation - Door I-108

a) Walls are painted
b) Popouts / bugholes (minor)
c) 6 abandoned concrete expansion anchors

≃ 281' Elevation – Door I-104

a) walls painted
c) minor bugholes

≃ 281' Elevation @ ladder beside Buttress #1

a) epoxy repair patch behind ladder 9"x9"
b) popouts and bugholes (minor)

≃ 322' Elevation – Room I-204

a) hairline cracks, minor bugholes and popouts
b) very minor leeching / efflorescence
c) exposed embed plates – minor corrosion/pitting
d) 3 abandoned expansion anchor~~s~~ holes REP 11/12/13

≃ 322' Elevation – Room I-203

a) minor popouts and bugholes
b) 3 abandoned expansion anchors
c) grout patch repairs
d) pipe ≃ 3/4" diameter protruding from wall. adjacent to junction box

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≟ 322' Elevation - room east of Buttress #1

a) minor popouts and bugholes
b) ≟ 3/4" pipe protruding from concrete
c) hairline cracks adjacent to Buttress #1
d) oil/grease on Buttress @ tendons - not on containment wall.

≟ 322' Elevation - Buttress #1

a) minor popouts and bugholes
b) construction seams

≟ 322' Elevation west side of Buttress #1 (Room I-202)

a) minor bug holes
b) hair line cracks
c) construction seams

≟ 322' Elevation - Room I-202 between Buttress 1 and 2

a) oil/grease on Buttress 1 westside and not on containment wall
b) minor hairline cracks
c) leeching/efflorescence 1 foot from Buttress #1 wall
d) grout repair patches
e) 2 abandoned expansion anchors
f) 3/4" pipe protruding ≟ 4" out from wall face
g) minor bugholes and popouts

≃ 322' Elevation – Room east of I-202

a) minor popouts and bugholes

≃ 322' Elevation – Room I-201

a) minor bugholes

b) bottom portion of wall painted ≃ 13"

≃ 357' Elevation

a) grout patches

b) Popouts and bugholes

≃ 357' Elevation – 2nd room west of I-202

a) hairline cracks

b) bugholes

c) very minor leeching/efflorescence

≃ 357' Elevation – West side of Buttress #6

a) minor popouts and bugholes

Page 6 of 6

General observations of areas that are not clearly / specifically defined — all elevations - Turbine Bldg.

a) hair line cracks
b) abandoned expansion anchors
c) minor leeching / efflorescence
d) minor popouts and bugholes
e) grout and epoxy patches

Note! All conditions noted are acceptable. These are being reported as "Information Only"

# VISUAL EXAMINATION – GENERAL VISUAL EXAMINATION

Project TMI Surveillance # 40TH Year 2013
Inspection Area: Tendon Gallery ≃ 253' elevation – 360° around
Equipment Used flashlight; headlight on hard hat and Test card S/N OC11-026

## Concrete Surface Condition

| Containment Surface (Findings and Description) | NI | IO | RI |
|---|---|---|---|
| ① Leeching/efflorescence (heavy) noted in two locations. | ☐ | ☒ | ☐ |
| Pictures included in report. Stalactites noted at inter- | ☐ | ☐ | ☐ |
| face between ceiling and wall. | ☐ | ☐ | ☐ |
| ② Exposed rebar noted @ V-143 and V-149 (V-150) location | ☐ | ☒ | ☐ |
| This was previously reported. | ☐ | ☐ | ☐ |
| ③ Two cavity repairs by epoxy noted @ V-149 and V-150 | ☐ | ☒ | ☐ |
| location. Epoxy repair is not flush with face of concrete | ☐ | ☐ | ☐ |
| One – 1½"L × ½"W – Two – 2½" × 2½" | ☐ | ☐ | ☐ |
| ④ Hairline cracks, minor bug holes and popouts noted which | ☐ | ☒ | ☐ |
| were previously noted. | ☐ | ☐ | ☐ |
| ⑤ Minor/medium leeching/efflorescence noted randomly | ☐ | ☒ | ☐ |
| 360°. This was previously reported. This is on | ☐ | ☐ | ☐ |
| inner and outer wall. | ☐ | ☐ | ☐ |
| ⑥ Exposed embed plate adjacent to V-113 is pitted < 0.010 | ☐ | ☒ | ☐ |
| deep. | ☐ | ☐ | ☐ |
|  | ☐ | ☐ | ☐ |

***(Use as many sketch sheets (page 2) as needed to report any Recordable Indication (RI) or Information Only (IO) findings for the purpose of documentation and orientation.)***

## Recordable Indications to be Examined For (PSC Procedure 8.4)

Leaching or Chemical Attack
Abrasion or Erosion Degradation
Popouts and Voids
Cracks
Scaling
Spalls
Corrosion Staining on the Concrete Surface
Exposed Reinforcing Steel
Surface Patches or Repairs

Deterioration of any Concrete Coating (if applicable)
Tendon Grease on Exposed Concrete Surfaces
Corrosion on Grease Cans, Bearing Plates or Anchorage
*Excessive Corrosion on Exposed Embedded Metal Surfaces
*Detached Embedments or Loose Bolting
*Indication of Degradation Due to Vibration
**(* The owner/agent must be notified for these noted conditions.)**

Comments and Disposition by Responsible Engineer ☒ Acceptable ☐ Unacceptable
Comments:

Inspector & Level: / Level II Date: 11/5/13
Responsible Engineer: , P.E. Date: 19 Feb 14
ANII: Date: 4/15/14

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## VISUAL EXAMINATION – GENERAL VISUAL EXAMINATION

Project TMI Surveillance # 40TH Year 2013
Inspection Area: Cont. Bldg Alligator Pitt approx 273' elev.
Equipment Used Tape measure; flashlight, and light attached to hard hat; Test Chart S/N OC11-026.

### Concrete Surface Condition

| Containment Surface (Findings and Description) | NI | IO | RI |
|---|---|---|---|
| Leeching/efflorescence – see attachments for specifics | ☐ | ☒ | ☐ |
| Popouts, voids, bug holes – see attachments for specifics | ☐ | ☒ | ☐ |
| Hairline cracks – see attachments for specifics | ☐ | ☒ | ☐ |
| Surface patches/repairs – see attachments for specifics | ☐ | ☒ | ☐ |
| Oil leeching thru concrete – see attachments for specifics | ☐ | ☒ | ☐ |
| Tendon grease on concrete surfaces – see attachments | ☐ | ☒ | ☐ |
| Abandoned expansion anchors – see attachments for specifics | ☐ | ☒ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| Note: This examination does not include | ☐ | ☐ | ☐ |
| ~~eac~~ Buttress 4. | ☐ | ☐ | ☐ |
| RaP 11/5/13 | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |

***(Use as many sketch sheets (page 2) as needed to report any Recordable Indication (RI) or Information Only (IO) findings for the purpose of documentation and orientation.)***

### Recordable Indications to be Examined For (PSC Procedure 8.4)

Leaching or Chemical Attack
Abrasion or Erosion Degradation
Popouts and Voids
Cracks
Scaling
Spalls
Corrosion Staining on the Concrete Surface
Exposed Reinforcing Steel
Surface Patches or Repairs

Deterioration of any Concrete Coating (if applicable)
Tendon Grease on Exposed Concrete Surfaces
Corrosion on Grease Cans, Bearing Plates or Anchorage
*Excessive Corrosion on Exposed Embedded Metal Surfaces
*Detached Embedments or Loose Bolting
*Indication of Degradation Due to Vibration
**(* The owner/agent must be notified for these noted conditions.)**

Comments and Disposition by Responsible Engineer ☒ Acceptable ☐ Unacceptable
Comments:

Inspector & Level: Date: 11/5/13
Responsible Engineer: P.E. Date: 19 Feb 14
ANII: Date: 4/15/14

① wall is painted approx. 11" from floor.

② At Buttress 1 - bugholes, an 11" grout patch, and grease was noted on the wall adjacent to the tendons.

③ The following conditions were noted between Buttress 1 and 6:
- a) hairline cracks approx 5ft ~~east~~ west of Azimuth 0° eap 11/5/13
- b) hairline cracks 2ft east Azimuth 0°
- c) A cavity 3"L x ½"w x ⅛"d @ Azimuth 350°
- d) hair line cracks between Azimuth 350° and 340° were leeching oil
- e) hairline cracks close to Azimuth 340° was noted as leeching/efflorescence.
- f) hairline cracks 5ft east of Azimuth 340° leeching oil.
- g) Approx 1 cup of oil noted on floor.
- h) hair line cracks leeching oil 1 ft west of Azimuth 330°.

④ The following conditions were noted @ Buttress 6:
- a) hairline cracks, bug holes and popouts
- b) Twenty-one (21) ~~abandoned~~ eap 11/5/13 expansion anchors were abandoned. One has bolt in the hole. These are aligned 8, 6 and 7 progressing west to east. One cavity, 3½" x 3½" x 2"d appears to be an abandoned expansion anchor.

⑤ The following conditions were noted between Buttress 6 and 5.
- a) leeching/efflorescence 7' west of Azimuth 310° ~~above~~ below electrical conduit mounted on well. eap 11/4/13
- b) hair line cracks located @ Azimuth 300° and east there of have 4 rows of leeching oil. Three are dry and one is wet.

⑤ Continued

c) Hairline cracks noted @ Azimuth 290° – two have oil (wet) leeching thru the wall. The other hairline crack the oil is dry.

⑥ Buttress 5 had the following conditions:

a) Minor hairline cracks < 0.010 and very minor leeching / efflorescence noted.

b) Oil / grease noted on wall and grease cap.

⑦ Between Buttress 5 and 4 the following conditions were noted:

a) Hairline cracks < 0.010 and very minor leeching / efflorescence.

⑧ Buttress 1 – the following conditions were noted:

a) minor bug holes

b) At Azimuth 40° white stains were observed emanating from a galvanized angle iron support (Info only)

c) very minor leeching / efflorescence noted approx 20" west side of tendons (between Buttress 1 and 2)

d) Hairline cracks leeching wet oil thru concrete noted 5' east of Azimuth 40°

e) Approx. 15 expansion anchors abandoned @ Azimuth 60°

f) Dry and wet oil leeching thru concrete was noted @ Azimuth 60°

g) Six (6) abandoned expansion anchor holes have been grouted.

⑨ Conditions noted @ Buttress 2
- a) very minor bugholes
- b) wet oil noted on grease caps and well

⑩ Conditions noted ~~@~~ RAP 11/5/13 between Buttress 2 and 3:
- a) minor popouts and bugholes
- b) hairline cracks < 0.010 noted @ Azimuths 90°; 100°; and 110°. Three were noted as having wet oil leeching thru concrete; the other has dry oil.

⑩ Conditions noted @ Buttress 3:
- a) bugholes
- b) one grout patch
- c) two cavities (just west of Buttress 3); One cavity 3" x 3/8" x 1/4"; the other 3" x 1" x 1/2".

Note: All the conditions noted above were previously reported and no apparent changes have occurred.

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## VISUAL EXAMINATION – GENERAL VISUAL EXAMINATION

Project TMI Unit 1 Surveillance # 40TH Year 2013
Inspection Area: West side of Buttress 3 - 305 elev Aux Bldg.
Equipment Used Flashlight and Test Chart S/N OC11-026

### Concrete Surface Condition

| Containment Surface (Findings and Description) | NI | IO | RI |
|---|---|---|---|
| Minor oil/grease staining | ☐ | ■ | ☐ |
| Minor bug holes | ☐ | ■ | ☐ |
| Brown stain on wall - origin unknown | ☐ | ■ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| Note: Walls are painted. | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |

***(Use as many sketch sheets (page 2) as needed to report any Recordable Indication (RI) or Information Only (IO) findings for the purpose of documentation and orientation.)***

Recordable Indications to be Examined For (PSC Procedure 8.4)

Leaching or Chemical Attack
Abrasion or Erosion Degradation
Popouts and Voids
Cracks
Scaling
Spalls
Corrosion Staining on the Concrete Surface
Exposed Reinforcing Steel
Surface Patches or Repairs

Deterioration of any Concrete Coating (if applicable)
Tendon Grease on Exposed Concrete Surfaces
Corrosion on Grease Cans, Bearing Plates or Anchorage
*Excessive Corrosion on Exposed Embedded Metal Surfaces
*Detached Embedments or Loose Bolting
*Indication of Degradation Due to Vibration
**(* The owner/agent must be notified for these noted conditions.)**

Comments and Disposition by Responsible Engineer ☒ Acceptable ☐ Unacceptable
Comments:

Inspector & Level: / II Date: 12/4/13
Responsible Engineer: P.E. Date: 19 Feb 14
ANII: Date: 4/15/14

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## VISUAL EXAMINATION – GENERAL VISUAL EXAMINATION

Project TMI Unit 1 Surveillance # 40TH Year 2013
Inspection Area: Buttress 4 West side Aux Bldg 305' elev
Equipment Used Flashlight and Test chart S/N OC11-026

### Concrete Surface Condition

| Containment Surface (Findings and Description) | NI | IO | RI |
|---|---|---|---|
| Minor brown staining | ☐ | ☒ | ☐ |
| Construction seams | ☐ | ☒ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| Note: walls are painted. | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |

***(Use as many sketch sheets (page 2) as needed to report any Recordable Indication (RI) or Information Only (IO) findings for the purpose of documentation and orientation.)***

### Recordable Indications to be Examined For (PSC Procedure 8.4)

- Leaching or Chemical Attack
- Abrasion or Erosion Degradation
- Popouts and Voids
- Cracks
- Scaling
- Spalls
- Corrosion Staining on the Concrete Surface
- Exposed Reinforcing Steel
- Surface Patches or Repairs
- Deterioration of any Concrete Coating (if applicable)
- Tendon Grease on Exposed Concrete Surfaces
- Corrosion on Grease Cans, Bearing Plates or Anchorage
- *Excessive Corrosion on Exposed Embedded Metal Surfaces
- *Detached Embedments or Loose Bolting
- *Indication of Degradation Due to Vibration

**(* The owner/agent must be notified for these noted conditions.)**

Comments and Disposition by Responsible Engineer ☒ Acceptable ☐ Unacceptable
Comments:

Inspector & Level: / II Date: 12/4/13
Responsible Engineer: P.E. Date: 19 FEB 14
ANII: Date: 4/15/14

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# VISUAL EXAMINATION – GENERAL VISUAL EXAMINATION

Project TMI Unit 1 Surveillance # 40TH Year 2013
Inspection Area: Buttress 4 281' elev both sides accessible
Equipment Used Flashlight and Test Chart S/N OC11-026

## Concrete Surface Condition

| Containment Surface (Findings and Description) | NI | IO | RI |
|---|---|---|---|
| Construction seams | ☐ | ☒ | ☐ |
| Minor leeching / efflorescence on wall | ☐ | ☒ | ☐ |
| Abandoned expansion anchor holes | ☐ | ☒ | ☐ |
| Abandoned expansion anchors | ☐ | ☒ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| Note: Buttress not painted - Containment | ☐ | ☐ | ☐ |
| walls are painted. Examination limited | ☐ | ☐ | ☐ |
| due to piping, conduit, junction boxes etc | ☐ | ☐ | ☐ |
| which obscured vision. | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |

***(Use as many sketch sheets (page 2) as needed to report any Recordable Indication (RI) or Information Only (IO) findings for the purpose of documentation and orientation.)***

Recordable Indications to be Examined For (PSC Procedure 8.4)

Leaching or Chemical Attack
Abrasion or Erosion Degradation
Popouts and Voids
Cracks
Scaling
Spalls
Corrosion Staining on the Concrete Surface
Exposed Reinforcing Steel
Surface Patches or Repairs

Deterioration of any Concrete Coating (if applicable)
Tendon Grease on Exposed Concrete Surfaces
Corrosion on Grease Cans, Bearing Plates or Anchorage
*Excessive Corrosion on Exposed Embedded Metal Surfaces
*Detached Embedments or Loose Bolting
*Indication of Degradation Due to Vibration
**(* The owner/agent must be notified for these noted conditions.)**

Comments and Disposition by Responsible Engineer ☒ Acceptable ☐ Unacceptable
Comments:

Inspector & Level: II Date: 12/4/13
Responsible Engineer: , P.E. Date: 19 FEB 14
ANII: Date: 4/15/14

## ATTACHMENT 4
## ASME IWL (Class CC) Containment Concrete Detailed or General Visual Examination
## NDE Report

Page 1 of ~~1~~ 2 RaP 12/3/13

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Station: | TMI | | Unit: | 1 | Date: | 12/3/13 | Report No: | | |
| System: | Post Tendons | Component: | Buttress 3 (outside) | | | | WO No(s).: | R2193606 | |
| Location: | Building: Cont. | Elev.: | N/A | Col.: | N/A | Row: | N/A | Azimuth/Radius: | N/A |

Exam Type: ☒ Detailed Visual * ☐ General Visual
Type Of Exam: ☒ Direct ☐ Remote
Matl. Type: Concrete
Design Drawing(s): TMI-0014/1
Visual Aids: Test Chart SN 0C11-026,
Surface: ☒ OD ☐ ID
Surface / Components Coated: ☐ YES ☒ NO
Illumination Used: Natural lighting - Sunlight

| Attribute | RI | NRI | IO | Explanation / Comments |
|---|---|---|---|---|
| Cracks (Characterize and Size) | | | ☒ | Cracking at Construction seams |
| Exposed Reinforcing Steel | | | | |
| Exposed Metallic Items (Other) | | | | |
| Evidence Of Grease Leakage | | | | |
| Evidence Of Moisture | | | | |
| Leaching Or Chemical Attack | | | | |
| Settlements Or Deflections | | | | |
| Degraded Patches or Repairs | | | ☒ | At Construction Seams |
| Popouts, Voids, Honeycomb | | | | |
| Spalls | | | | |
| Cold Joint Lines | | | | |
| Corrosion Staining | | | | |
| Scaling / Dusting | | | | |
| Coating Deterioration | | | | |
| Abrasion, Cavitation, Wear | | | | |
| Air Voids / Bug Holes | | | | |
| Efflorescence | | | | |
| Other (Explain) | ☒ | | | Embed plate pulled away from face of concrete |

Results Legend: RI - Recordable Indication NRI - No Recordable Indications IO - Information Only

Supplemental Information: ☒ Yes ☐ No ☒ Sketch ☐ Photo ☐ Video ☐ Other (Describe):

Examiner: RaPy Level: II Date: 12/3/13

Further Evaluation Required: ☒ Yes ☐ No

Additional Actions: RE-EXAMINE & DOCUMENT ADDL. DETAIL AT EMBED PLATE RI

(Action Request, Work Order, Issue Report, etc. initiated for Corrective Action) Suspect Areas shall be dispositioned by a Responsible Engineer

Reviewer: , P.E., RESPONSIBLE ENGINEER Date: 1/16/14

ANII: Date: 4/15/14

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* Initial examination was performed remotely with the aid of binoculars. Locations requiring direct VT-1C were performed on suspect Locations as noted above RaP 12/3/13

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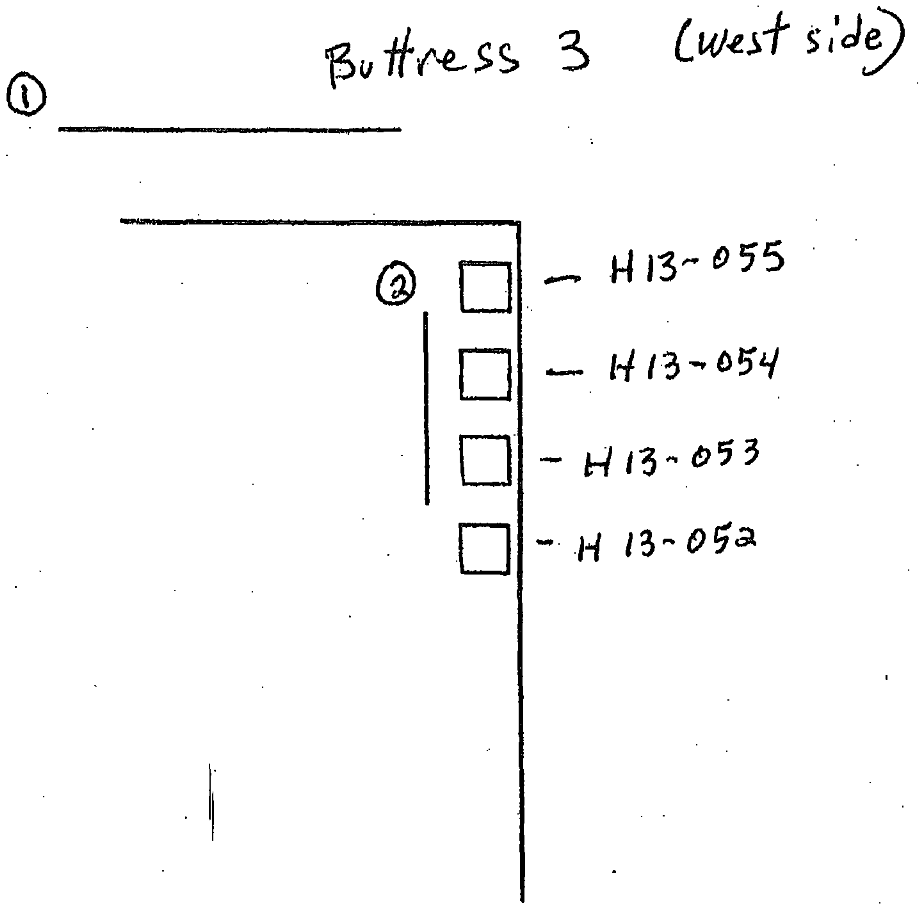
| | |
|---|---|
| Project: | TMI 2013 40TH YEAR TENDON SURVEILLANCE |
| Inspection Area: | Buttress 3 |

1. Sketch or attach photographs to provide documentation or additional details as necessary.



Comments:
① cracking and grout degradation @ construction seam
② Embed is pulled away from face of concrete

| | | | | | |
|---|---|---|---|---|---|
| QC Inspector: | RAP | Level: | II | Date: | 12/3/13 |

20 SQ 8.4.TMI.13 ISI

## ATTACHMENT 4
## ASME IWL (Class CC) Containment Concrete Detailed or General Visual Examination NDE Report
Page 1 of 1

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Station: | TMI | | | Unit: | 1 | Date: | 11/15/13 | Report No: | |
| System: | Cont. Tendons | Component: | Buttress 1 (Outside) | | | | | WO No(s).: | R2193606 |
| Location: | Building: Cont. | Elev.: | N/A | Col.: | N/A | Row: | N/A | Azimuth/Radius: | N/A |

Exam Type: ☐ Detailed Visual ☒ General Visual
Type Of Exam: ☐ Direct ☒ Remote
Matl. Type: Concrete
Design Drawing(s): TMI-0014/1
Visual Aids: Binoculars
Surface: ☒ OD ☐ ID
Surface / Components Coated: ☐ YES ☒ NO
Illumination Used: Sunlight / binoculars

| Attribute | RI | NRI | IO | Explanation / Comments |
|---|---|---|---|---|
| Cracks (Characterize and Size) | | | ☒ | Hairline - as previously reported |
| Exposed Reinforcing Steel | | | | |
| Exposed Metallic Items (Other) | | | | |
| Evidence Of Grease Leakage | | | | |
| Evidence Of Moisture | | | | |
| Leaching Or Chemical Attack | | | | |
| Settlements Or Deflections | | | | |
| Degraded Patches or Repairs | | | ☒ | As previously reported |
| [✓ Popouts] Voids, Honeycomb | | | ☒ | and bugholes - minor - As previously reported |
| Spalls | | | ☒ | At embed plates - slight |
| Cold Joint Lines | | | | |
| Corrosion Staining | | | | |
| Scaling / Dusting | | | | |
| Coating Deterioration | | | | |
| Abrasion, Cavitation, Wear | | | | |
| Air Voids / Bug Holes | | | | |
| Efflorescence | | | | |
| Other (Explain) | | | ☒ | Abandoned expansion anchors |

Results Legend: RI - Recordable Indication NRI - No Recordable Indications IO - Information Only

Supplemental Information: ☐ Yes ☒ No ☐ Sketch ☐ Photo ☐ Video ☐ Other (Describe):

Examiner: Level: II Date: 11/15/13

Further Evaluation Required: ☐ Yes ☒ No

Additional Actions:

(Action Request, Work Order, Issue Report, etc. Initiated for Corrective Action) Suspect Areas shall be dispositioned by a Responsible Engineer

Reviewer: , P.E., RESPONSIBLE ENGINEER Date: 19 Feb 14

ANII: Date: 4/15/14

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## ATTACHMENT 4
## ASME IWL (Class CC) Containment Concrete Detailed or General Visual Examination
## NDE Report
Page 1 of 1

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Station: | TMI | | Unit: | 1 | Date: | 11/15/13 | | Report No: | |
| System: | Cont Tendons | Component: | Buttress 2 | | | | | WO No(s).: | R2193606 |
| Location: | Building: Cont. | Elev.: | N/A | Col.: | N/A | Row: | N/A | Azimuth/Radius: | N/A |

Exam Type: ☐ Detailed Visual ▨ General Visual
Type Of Exam: ☐ Direct ▨ Remote
Matl. Type: Concrete
Design Drawing(s) TMI-0014/1
Visual Aids: Binoculars
Surface: ▨ OD ☐ ID
Surface / Components Coated: ☐ YES ▨ NO
Illumination Used Natural lighting - Sunlight

| Attribute | RI | NRI | IO | Explanation / Comments |
|---|---|---|---|---|
| Cracks (Characterize and Size) | | | ▨ | Hairline * |
| Exposed Reinforcing Steel | | | | |
| Exposed Metallic Items (Other) | | | ▨ | Embed plates * |
| Evidence Of Grease Leakage | | | | |
| Evidence Of Moisture | | | | |
| Leaching Or Chemical Attack | | | | |
| Settlements Or Deflections | | | | |
| Degraded Patches or Repairs | | | ▨ | |
| [✓ Popouts] / Voids, Honeycomb | | | ▨ | And bugholes - minor * |
| Spalls | | | | |
| Cold Joint Lines | | | | |
| Corrosion Staining | | | | |
| Scaling / Dusting | | | | |
| Coating Deterioration | | | | |
| Abrasion, Cavitation, Wear | | | | |
| Air Voids / Bug Holes | | | | |
| Efflorescence | | | | |
| Other (Explain) | | | ▨ | Abandoned expansion anchors |

Results Legend: RI - Recordable Indication NRI - No Recordable Indications IO - Information Only

Supplemental Information: ☐ Yes ▨ No ☐ Sketch ☐ Photo ☐ Video ☐ Other (Describe):

Examiner: R A P Level: II Date: 11/15/13
Further Evaluation Required: ☐ Yes ☒ No * Previously reported - essentially remain the same
Additional Actions:
(Action Request, Work Order, Issue Report, etc. Initiated for Corrective Action) Suspect Areas shall be dispositioned by a Responsible Engineer
Reviewer: , P.E., RESPONSIBLE ENGINEER Date: 19 Feb 14
ANII: Date: 4/15/14

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# ATTACHMENT 4
# ASME IWL (Class CC) Containment Concrete Detailed or General Visual Examination NDE Report
Page 1 of 1

Station: TMI | Unit: 1 | Date: 11/18/13 | Report No:

System: Cont. Tendons | Component: Buttress 3 (outside) | WO No(s).: R2153606

Location: | Building: Cont. | Elev.: N/A | Col.: N/A | Row: N/A | Azimuth/Radius: N/A

Exam Type: ☐ Detailed Visual ☒ General Visual | Type Of Exam: ☐ Direct ☒ Remote | Mat'l. Type: Concrete

Design Drawing(s) TMI-0014/1 | Visual Aids: Binoculars

Surface: ☒ OD ☐ ID | Surface / Components Coated: ☐ YES ☒ NO

Illumination Used Natural lighting - Sunlight

| Attribute | RI | NRI | IO | Explanation / Comments |
|---|---|---|---|---|
| Cracks (Characterize and Size) | | | ☒ | Hairline - previously reported |
| Exposed Reinforcing Steel | | | | |
| Exposed Metallic Items (Other) | | | ☒ | Minor corrosion @ embed plates |
| Evidence Of Grease Leakage | | | | |
| Evidence Of Moisture | | | | |
| Leaching Or Chemical Attack | | | | |
| Settlements Or Deflections | | | | |
| Degraded Patches or Repairs | | | ☒ | As previously reported |
| Popouts, Voids, Honeycomb | | | ☒ | Minor popouts / bugholes |
| Spalls | | | | |
| Cold Joint Lines | | | | |
| Corrosion Staining | | | | |
| Scaling / Dusting | | | | |
| Coating Deterioration | | | | |
| Abrasion, Cavitation, Wear | | | | |
| Air Voids / Bug Holes | | | | |
| Efflorescence | | | | |
| Other (Explain) | | | ☒ | Abandoned expansion anchors |

Results Legend: RI - Recordable Indication NRI - No Recordable Indications IO - Information Only

Supplemental Information: ☐ Yes ☒ No ☐ Sketch ☐ Photo ☐ Video ☐ Other (Describe):

Examiner: Level: II Date: 11/18/13

Further Evaluation Required: ☐ Yes ☒ No

Additional Actions:

(Action Request, Work Order, Issue Report, etc. Initiated for Corrective Action) Suspect Areas shall be dispositioned by a Responsible Engineer

Reviewer: , P.E., RESPONSIBLE ENGINEER Date: 19 Feb 14

ANII: Date: 4/15/14

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## ATTACHMENT 4
## ASME IWL (Class CC) Containment Concrete Detailed or General Visual Examination NDE Report
**Page 1 of 1**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Station: | TMI | | Unit: | 1 | Date: 11/13/14 | Report No: | |
| System: Cont Tendons | Component: | Buttress 4 (outside) | | | | WO No(s).: | R2193606 |
| Location: | Building: Cont. | Elev.: N/A | Col.: N/A | Row: N/A | | Azimuth/Radius: | N/A |

Exam Type: ☐ Detailed Visual ☒ General Visual
Type Of Exam: ☐ Direct ☒ Remote
Matl. Type: Concrete
Design Drawing(s): TMI-0014/1
Visual Aids: Binoculars
Surface: ☒ OD ☐ ID
Surface / Components Coated: ☐ YES ☒ NO
Illumination Used: Natural lighting - Sunlight

| Attribute | RI | NRI | IO | Explanation / Comments |
|---|---|---|---|---|
| Cracks (Characterize and Size) | | | ☒ | Hairline |
| Exposed Reinforcing Steel | | | | |
| Exposed Metallic Items (Other) | | | ☒ | Category A corrosion - embed plates |
| Evidence Of Grease Leakage | | | | |
| Evidence Of Moisture | | | | |
| Leaching Or Chemical Attack | | | | |
| Settlements Or Deflections | | | | |
| Degraded Patches or Repairs | | | ☒ | Previously reported |
| Popouts, Voids, Honeycomb | | | | |
| Spalls | | | | |
| Cold Joint Lines | | | | |
| Corrosion Staining | | | | |
| Scaling / Dusting | | | | |
| Coating Deterioration | | | | |
| Abrasion, Cavitation, Wear | | | | |
| Air Voids / Bug Holes | | | | |
| Efflorescence | | | | |
| Other (Explain) | | | ☒ | Bugholes - minor |

Results Legend: RI - Recordable Indication NRI - No Recordable Indications IO - Information Only

Supplemental Information: ☐ Yes ☒ No ☐ Sketch ☐ Photo ☐ Video ☐ Other (Describe):

Examiner: ______________ Level: II Date: 11/13/13

Further Evaluation Required: ☐ Yes ☒ No

Additional Actions: ______________

(Action Request, Work Order, Issue Report, etc. initiated for Corrective Action) Suspect Areas shall be dispositioned by a Responsible Engineer

Reviewer: , P.E., RESPONSIBLE ENGINEER Date: 19 Feb 14

ANII: ______________ Date: 4/15/14

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## ATTACHMENT 4
## ASME IWL (Class CC) Containment Concrete Detailed or General Visual Examination
## NDE Report

RAP 12/3/13
**Page 1 of ~~1~~ 2**

Station: TMI  Unit: 1  Date: 12/3/13  Report No:
System: Cont. Tendons  Component: Buttress 4 and adjacent areas  WO No(s).: R2193606
Location: Building: Cont.  Elev.: N/A  Col.: N/A  Row: N/A  Azimuth/Radius: N/A
Exam Type: ☒ Detailed Visual  * ☐ General Visual  Type Of Exam: ☒ Direct ☐ Remote  Matl. Type: Concrete
Design Drawing(s) TMI-0014/1  Visual Aids: Test Chart OC11-026
Surface: ☒ OD ☐ ID  Surface / Components Coated: ☐ YES ☒ NO
Illumination Used Natural lighting - Sunlight

| Attribute | RI | NRI | IO | Explanation / Comments |
|---|---|---|---|---|
| Cracks (Characterize and Size) | | | | |
| Exposed Reinforcing Steel | | | | |
| Exposed Metallic Items (Other) | ☒ | | | Embed plate flaking |
| Evidence Of Grease Leakage | | | | |
| Evidence Of Moisture | | | | |
| Leaching Or Chemical Attack | | | | |
| Settlements Or Deflections | | | | |
| Degraded Patches or Repairs | | | ☒ | At construction seams and embed plates |
| Popouts, Voids, Honeycomb | | | | |
| Spalls | | | ☒ | And scaling at face of ring girder (random) |
| Cold Joint Lines | | | | |
| Corrosion Staining | | | | |
| Scaling / Dusting | | | | |
| Coating Deterioration | | | | |
| Abrasion, Cavitation, Wear | | | | |
| Air Voids / Bug Holes | | | | |
| Efflorescence | | | | |
| Other (Explain) | ☒ | | | Embed plates pulled away from face of concrete |

Results Legend: RI - Recordable Indication NRI - No Recordable Indications IO - Information Only

Supplemental Information: ☐ Yes ☐ No ☒ Sketch ☐ Photo ☐ Video ☐ Other (Describe):

Examiner: RAP  Level: II  Date: 12/3/13

Further Evaluation Required: ☒ Yes ☐ No

Additional Actions: RE-EXAMINE & DOCUMENT ADDL. DETAIL AT EMBED PLATE RI'S

(Action Request, Work Order, Issue Report, etc. initiated for Corrective Action) Suspect Areas shall be dispositioned by a Responsible Engineer

Reviewer: , P.E., RESPONSIBLE ENGINEER  Date: 19 FEB 14

ANII:  Date: 4/15/14

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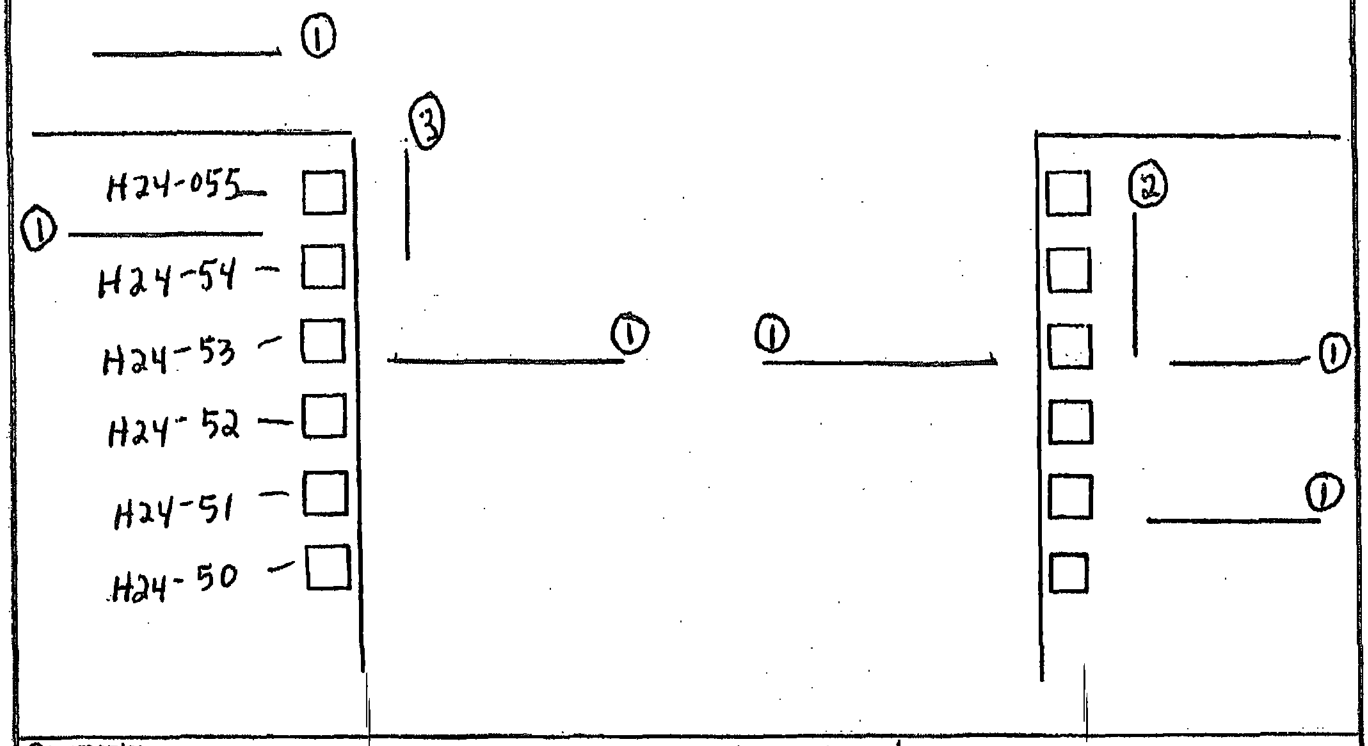
* Initial examination was performed remotely with the aid of binoculars. Locations requiring direct VT-1C were performed on suspect areas/locations as noted above. RAP 12/3/13

**CONCRETE EXTERIOR**
**SKETCH SHEET 8.4**
09/03/13
Page 1 of 1
Revision 0

Project: TMI 2013 40TH YEAR TENDON SURVEILLANCE

Inspection Area: Buttress 4

1. Sketch or attach photographs to provide documentation or additional details as necessary.



Comments:
① Construction seam cracks - degraded patches
② Embed protruding from face
③ Embed flaking

QC Inspector:

Level: II

Date: 12/3/13

## ATTACHMENT 4
## ASME IWL (Class CC) Containment Concrete Detailed or General Visual Examination NDE Report
Page 1 of 1

Station: TMI | Unit: 1 | Date: 10/30/13 | Report No:
System: Cont Tendons | Component: Containment Bld Buttress 5 * | WO No(s).: R2193606
Location: | Building: Cont. | Elev.: N/A | Col.: N/A | Row: N/A | Azimuth/Radius: N/A
Exam Type: ☐ Detailed Visual ☒ General Visual | Type Of Exam: ☐ Direct ☒ Remote | Matl. Type: Concrete
Design Drawing(s) TMI1-0014/1 | Visual Aids: Binoculars
Surface: ☒ OD ☐ ID | Surface / Components Coated: ☐ YES ☒ NO
Illumination Used Natural lighting - Sunlight

| Attribute | RI | NRI | IO | Explanation / Comments |
|---|---|---|---|---|
| Cracks (Characterize and Size) | | | ☒ | Small cracks noted <0.010 |
| Exposed Reinforcing Steel | | | | |
| Exposed Metallic Items (Other) | | | ☒ | Exposed embed plates noted - minor oxidation<br>no degradation |
| Evidence Of Grease Leakage | | | | |
| Evidence Of Moisture | | | | |
| Leaching Or Chemical Attack | | | | |
| Settlements Or Deflections | | | | |
| Degraded Patches or Repairs | | | ☒ | Grout patches degraded |
| Popouts, Voids, Honeycomb | | | | |
| Spalls | | | | |
| Cold Joint Lines | | | | * Exam performed outside |
| Corrosion Staining | | | | |
| Scaling / Dusting | | | | |
| Coating Deterioration | | | | |
| Abrasion, Cavitation, Wear | | | | |
| Air Voids / Bug Holes | | | | |
| Efflorescence | | | | |
| Other (Explain) | | | ☒ | Bugholes and oil stains noted |

Results Legend: RI - Recordable Indication NRI - No Recordable Indications IO - Information Only

Supplemental Information: ☐ Yes ☒ No ☐ Sketch ☐ Photo ☐ Video ☐ Other (Describe):

Examiner: R a P Level: II Date: 10/31/13

Further Evaluation Required: ☐ Yes ☒ No

Additional Actions:

(Action Request, Work Order, [illegible] Report, etc. initiated for Corrective Action) Suspect Areas shall be dispositioned by a Responsible Engineer

Reviewer: , P.E, RESPONSIBLE ENGINEER Date: 19 FEB 14

ANII: Date: 4/15/14

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## ATTACHMENT 4
## ASME IWL (Class CC) Containment Concrete Detailed or General Visual Examination NDE Report
Page 1 of 1

Station: TMI | Unit: 1 | Date: 11/12/13 | Report No:
System: Con Tendons | Component: Buttress 6 (outside) | WO No(s).: R2193606
Location: | Building: Cont. | Elev.: N/A | Col.: N/A | Row: N/A | Azimuth/Radius: N/A
Exam Type: ☐ Detailed Visual ☒ General Visual | Type Of Exam: ☐ Direct ☒ Remote | Matl. Type: Concrete
Design Drawing(s) TMI-0014/1 | Visual Aids: Binoculars
Surface: ☒ OD ☐ ID | Surface / Components Coated: ☐ YES ☒ NO
Illumination Used Natural lighting - Sunlight

| Attribute | RI | NRI | IO | Explanation / Comments |
|---|---|---|---|---|
| Cracks (Characterize and Size) | | | ☒ | Hairline |
| Exposed Reinforcing Steel | | | | |
| Exposed Metallic Items (Other) | | | ☒ | Abandoned expansion anchors |
| Evidence Of Grease Leakage | | | | |
| Evidence Of Moisture | | | | |
| Leaching Or Chemical Attack | | | | |
| Settlements Or Deflections | | | | |
| Degraded Patches or Repairs | | | ☒ | Previously reported |
| Popouts, Voids, Honeycomb | | | ☒ | Minor popouts and bugholes |
| Spalls | | | | |
| Cold Joint Lines | | | | |
| Corrosion Staining | | | | |
| Scaling / Dusting | | | | |
| Coating Deterioration | | | | |
| Abrasion, Cavitation, Wear | | | | |
| Air Voids / Bug Holes | | | | |
| Efflorescence | | | | |
| Other (Explain) | | | | |

Results Legend: RI - Recordable Indication NRI - No Recordable Indications IO - Information Only

Supplemental Information: ☐ Yes ☒ No ☐ Sketch ☐ Photo ☐ Video ☐ Other (Describe):

Examiner: ______ Level: II Date: 11/12/13

Further Evaluation Required: ☐ Yes ☒ No

Additional Actions: ______

(Action Request, Work Order, Sole Report, etc. Initiated for Corrective Action) Suspect Areas shall be dispositioned by a Responsible Engineer

Reviewer: , P.E., RESPONSIBLE ENGINEER Date: 19 Feb 14

ANII: ______ Date: 4/15/14

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## ATTACHMENT 4
## ASME IWL (Class CC) Containment Concrete Detailed or General Visual Examination NDE Report
Page 1 of 1

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Station: | TMI | Unit: | 1 | Date: | 11/12/13 | Report No: | |
| System: | Cont Tendons | Component: | Containment Dome | | | WO No(s).: | R2193606 |
| Location: | Building: Cont. | Elev.: | N/A | Col.: | N/A | Row: N/A | Azimuth/Radius: N/A |
| Exam Type: ☐ Detailed Visual<br>☒ General Visual | | Type Of Exam: ☐ Direct<br>☒ Remote | | Matl. Type: | Concrete | | |
| Design Drawing(s) | TMI-0014/1 | | | Visual Aids: | Binoculars | | |
| Surface: ☒ OD ☐ ID | | | | Surface / Components Coated: ☐ YES ☒ NO | | | |
| Illumination Used | Natural lighting - Sunlight | | | | | | |

| Attribute | RI | NRI | IO | Explanation / Comments |
|---|---|---|---|---|
| Cracks (Characterize and Size) | | | ■ | Minor cracking ① |
| Exposed Reinforcing Steel | | | ■ | Water seepage on dome embeds ① |
| Exposed Metallic Items (Other) | | | | |
| Evidence Of Grease Leakage | | | | |
| Evidence Of Moisture | | | | |
| Leaching Or Chemical Attack | | | | |
| Settlements Or Deflections | | | | |
| Degraded Patches or Repairs | | | ■ | ① |
| Popouts, Voids, Honeycomb | | | | |
| Spalls | | | ■ | At dome trench ① |
| Cold Joint Lines | | | | |
| Corrosion Staining | | | ■ | Angle iron supports exhibit rust |
| Scaling / Dusting | | | | |
| Coating Deterioration | | | | |
| Abrasion, Cavitation, Wear | | | | |
| Air Voids / Bug Holes | | | | |
| Efflorescence | | | | |
| Other (Explain) | | | ■ | Rain has exposed aggregate |

Results Legend: RI - Recordable Indication NRI - No Recordable Indications IO – Information Only

Supplemental Information: ☐ Yes ☒ No ☐ Sketch ☐ Photo ☐ Video ☐ Other (Describe):

Examiner: R a Py Level: II Date: 11/12/13

Further Evaluation Required: ☐ Yes ☒ No

Additional Actions:

(Action Request, Work Order, Issue Report, etc. initiated for Corrective Action) Suspect Areas shall be dispositioned by a Responsible Engineer

Reviewer: , P.E., RESPONSIBLE ENGINEER Date: 19 Feb 14

ANII: Date: 4/15/14

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① These conditions were previously reported, no changes were noted.

## ATTACHMENT 4
## ASME IWL (Class CC) Containment Concrete Detailed or General Visual Examination NDE Report
Page 1 of 1

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Station: | TMI | Unit: | 1 | Date: | 11/18/13 | Report No: | |
| System: | Cont Tendons | Component: | Behind missle shield | | | WO No(s).: | R2193606 |

Location: Building: Cont. Elev.: N/A Col.: N/A Row: N/A Azimuth/Radius: N/A

Exam Type: ☐ Detailed Visual ☒ General Visual Type Of Exam: ☒ Direct ☒ Remote Matl. Type: Concrete

Design Drawing(s) TMI-0014/1 Visual Aids: binoculars/Test Chart SN0011-026

Surface: ☒ OD ☐ ID Surface / Components Coated: ☐ YES ☒ NO

Illumination Used Natural lighting - Sunlight

| Attributs | RI | NRI | IO | Explanation / Comments |
|---|---|---|---|---|
| Cracks (Characterize and Size) | | | ■ | hairline |
| Exposed Reinforcing Steel | | | | |
| Exposed Metallic Items (Other) | | | ■ | Abandoned expansion anchors |
| Evidence Of Grease Leakage | | | | |
| Evidence Of Moisture | | | | |
| Leaching Or Chemical Attack | | | ■ | Minor in several locations |
| Settlements Or Deflections | | | | |
| Degraded Patches or Repairs | | | ■ | Minor |
| [✓ Popouts] /Voids, Honeycomb | | | ■ | and bug holes - minor |
| [✓ Spalls] | | | ■ | At repair areas |
| Cold Joint Lines | | | | |
| Corrosion Staining | | | | |
| Scaling / Dusting | | | ■ | Minor @ several locations |
| Coating Deterioration | | | | |
| Abrasion, Cavitation, Wear | | | | |
| Air Voids / Bug Holes | | | | |
| Efflorescence | | | ■ | Minor at several locations |
| Other (Explain ) | | | | |

Results Legend: RI - Recordable Indication NRI - No Recordable Indications IO - Information Only

Supplemental Information : ☐ Yes ☒ No ☐ Sketch ☐ Photo ☐ Video ☐ Other (Describe):

Examiner: Level: II Date: 11/18/13

Further Evaluation Required: ☐ Yes ☒ No

Additional Actions:

(Action Request, Work Order, Issue Report, etc. Initiated for Corrective Action) Suspect Areas shall be dispositioned by a Responsible Engineer

Reviewer: P.E., RESPONSIBLE ENGINEER Date: 19 Feb 14

ANII: Date: 4/15/14

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## ATTACHMENT 4
## ASME IWL (Class CC) Containment Concrete Detailed or General Visual Examination NDE Report
### Page 1 of 1

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Station:** | TMI | | | **Unit:** | 1 | **Date:** | 11/15/13 | **Report No:** | |
| **System:** | Cont Tendons | **Component:** | *Between Buttress 2 and 1 | | | | | **WO No(s).:** | R2193606 |
| **Location:** | **Building:** Cont. | **Elev.:** | N/A | **Col.:** | N/A | **Row:** | N/A | **Azimuth/Radius:** | N/A |
| **Exam Type:** ☐ Detailed Visual ☒ General Visual | | **Type Of Exam:** ☐ Direct ☒ Remote | | | **Matl. Type:** | Concrete | | | |
| **Design Drawing(s)** | TMI-0014/1 | | | **Visual Aids:** | Binoculars | | | | |
| **Surface:** ☒ OD ☐ ID | | | | **Surface / Components Coated:** ☐ YES ☒ NO | | | | | |
| **Illumination Used** | Natural lighting - Sunlight | | | | | | | | |

| Attribute | RI | NRI | IO | Explanation / Comments |
|---|---|---|---|---|
| Cracks (Characterize and Size) | | | ☒ | Hairline |
| Exposed Reinforcing Steel | | | ☒ | Embed plate |
| Exposed Metallic Items (Other) | | | | |
| Evidence Of Grease Leakage | | | | |
| Evidence Of Moisture | | | | |
| Leaching Or Chemical Attack | | | ☒ | Very minor |
| Settlements Or Deflections | | | | |
| Degraded Patches or Repairs | | | ☒ | |
| [✓ Popouts] Voids, Honeycomb | | | ☒ | And bugholes |
| Spalls | | | ☒ | At embed plates (minor) * |
| Cold Joint Lines | | | | |
| Corrosion Staining | | | | |
| Scaling / Dusting | | | | |
| Coating Deterioration | | | | * Exam performed outside |
| Abrasion, Cavitation, Wear | | | | |
| Air Voids / Bug Holes | | | | |
| Efflorescence | | | | |
| Other (Explain) | | | | |
| **Results Legend:** | RI - Recordable Indication NRI - No Recordable Indications IO – Information Only | | | |

**Supplemental Information:** ☐ Yes ☒ No ☐ Sketch ☐ Photo ☐ Video ☐ Other (Describe):

**Examiner:** K a P **Level:** II **Date:** 11/15/13

**Further Evaluation Required:** ☐ Yes ☒ No

**Additional Actions:** ______

(Action Request, Work Order, Issue Report, etc. initiated for Corrective Action) Suspect Areas shall be dispositioned by a Responsible Engineer

**Reviewer:** , P.E., RESPONSIBLE ENGINEER **Date:** 19Feb14

**ANII:** **Date:** 4/15/14

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## ATTACHMENT 4
## ASME IWL (Class CC) Containment Concrete Detailed or General Visual Examination NDE Report
Page 1 of 1

Station: TMI ✱ Unit: 1 Date: 11/15/13 Report No:
System: Cont. Tendons Component: Between Buttress 3 and 2 WO No(s).: R2193606
Location: Building: Cont. Elev.: N/A Col.: N/A Row: N/A Azimuth/Radius: N/A
Exam Type: ☐ Detailed Visual ☑ General Visual Type Of Exam: ☐ Direct ☑ Remote Matl. Type: Concrete
Design Drawing(s) TMI-0014/1 Visual Aids: Binoculars
Surface: ☑ OD ☐ ID Surface / Components Coated: ☐ YES ☑ NO
Illumination Used Sunlight - Natural lighting

| Attribute | RI | NRI | IO | Explanation / Comments |
|---|---|---|---|---|
| Cracks (Characterize and Size) | | | ■ | Hairline ✱ |
| Exposed Reinforcing Steel | | | | |
| Exposed Metallic Items (Other) | | | ■ | Embed plate ✱ |
| Evidence Of Grease Leakage | | | | |
| Evidence Of Moisture | | | | |
| Leaching Or Chemical Attack | | | ■ | Very Slight ✱ |
| Settlements Or Deflections | | | | |
| Degraded Patches or Repairs | | | ■ | Grout patches ✱ |
| Popouts, Voids, Honeycomb | | | | |
| Spalls | | | ■ | at embed plates ✱ |
| Cold Joint Lines | | | | |
| Corrosion Staining | | | | |
| Scaling / Dusting | | | | |
| Coating Deterioration | | | | ✱ Exam performed outside |
| Abrasion, Cavitation, Wear | | | | |
| Air Voids / Bug Holes | | | | |
| Efflorescence | | | | |
| Other (Explain) | | | ■ | Abandoned expansion anchors |

Results Legend: RI - Recordable Indication NRI - No Recordable Indications IO – Information Only

Supplemental Information: ☐ Yes ☑ No ☐ Sketch ☐ Photo ☐ Video ☐ Other (Describe):

Examiner: R a Pey Level: II Date: 11/15/13
Further Evaluation Required: ☐ Yes ☒ No ✱ Previously reported condition essentially the same
Additional Actions:
(Action Request, Work Order, Issue Report, etc. Initiated for Corrective Action) Suspect Areas shall be dispositioned by a Responsible Engineer
Reviewer: , P.E. RESPONSIBLE ENGINEER Date: 19 FEB 14
ANII: Date: 4/15/14

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## ATTACHMENT 4
## ASME IWL (Class CC) Containment Concrete Detailed or General Visual Examination NDE Report
Page 1 of 1

**Station:** TMI **Unit:** 1 **Date:** 11/12/13 **Report No:**

**System:** Cont Tendons **Component:** Between Buttress 3-4-outside **WO No(s).:** R2193606

**Location:** **Building:** Cont **Elev.:** N/A **Col.:** N/A **Row:** N/A **Azimuth/Radius:** N/A

**Exam Type:** ☐ Detailed Visual ☒ General Visual **Type Of Exam:** ☐ Direct ☒ Remote **Matl. Type:** Concrete

**Design Drawing(s)** TMI-0014/1 **Visual Aids:** Binoculars

**Surface:** ☒ OD ☐ ID **Surface / Components Coated:** ☐ YES ☒ NO

**Illumination Used** Natural lighting - Sunlight

| Attribute | RI | NRI | IO | Explanation / Comments |
|---|---|---|---|---|
| Cracks (Characterize and Size) | | | ☒ | Hairline ① |
| Exposed Reinforcing Steel | | | | |
| Exposed Metallic Items (Other) | | | ☒ | Embed plates - A corrosion |
| Evidence Of Grease Leakage | | | | |
| Evidence Of Moisture | | | | |
| Leaching Or Chemical Attack | | | | |
| Settlements Or Deflections | | | | |
| Degraded Patches or Repairs | | | ☒ | As previously reported |
| Popouts, Voids, Honeycomb | | | ☒ | Minor popouts / bugholes |
| Spalls | | | ☒ | At ring girder - minor |
| Cold Joint Lines | | | | |
| Corrosion Staining | | | | |
| Scaling / Dusting | | | | |
| Coating Deterioration | | | | |
| Abrasion, Cavitation, Wear | | | | |
| Air Voids / Bug Holes | | | | |
| Efflorescence | | | ☒ | Minor leeching / efflorescence |
| Other (Explain) | | | ☒ | Exposed expansion anchors (abandoned) |

**Results Legend:** RI - Recordable Indication NRI - No Recordable Indications IO - Information Only

**Supplemental Information :** ☐ Yes ☐ No ☐ Sketch ☐ Photo ☐ Video ☐ Other (Describe):

**Examiner:** Ra Pry **Level:** II **Date:** 11/13/13

**Further Evaluation Required:** ☐ Yes ☒ No

**Additional Actions:**

(Action Request, Work Order, Issue Report, etc. initiated for Corrective Action) Suspect Areas shall be dispositioned by a Responsible Engineer

**Reviewer:** , P.E., RESPONSIBLE ENGINEER **Date:** 19 Feb 14

**ANII:** **Date:** 4/15/14

Page 1 of 1

① cracks above Fuel Handling Bldg remain unchanged from previous report.

## ATTACHMENT 4
## ASME IWL (Class CC) Containment Concrete Detailed or General Visual Examination NDE Report
Page 1 of 1

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Station: | TMI | Unit: | 1 | Date: | 11/14/13 | Report No: | |
| System: | Cont Tendons | Component: | Between Buttress 4-5 (outside) | | | WO No(s).: | R2193606 |

Location: Building: Cont. Elev.: N/A Col.: N/A Row: N/A Azimuth/Radius: N/A

Exam Type: ☐ Detailed Visual ☒ General Visual

Type Of Exam: ☐ Direct ☒ Remote

Matl. Type: Concrete

Design Drawing(s): TMI-0014/1

Visual Aids: Binoculars

Surface: ☒ OD ☐ ID

Surface / Components Coated: ☐ YES ☒ NO

Illumination Used: Natural lighting – Sunlight

| Attribute | RI | NRI | IO | Explanation / Comments |
|---|---|---|---|---|
| Cracks (Characterize and Size) | | | ☒ | Hairline |
| Exposed Reinforcing Steel | | | | |
| Exposed Metallic Items (Other) | | | | |
| Evidence Of Grease Leakage | | | | |
| Evidence Of Moisture | | | | |
| Leaching Or Chemical Attack | | | | |
| Settlements Or Deflections | | | | |
| Degraded Patches or Repairs | | | ☒ | Previously reported |
| Popouts, Voids, Honeycomb | | | ☒ | Minor popouts/bugholes |
| Spalls | | | | |
| Cold Joint Lines | | | | |
| Corrosion Staining | | | | |
| Scaling / Dusting | | | | |
| Coating Deterioration | | | | |
| Abrasion, Cavitation, Wear | | | | |
| Air Voids / Bug Holes | | | | |
| Efflorescence | | | ☒ | Slight leeching/efflorescence |
| Other (Explain) | | | | Category A corrosion on embed plates |

Results Legend: RI - Recordable Indication NRI - No Recordable Indications IO – Information Only

Supplemental Information: ☐ Yes ☒ No ☐ Sketch ☐ Photo ☐ Video ☐ Other (Describe):

Examiner: Level: II Date: 11/14/13

Further Evaluation Required: ☐ Yes ☒ No

Additional Actions:

(Action Request, Work Order, Issue Report, etc. initiated for Corrective Action) Suspect Areas shall be dispositioned by a Responsible Engineer

Reviewer: , P.E., RESPONSIBLE ENGINEER Date: 19 Feb 14

ANII: Date: 4/15/14

Page 1 of 1

## ATTACHMENT 4
## ASME IWL (Class CC) Containment Concrete Detailed or General Visual Examination
## NDE Report
Page 1 of 1

Station: TMI | Unit: 1 | Date: | Report No:

System: Cont. Tendons | Component: Between Buttress 5 & 6 (Out side) | WO No(s).: R2193606

Location: | Building: Cont | Elev.: N/A | Col.: N/A | Row: N/A | Azimuth/Radius: N/A

Exam Type: ☒ Detailed Visual ☐ General Visual | Type Of Exam: ☒ Direct ☐ Remote | Matl. Type: Concrete

Design Drawing(s) TMI-0014/1 | Visual Aids: Camera; natural light Test chart SN OC11-026

Surface: ☒ OD ☐ ID | Surface / Components Coated: ☒ YES ☐ NO ①

Illumination Used Natural lighting - Sunlight

| Attribute | RI | NRI | IO | Explanation / Comments |
|---|---|---|---|---|
| Cracks (Characterize and Size) | | | ☒ | |
| Exposed Reinforcing Steel | | | | |
| Exposed Metallic Items (Other) | ☒ | | ☒ | ② Embed plates (Vertical) see attached comments |
| Evidence Of Grease Leakage | | | | |
| Evidence Of Moisture | | | | |
| Leaching Or Chemical Attack | | | | |
| Settlements Or Deflections | | | | |
| Degraded Patches or Repairs | | | ☒ | Grout patch over Equipment Opening remains unchanged |
| Popouts, Voids, Honeycomb | | | | |
| Spalls | | | ☒ | |
| Cold Joint Lines | | | | |
| Corrosion Staining | | | | |
| Scaling / Dusting | | | | |
| Coating Deterioration | | | | |
| Abrasion, Cavitation, Wear | | | | |
| Air Voids / Bug Holes | | | | |
| Efflorescence | | | | |
| Other (Explain) | | | ☒ | W side of Buttress 5 ~ Bird poop |

Results Legend: RI - Recordable Indication NRI - No Recordable Indications IO - Information Only

Supplemental Information: ☒ Yes ☐ No ☐ Sketch ☐ Photo ☐ Video ☐ Other (Describe):

Examiner: ____________ Level: II Date: 11/14/13

Further Evaluation Required: ☒ Yes ☐ No

Additional Actions: PHOTOGRAPH SPALL AREAS & RE-EXAMINE & DOCUMENT ADDITIONAL DETAIL AT EMBED PL. RI'S

(Action Request, Work Order, Issue Report, etc. Initiated for Corrective Action) Suspect Areas shall be dispositioned by a Responsible Engineer

Reviewer: , P.E. RESPONSIBLE ENGINEER Date: 19 Feb 14

ANII: ____________ Date: 4/15/14

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① SGR construction repair patch is coated with a shiny curing compound which is transparent and does not interfere/prohibit 100% examination. All other concrete surfaces are not coated. Condition remains unchanged.

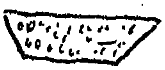
② Embed plate (vertical) that is 4" wide and 2' feet from west side of Buttress 5 has the following condition(s):

a) 7 tendons down from top the embed plate is pulled away from the face of the containment wall approx 1/4". Concrete has spalled on the Left hand side of the embed plate.

b) 13 tendons down from top - repair patch is spalling 9"L x 5"w x 1/2"D.

c) 21 tendons down from top - the embed plate has pulled away from the concrete face approx. 1/4".

③ Crack just below ring girder is 7"x 2"x 1/2"d.

④ spalled area  — noted ≈ 1/2" in depth

⑤ Vertical embed plate that is 4" wide and 2' feet from east side of Buttress 6, the following conditions are noted:

a) one location-embed plate concrete has degraded on Rt side. and cracks at repair area noted.

b) 2nd location - cracking/spalling of repair area @ embed plate.

c) 3rd location - embed plate has pulled away from face of concrete - concrete has separated from embed plate.

d) 4th location - concrete has separated from embed plate and embed plate is not flush with face of concrete.

e) 5th location - repair patch cracking and concrete separated from embed plate.

f) 6th location – concrete has separated from embed plate and embed plate is not flush with concrete surface.

g) 7th location – concrete has separated from embed plate and embed plate is not flush with face of concrete.

General Observations: Previously reported

a) hair cracks

b) abandoned expansion anchors have Category A corrosion

c) Embed plates that are exposed to the environment have Category A corrosion.

d) Grout patches / repair areas exhibit continued degrading

e) small bug holes

These conditions have been previously reported.

Note: Outside the scope of ASME Section XI IWE:

a) Meteorological / electrical boxes exhibit significant degradation (material loss due to weathering) and provide ~~no~~ RAP 11/14/13 little to no protection.

## ATTACHMENT 4
## ASME IWL (Class CC) Containment Concrete Detailed or General Visual Examination NDE Report
### Page 1 of 1

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Station:** | TMI | | | **Unit:** | 1 | **Date:** | | **Report No:** | |
| **System:** | Cont Tendons | **Component:** | Between Buttress 1-6 (outsde) | | | | | **WO No(s).:** | R2193606 |
| **Location:** | **Building:** Cont. | **Elev.:** | N/A | **Col.:** | N/A | **Row:** | N/A | **Azimuth/Radius:** | N/A |
| **Exam Type:** ☐ Detailed Visual<br>☒ General Visual | | **Type Of Exam:** ☐ Direct<br>☒ Remote | | | **Matl. Type:** | Concrete | | | |
| **Design Drawing(s)** | TMI-0014/1 | | | **Visual Aids:** | binoculars | | | | |
| **Surface:** ☒ OD ☐ ID | | | | **Surface / Components Coated:** ☐ YES ☐ NO | | | | | |
| **Illumination Used** | Sunlight; Test card SNOC11-026 | | | | | | | | |

| Attribute | RI | NRI | IO | Explanation / Comments |
|---|---|---|---|---|
| Cracks (Characterize and Size) | | | ☒ | Hairline * |
| Exposed Reinforcing Steel | | | | |
| Exposed Metallic Items (Other) | | | | |
| Evidence Of Grease Leakage | | | | |
| Evidence Of Moisture | | | | |
| Leaching Or Chemical Attack | | | | |
| Settlements Or Deflections | | | | |
| Degraded Patches or Repairs | | | ☒ | * |
| [✓ Popouts] Voids, Honeycomb | | | ☒ | bugholes * |
| Spalls | | | | |
| Cold Joint Lines | | | | |
| Corrosion Staining | | | | |
| Scaling / Dusting | | | | |
| Coating Deterioration | | | | |
| Abrasion, Cavitation, Wear | | | | |
| Air Voids / Bug Holes | | | | |
| Efflorescence | | | | |
| Other (Explain) | | | ☒ | Abandoned expansion anchors |
| **Results Legend:** | RI - Recordable Indication | NRI - No Recordable Indications | IO - Information Only | |

**Supplemental Information:** ☐ Yes ☐ No ☐ Sketch ☐ Photo ☐ Video ☐ Other (Describe):

**Examiner:** ______ **Level:** II **Date:** 11/15/13

**Further Evaluation Required:** ☐ Yes ☒ No  * Previously reported

**Additional Actions:** ______

(Action Request, Work Order, Issue Report, etc. initiated for Corrective Action) Suspect Areas shall be dispositioned by a Responsible Engineer

**Reviewer:** , P.E., RESPONSIBLE ENGINEER **Date:** 19 FEB 14

**ANII:** ______ **Date:** 4/15/14

Page 1 of 1

# ATTACHMENT 4
## ASME IWL (Class CC) Containment Concrete Detailed or General Visual Examination
## NDE Report

Page 1 of ~~1~~ 2 RaP 11/5/13

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Station: | TMI | Unit: | 1 | Date: | 11/5/13 | Report No: | |
| System: | Cont. Tendons | Component: | Tendon Gallery Base Mat | | | WO No(s).: | R2193606 |
| Location: | Building: Cont. | Elev.: | ± 253' | Col.: N/A | Row: N/A | Azimuth/Radius: | N/A |
| Exam Type: | ☒ Detailed Visual<br>☒ General Visual | Type Of Exam: | ☒ Direct<br>☒ Remote | Matl. Type: | Concrete | | |
| Design Drawing(s) | TMI 1-0016/1 | Visual Aids: | flashlight/ Tape measure | | | | |
| Surface: | ☒ OD ☐ ID | Surface / Components Coated: | ☐ YES ☒ NO | | | | |
| Illumination Used | Flashlight and light mounted on hard hat. | | | | | | |

| Attribute | RI | NRI | IO | Explanation / Comments |
|---|---|---|---|---|
| Cracks (Characterize and Size) | | | | |
| Exposed Reinforcing Steel | | | ☒ | Adjacent to V-143 and V-149 (V-150) |
| Exposed Metallic Items (Other) | | | | |
| Evidence Of Grease Leakage | | | | |
| Evidence Of Moisture | | | ☒ | Ground water noted on floor in two locations |
| Leaching Or Chemical Attack | | | ☒ | * See comment on attached page |
| Settlements Or Deflections | | | | |
| Degraded Patches or Repairs | | | ☒ | *See comment on attached page |
| Popouts, Voids, Honeycomb | | | | Minor popouts/bugholes noted |
| Spalls | | | ☒ | At construction joint 6' above top basemat |
| Cold Joint Lines | | | | |
| Corrosion Staining | | | | |
| Scaling / Dusting | | | | |
| Coating Deterioration | | | | |
| Abrasion, Cavitation, Wear | | | | |
| Air Voids / Bug Holes | | | | |
| Efflorescence | | | ☒ | * See comment on attached page |
| Other (Explain) | | | | |

Results Legend: RI - Recordable Indication NRI - No Recordable Indications IO - Information Only

Supplemental Information: ☒ Yes ☐ No ☐ Sketch ☐ Photo ☐ Video ☐ Other (Describe):

Examiner: R a P Level: II Date: 11/5/13

Further Evaluation Required: ☐ Yes ☒ No

Additional Actions:

(Action Request, Work Order, Issue Report, etc. initiated for Corrective Action) Suspect Areas shall be dispositioned by a Responsible Engineer

Reviewer: , P.E., RESPONSIBLE ENGINEER Date: 19Feb14

ANII: Date: 4/15/14

① Leeching/efflorescence heavy accumulation noted @ 2 locations. Accumulation buildup approx. 1/4" from face of concrete. Stalactites noted @ interface between ceiling and wall. Previously noted.

② Leeching/efflorescence noted randomly 360° around tendon gallery. This condition was previously noted. Located inner/outer walls.

③ Two cavity repairs using epoxy was noted at location V-149 and V-150. The epoxy is not flush with the surface of the concrete. One repair 7 1/2 L × 1/2" W. The other repair is 2 1/2" × 2 1/2".

④ Other conditions noted, i.e. popouts, hairline cracks and bugholes were previously reported.

⑤ Stress cracks previously reported remain @ < 0.015". RAP 11/05/13

⑥ Exposed metal/embed plates have pitting < 0.010". This was previously reported.

⑦ Ground water noted in two locations on floor.

## ATTACHMENT 4
## ASME IWL (Class CC) Containment Concrete Detailed or General Visual Examination
## NDE Report

Page 1 of ~~1~~ 4 RaP 11/5/13

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Station: | TMI | | Unit: | 1 | Date: 11/5/13 | Report No: | |
| System: | Cont tendons | Component: | Cont. Bldg Alligator Pit | | | WO No(s).: | R2193606 |
| Location: | Building: Cont | Elev.: ≃ 273' | Col.: | N/A | Row: N/A | Azimuth/Radius: | N/A |

Exam Type: ☒ Detailed Visual ☒ General Visual

Type Of Exam: ☒ Direct ☒ Remote

Matl. Type: Concrete

Design Drawing(s): TMI-0014/1

Visual Aids: Flashlight / hand hat light

Surface: ☒ OD ☐ ID

Surface / Components Coated: ☐ YES ☒ NO

Illumination Used:

| Attribute | RI | NRI | IO | Explanation / Comments |
|---|---|---|---|---|
| Cracks (Characterize and Size) | | | ☒ | Hair line - See attached pages |
| Exposed Reinforcing Steel | | | | |
| Exposed Metallic Items (Other) | | | | |
| Evidence Of Grease Leakage | | | ☒ | See attached pages for details |
| Evidence Of Moisture | | | | |
| Leaching Or Chemical Attack | | | ☒ | See attached pages for details |
| Settlements Or Deflections | | | | |
| Degraded Patches or Repairs | | | | |
| Popouts, Voids, Honeycomb | | | ☒ | And bugholes - see attached pages |
| Spalls | | | ☒ | Minor |
| Cold Joint Lines | | | | |
| Corrosion Staining | | | | |
| Scaling / Dusting | | | | |
| Coating Deterioration | | | | |
| Abrasion, Cavitation, Wear | | | | |
| Air Voids / Bug Holes | | | | |
| Efflorescence | | | ☒ | See attached pages for details |
| Other (Explain) | | | ☒ | See attached pages for details |

Results Legend: RI - Recordable Indication NRI - No Recordable Indications IO – Information Only

Supplemental Information: ☐ Yes ☐ No ☐ Sketch ☐ Photo ☐ Video ☐ Other (Describe):

Examiner: R a P Level: II Date: 11/5/13

Further Evaluation Required: ☐ Yes ☒ No

Additional Actions:

(Action Request, Work Order/Issue Report, etc. Initiated for Corrective Action) Suspect Areas shall be dispositioned by a Responsible Engineer

Reviewer: , P.E., RESPONSIBLE ENGINEER Date: 19 Feb 14

ANII: Date: 4/15/14

① wall is painted approx. 11" from floor.

② At Buttress 1 - bugholes, an 11" grout patch, and grease was noted on the wall adjacent to the tendons.

③ The following conditions were noted between Buttress 1 and 6:

a) hairline cracks approx 5ft ~~east~~ west Rap 11/5/13 of Azimuth 0°

b) hairline cracks 2ft east Azimuth 0°

c) A cavity 3"L x ½"w x ⅛"d @ Azimuth 350°

d) hairline cracks between Azimuth 350° and 340° were leeching oil

e) hairline cracks close to Azimuth 340° was noted as leeching/efflorescence.

f) hairline cracks 5ft east of Azimuth 340° leeching oil.

g) Approx 1 cup of oil noted on floor.

h) hairline cracks leeching oil 1 ft west of Azimuth 330°.

④ The following conditions were noted @ Buttress 6:

a) hairline cracks, bug holes and popouts

b) Twenty-one (21) ~~abandoned~~ eap 11/5/13 expansion anchors were abandoned. One has bolt in the hole. These are aligned 8, 6 and 7, progressing west to east. One cavity, 3½" x 3½" x 2"d appears to be an abandoned expansion anchor.

⑤ The following conditions were noted between Buttress 6 and 5.

a) leeching/efflorescence 7' west of Azimuth 310° ~~above~~ below electrical conduit mounted on well. Rap 11/4/13

b) hair line cracks located @ Azimuth 300° and east there of have 4 rows of leeching oil. Three are dry and one is wet.

Page 3 of 4

ER-AA-335-019

⑤ Continued

c) Hairline cracks noted @ Azimuth 290° - two have oil (wet) leeching thru the wall. The other hairline crack the oil is dry.

⑥ Buttress 5 had the following conditions:

a) Minor hairline cracks < 0.010 and very minor leeching / efflorescence noted.

b) Oil / grease noted on wall and grease cap.

⑦ Between Buttress 5 and 4 the following conditions were noted:

a). Hairline cracks < 0.010 and very minor leeching / efflorescence.

⑧ Buttress 1 - the following conditions were noted:

a) minor bug holes

b) At Azimuth 40° white stains were observed emanating from a galvanized angle iron support (Info only)

c) very minor leeching / efflorescence noted approx 20" west side of tendons (between Buttress 1 and 2)

d) Hairline cracks leeching wet oil thru concrete noted 5' east of Azimuth 40°

e) Approx. 15 expansion anchors abandoned @ Azimuth 60°

f) Dry and wet oil leeching thru concrete was noted @ Azimuth 60°

g) Six (6) abendoned expension anchor holes have been grouted.

Page 4 of 4
ER-AA-335-019

⑨ Conditions noted @ Buttress 2
a) very minor bugholes
b) wet oil noted on grease caps and well

RAP 11/5/13
⑩ Conditions noted ~~@~~ between Buttress 2 and 3;
a) minor popouts and bugholes
b) hairline cracks < 0.010 noted @ Azimuths 90°; 100°; and 110°. Three were noted as having wet oil leeching thru concrete; the other has dry oil.

⑩ Conditions noted @ Buttress 3:
a) bugholes
b) one grout patch
c) two cavities (just west of Buttress 3); one cavity 3" x 3/8" x 1/4"; the other 3" x 1" x 1/2".

Note: All the conditions noted above were previously reported and no apparent changes have occorred.

## ATTACHMENT 4
## ASME IWL (Class CC) Containment Concrete Detailed or General Visual Examination
## NDE Report

Page 1 of ~~1~~ 6 RAP 11/12/13

|  |  |  |  |  |  |  |  |
|---|---|---|---|---|---|---|---|
| **Station:** TMI | | | **Unit:** 1 | **Date:** 11/12/13 | | **Report No:** | |
| **System:** Cont. Tendons | **Component:** Containment Bldg ① Turbine | | | | | **WO No(s).:** R2153606 | |
| **Location:** | **Building:** Turbine | **Elev.:** All | **Col.:** N/A | **Row:** N/A | | **Azimuth/Radius:** N/A | |
| **Exam Type:** ☐ Detailed Visual<br>☒ General Visual | **Type Of Exam:** ☒ Direct<br>☒ Remote | | **Matl. Type:** | Concrete | | | |
| **Design Drawing(s)** TMI 1-0015/1 | | | **Visual Aids:** See below ② | | | | |
| **Surface:** ☒ OD ☐ ID | | | **Surface / Components Coated:** ☒ YES ☒ NO as noted | | | | |
| **Illumination Used** ② | | | | | | | |

| Attribute | RI | NRI | IO | Explanation / Comments |
|---|---|---|---|---|
| Cracks (Characterize and Size) | | | | |
| Exposed Reinforcing Steel | | | | See attached pages for |
| Exposed Metallic Items (Other) | | | | specific comments. |
| Evidence Of Grease Leakage | | | | |
| Evidence Of Moisture | | | | |
| Leaching Or Chemical Attack | | | | |
| Settlements Or Deflections | | | | |
| Degraded Patches or Repairs | | | | |
| Popouts, Voids, Honeycomb | | | | |
| Spalls | | | | |
| Cold Joint Lines | | | | |
| Corrosion Staining | | | | |
| Scaling / Dusting | | | | |
| Coating Deterioration | | | | |
| Abrasion, Cavitation, Wear | | | | |
| Air Voids / Bug Holes | | | | |
| Efflorescence | | | | |
| Other (Explain) | | | | |

**Results Legend:** RI - Recordable Indication NRI - No Recordable Indications IO - Information Only

**Supplemental Information:** ☒ Yes ☐ No ☐ Sketch ☐ Photo ☐ Video ☐ Other (Describe):

**Examiner:** R a P **Level:** II **Date:** 11/12/13

**Further Evaluation Required:** ☐ Yes ☒ No

**Additional Actions:**

(Action Request, Work Order, Issue Report, etc. Initiated for Corrective Action) Suspect Areas shall be dispositioned by a Responsible Engineer

**Reviewer:** , P.E., RESPONSIBLE ENGINEER **Date:** 19FEB14

**ANII:** **Date:** 4/15/14

② Flashlight, light that is mounted on hard hat, beacon light, binoculars and Test Chart SN OC11-026

① This examination was performed from floors, roofs, platforms, walkways, ladders and other permanent vantage points. This examination was performed on 11/4/13 through 11/8/13, specific examination results are provided where rooms are identified on the doorway, otherwise general area comments are provided.

Note: In all instances the conditions noted/observed are reported as "Information Only." No "Reportable Indications" (RI) were noted.

≈ <u>281' Elevation - Door I-10~~8~~7</u> RJP 11/12/13

a) Walls are painted — minor chipping

b) abandoned expansion anchors

c) grout repairs

= <u>281' Elevation - Door I-108</u>

a) Walls are painted

b) Popouts/bugholes (minor)

c) 6 abandoned concrete expansion anchors

≃ 281' Elevation – Door I-104

a) walls painted

c) minor bugholes

≃ 281' Elevation @ ladder beside Buttress #1

a) epoxy repair patch behind ladder 9"x9"

b) popouts and bugholes (minor)

≃ 322' Elevation – Room I-204

a) hairline cracks, minor bugholes and popouts

b) very minor leeching / efflorescence

c) exposed embed plates – minor corrosion/pitting

d) 3 abandoned expansion anchor~~s~~ REP 11/12/13 holes

≃ 322' Elevation – Room I-203

a) minor popouts and bugholes

b) 3 abandoned expansion anchors

c) grout patch repairs

d) pipe ≃ 3/4" diameter protruding from wall, adjacent to junction box

### ≅ 322' Elevation - room east of Buttress #1

a) minor popouts and bugholes
b) ≅ 3/4" pipe protruding from concrete
c) hairline cracks adjacent to Buttress #1
d) oil/grease on Buttress @ tendons - not on containment wall.

### ≅ 322' Elevation - Buttress #1

a) minor popouts and bugholes
b) construction seams

### ≅ 322' Elevation west side of Buttress #1 (Room I-202)

a) minor bug holes
b) hair line cracks
c) construction seams

### ≅ 322' Elevation - Room I-202 between Buttress 1 and 2

a) oil/grease on Buttress 1 west side and not on containment wall
b) minor hairline cracks
c) leeching/efflorescence 1 foot from Buttress #1 wall
d) grout repair patches
e) 2 abandoned expansion anchors
f) 3/4" pipe protruding ≅ 4" out from wall face
g) minor bug holes and popouts

≃ 322' Elevation – Room east of I-202

a) minor popouts and bugholes

≃ 322' Elevation – Room I-201

a) minor bugholes
b) bottom portion of wall painted ≃ 13"

≃ 357' Elevation

a) grout patches
b) Popouts and bugholes

≃ 357' Elevation – 2nd room west of I-202

a) hairline cracks
b) bugholes
c) very minor leeching/efflorescence

≃ 357' Elevation – West side of Buttress #6

a) minor popouts and bugholes

Page 6 oF 6

General observations of areas that are not clearly/specifically defined – all elevations – Turbine Bldg.

a) hair line cracks
b) abandoned expansion anchors
c) minor leeching / efflorescence
d) minor popouts and bugholes
e) grout and epoxy patches

Note! All conditions noted are acceptable. These are being reported as "Information Only"

## ATTACHMENT 4
## ASME IWL (Class CC) Containment Concrete Detailed or General Visual Examination NDE Report
Page 1 of 1

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Station: | TMI | Unit: | 1 | Date: | 11/12/13 | Report No: | |
| System: | Cont Tendons | Component: | Buttress 6 (outside) | | | WO No(s).: | R2193606 |
| Location: Building: | cont. | Elev.: | N/A | Col.: | N/A | Row: | N/A |
| Azimuth/Radius: | N/A | | | | | | |
| Exam Type: ☐ Detailed Visual ☒ General Visual | | Type Of Exam: ☐ Direct ☒ Remote | | Matl. Type: | Concrete | | |
| Design Drawing(s) | TMI-0014/1 | Visual Aids: | Binoculars | | | | |
| Surface: ☒ OD ☐ ID | | Surface / Components Coated: ☐ YES ☒ NO | | | | | |
| Illumination Used | Natural lighting | | | | | | |

| Attribute | RI | NRI | IO | Explanation / Comments |
|---|---|---|---|---|
| Cracks (Characterize and Size) | | | ☒ | Hairline cracks |
| Exposed Reinforcing Steel | | | | |
| Exposed Metallic Items (Other) | | | ☒ | Abandoned expansion anchors |
| Evidence Of Grease Leakage | | | | |
| Evidence Of Moisture | | | | |
| Leaching Or Chemical Attack | | | | |
| Settlements Or Deflections | | | | |
| Degraded Patches or Repairs | | | ☒ | Previously reported |
| Popouts, Voids, Honeycomb | | | ☒ | Minor bugholes and popouts |
| Spalls | | | | |
| Cold Joint Lines | | | | |
| Corrosion Staining | | | | |
| Scaling / Dusting | | | | |
| Coating Deterioration | | | | |
| Abrasion, Cavitation, Wear | | | | |
| Air Voids / Bug Holes | | | | |
| Efflorescence | | | | |
| Other (Explain) | | | | Category A corrosion of embed plates |

Results Legend: RI - Recordable Indication NRI - No Recordable Indications IO – Information Only

Supplemental Information: ☐ Yes ☒ No ☐ Sketch ☐ Photo ☐ Video ☐ Other (Describe):

Examiner: R a P Level: II Date: 11/11/13

Further Evaluation Required: ☐ Yes ☒ No

Additional Actions:

(Action Request, Work Order, Issue Report, etc. Initiated for Corrective Action) Suspect Areas shall be dispositioned by a Responsible Engineer

Reviewer: , P.E., RESPONSIBLE ENGINEER Date: 19 FEB 14

ANII: Date: 4/15/14

# ATTACHMENT 4
# ASME IWL (Class CC) Containment Concrete Detailed or General Visual Examination NDE Report
## Page 1 of 1

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Station:** | TMI | **Unit:** | 1 | **Date:** | 12/4/13 | **Report No:** | |
| **System:** | Cont. Tendons | **Component:** | West side of Buttress 3 | | | **WO No(s).:** | R2193606 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Location:** | **Building:** | Aux | **Elev.:** | 305' | **Col.:** | N/A | **Row:** | N/A | **Azimuth/Radius:** N/A |

| | | | |
|---|---|---|---|
| **Exam Type:** ☐ Detailed Visual<br>☒ General Visual | **Type Of Exam:** ☐ Direct<br>☒ Remote | **Matl. Type:** | Concrete |
| **Design Drawing(s)** | TMI-0014/1 | **Visual Aids:** | Flashlight Test chart OC11-026 |
| **Surface:** ☒ OD ☐ ID | | **Surface / Components Coated:** ☒ YES ☐ NO | |
| **Illumination Used** | Flashlight, Test Chart OC11-026 | | |

| Attribute | RI | NRI | IO | Explanation / Comments |
|---|---|---|---|---|
| Cracks (Characterize and Size) | | | | |
| Exposed Reinforcing Steel | | | | |
| Exposed Metallic Items (Other) | | | | |
| Evidence Of Grease Leakage | | | ■ | Minor |
| Evidence Of Moisture | | | | |
| Leaching Or Chemical Attack | | | | |
| Settlements Or Deflections | | | | |
| Degraded Patches or Repairs | | | | |
| Popouts, Voids, Honeycomb | | | ■ | Minor bugholes |
| Spalls | | | | |
| Cold Joint Lines | | | | |
| Corrosion Staining | | | | |
| Scaling / Dusting | | | | |
| Coating Deterioration | | | | |
| Abrasion, Cavitation, Wear | | | | |
| Air Voids / Bug Holes | | | | |
| Efflorescence | | | | |
| Other (Explain) | | | ■ | Brown stain on wall - origin unknown |

**Results Legend:** RI - Recordable Indication NRI - No Recordable Indications IO - Information Only

**Supplemental Information:** ☐ Yes ☒ No ☐ Sketch ☐ Photo ☐ Video ☐ Other (Describe):

**Examiner:** R a Py **Level:** II **Date:** 12/4/13

**Further Evaluation Required:** ☐ Yes ☒ No

**Additional Actions:**

(Action Request, Work Order, Issue Report, etc. Initiated for Corrective Action) Suspect Areas shall be dispositioned by a Responsible Engineer

**Reviewer:** , P.E., Responsible Engineer **Date:** 19 [illegible] 14

**ANII:** **Date:** 4/15/14

Page 1 of 1

## ATTACHMENT 4
## ASME IWL (Class CC) Containment Concrete Detailed or General Visual Examination
## NDE Report
**Page 1 of 1**

**Station:** TMI **Unit:** 1 **Date:** 12/4/13 **Report No:**
**System:** Cont Tendons **Component:** Buttress 4 281elev Aux Bldg **WO No(s).:** R2193606
**Location:** **Building:** Aux **Elev.:** 281 **Col.:** N/A **Row:** N/A **Azimuth/Radius:** N/A
**Exam Type:** ☐ Detailed Visual ☒ General Visual **Type Of Exam:** ☐ Direct ☒ Remote **Matl. Type:** Concrete
**Design Drawing(s)** TMI-0014/1 **Visual Aids:** Flashlight Test Chart OC11-026
**Surface:** ☒ OD ☐ ID **Surface / Components Coated:** ☒ YES ☐ NO *
**Illumination Used** Flashlight and Test Chart OC-11-026

| Attribute | RI | NRI | IO | Explanation / Comments |
|---|---|---|---|---|
| Cracks (Characterize and Size) | | | | |
| Exposed Reinforcing Steel | | | | |
| Exposed Metallic Items (Other) | | | | |
| Evidence Of Grease Leakage | | | | |
| Evidence Of Moisture | | | | Note: Examination limited due to |
| Leaching Or Chemical Attack | | | | piping, conduit, junction boxes |
| Settlements Or Deflections | | | | etc. which obscured vision |
| Degraded Patches or Repairs | | | | *The buttress is not painted and |
| Popouts, Voids, Honeycomb | | | | containment walls are painted |
| Spalls | | | | |
| Cold Joint Lines | | | | |
| Corrosion Staining | | | | |
| Scaling / Dusting | | | | |
| Coating Deterioration | | | | |
| Abrasion, Cavitation, Wear | | | | |
| Air Voids / Bug Holes | | | | |
| Efflorescence | | | ▨ | Minor leeching/efflorescence |
| Other (Explain) | | | ▨ | Abandoned expansion anchors and holes |

**Results Legend:** RI - Recordable Indication NRI - No Recordable Indications IO – Information Only

**Supplemental Information:** ☐ Yes ☒ No ☐ Sketch ☐ Photo ☐ Video ☐ Other (Describe):

**Examiner:** Ra Py **Level:** II **Date:** 12/4/13

**Further Evaluation Required:** ☐ Yes ☒ No

**Additional Actions:**

(Action Request, Work Order, Issue Report, etc. Initiated for Corrective Action) Suspect Areas shall be dispositioned by a Responsible Engineer

**Reviewer:** , P.E., RESPONSIBLE ENGINEER **Date:** 19 Feb14

**ANII:** **Date:** 4/15/14

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# ATTACHMENT 4
# ASME IWL (Class CC) Containment Concrete Detailed or General Visual Examination NDE Report
## Page 1 of 1

Station: TMI Unit: 1 Date: 12/4/13 Report No:
System: Cont Tendons Component: Buttress 4 west side WO No(s).: R2193606
Location: Building: Aux Elev.: 305' Col.: N/A Row: N/A Azimuth/Radius: N/A
Exam Type: ☐ Detailed Visual ☒ General Visual Type Of Exam: ☐ Direct ☒ Remote Matl. Type: Concrete
Design Drawing(s): TMI-0014/1 Visual Aids: Flashlight Test chart OC11-026
Surface: ☒ OD ☐ ID Surface / Components Coated: ☒ YES ☐ NO
Illumination Used: Flashlight - Test chart OC11-026

| Attribute | RI | NRI | IO | Explanation / Comments |
|---|---|---|---|---|
| Cracks (Characterize and Size) | | | | |
| Exposed Reinforcing Steel | | | | |
| Exposed Metallic Items (Other) | | | | |
| ~~Evidence Of Grease Leakage~~ | | | ☒ | Minor brown staining |
| ~~Evidence Of Moisture~~ | | | ☒ | Construction seams |
| Leaching Or Chemical Attack | | | | |
| Settlements Or Deflections | | | | |
| Degraded Patches or Repairs | | | | |
| Popouts, Voids, Honeycomb | | | | |
| Spalls | | | | |
| Cold Joint Lines | | | | |
| Corrosion Staining | | | | |
| Scaling / Dusting | | | | |
| Coating Deterioration | | | | |
| Abrasion, Cavitation, Wear | | | | |
| Air Voids / Bug Holes | | | | |
| Efflorescence | | | | |
| Other (Explain) | | | | |

RaP
12/4/13

Results Legend: RI - Recordable Indication NRI - No Recordable Indications IO - Information Only

Supplemental Information: ☐ Yes ☒ No ☐ Sketch ☐ Photo ☐ Video ☐ Other (Describe):

Examiner: R a P Level: II Date: 12/4/13
Further Evaluation Required: ☐ Yes ☒ No
Additional Actions:
(Action Request, Work Order, Issue Report, etc. initiated for Corrective Action) Suspect Areas shall be dispositioned by a Responsible Engineer
Reviewer: , P.E., RESPONSIBLE ENGINEER Date: 19 Feb 14
ANII: Date: 4/15/14

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PSC
PRECISION SURVEILLANCE

N1091 PSC PROCEDURE SQ 8.5
GREASE CAP INSPECTION
Data Sheet 8.5
09/03/13
Page 16 of 20
Revision 0

## TMI UNIT 1 TENDON ANCHORAGE GREASE CAP INSPECTION

| TENDON ID | LOCATION OR BUTTRESS | EVIDENCE OF FREE WATER YES/NO | EVIDENCE OF GREASE LEAKAGE * YES/NO | EVIDENCE OF GREASE CAP DEFORMATION YES/NO | EVIDENCE OF CORROSION ** YES/NO | INSPECTOR'S INITIALS AND DATE |
|---|---|---|---|---|---|---|
| V-1 | Top & Bottom | N | N | N | N | WRR 12-4-13 |
| V-2 | T & B | N | N | N | N | WRR 12-4-13 |
| V-3 | T & B | N | N | N | N | WRR 12-4-13 |
| V-4 | T & B | N | N | N | N | WRR 12-4-13 |
| V-5 | T & B | N | N | N | N | WRR 12-4-13 |
| V-6 | T & B | N | N | N | N | WRR 12-4-13 |
| V-7 | T & B | N | N | N | N | WRR 12-4-13 |
| V-8 | T & B | N | N | N | N | WRR 12-4-13 |
| V-9 | T & B | N | N | N | N | WRR 12-4-13 |
| V-10 | T & B | N | N | N | N | WRR 12-4-13 |
| V-11 | T & B | N | N | N | N | WRR 12-4-13 |
| V-12 | T & B | N | N | N | N | WRR 12-4-13 |
| V-13 | T & B | N | N | N | N | WRR 12-4-13 |
| V-14 | T & B | N | N | N | N | WRR 12-4-13 |
| V-15 | T & B | N | N | N | N | WRR 12-4-13 |
| V-16 | T & B | N | N | N | N | WRR 12-4-13 |
| V-17 | T & B | N | N | N | N | WRR 12-4-13 |
| V-18 | T & B | N | N | N | N | WRR 12-4-13 |
| V-19 | T & B | N | N | N | N | WRR 12-4-13 |
| V-20 | T & B | N | N | N | N | WRR 12-4-13 |
| V-21 | T & B | N | N | N | N | WRR 12-4-13 |
| V-22 | T & B | N | N | N | N | WRR 12-4-13 |
| V-23 | T & B | N | N | N | N | WRR 12-4-13 |
| V-24 | T & B | N | N | N | N | WRR 12-4-13 |
| V-25 | T & B | N | N | N | N | WRR 12-4-13 |
| V-26 | T & B | N | N | N | N | WRR 12-4-13 |
| V-27 | T & B | N | N | N | N | WRR 12-4-13 |
| V-28 | T & B | N | N | N | N | WRR 12-4-13 |
| V-29 | T & B | N | N | N | N | WRR 12-4-13 |
| V-30 | T & B | N | N | N | N | WRR 12-4-13 |
| V-31 | T & B | N | N | N | N | WRR 12-4-13 |
| V-32 | T & B | N | N | N | N | WRR 12-4-13 |
| V-33 | T & B | N | N | N | N | WRR 12-4-13 |
| V-34 | T & B | N | N | N | N | WRR 12-4-13 |
| V-35 | T & B | N | N | N | N | WRR 12-4-13 |
| V-36 | T & B | N | N | N | N | WRR 12-4-13 |

* Evidence of oil at threaded connection is acceptable providing it is not excessive. This is oil that has separated from grease and is common.

** This is evidence of corrosion that resulted in metal loss and wastage that may affect the ability of the grease cap to contain the sheathing filler grease.

PSC
PRECISION SURVEILLANCE

N1091 PSC PROCEDURE SQ 8.5
**GREASE CAP INSPECTION**
**Data Sheet 8.5**
09/03/13
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Revision 0

## TMI UNIT 1 TENDON ANCHORAGE GREASE CAP INSPECTION

| TENDON ID | LOCATION OR BUTTRESS | EVIDENCE OF FREE WATER YES/NO | EVIDENCE OF GREASE LEAKAGE * YES/NO | EVIDENCE OF GREASE CAP DEFORMATION YES/NO | EVIDENCE OF CORROSION ** YES/NO | INSPECTOR'S INITIALS AND DATE |
|---|---|---|---|---|---|---|
| V-37 | T & B | N | N | N | N | WRR 12-4-13 |
| V-38 | T & B | N | N | N | N | WRR 12-4-13 |
| V-39 | T & B | N | N | N | N | WRR 12-4-13 |
| V-40 | T & B | N | N | N | N | WRR 12-4-13 |
| V-41 | T & B | N | N | N | N | WRR 12-4-13 |
| V-42 | T & B | N | N | N | N | WRR 12-4-13 |
| V-43 | T & B | N | N | N | N | WRR 12-4-13 |
| V-44 | T & B | N | N | N | N | WRR 12-4-13 |
| V-45 | T & B | N | N | N | N | WRR 12-4-13 |
| V-46 | T & B | N | N | N | N | WRR 12-4-13 |
| V-47 | T & B | N | N | N | N | WRR 12-4-13 |
| V-48 | T & B | N | N | N | N | WRR 12-4-13 |
| V-49 | T & B | N | N | N | N | WRR 12-4-13 |
| V-50 | T & B | N | N | N | N | WRR 12-4-13 |
| V-51 | T & B | N | N | N | N | WRR 12-4-13 |
| V-52 | T & B | N | N | N | N | WRR 12-4-13 |
| V-53 | T & B | N | N | N | N | WRR 12-4-13 |
| V-54 | T & B | N | N | N | N | WRR 12-4-13 |
| V-55 | T & B | N | N | N | N | WRR 12-4-13 |
| V-56 | T & B | N | N | N | N | WRR 12-4-13 |
| V-57 | T & B | N | N | N | N | WRR 12-4-13 |
| V-58 | T & B | N | N | N | N | WRR 12-4-13 |
| V-59 | T & B | N | N | N | N | WRR 12-4-13 |
| V-60 | T & B | N | N | N | N | WRR 12-4-13 |
| V-61 | T & B | N | N | N | N | WRR 12-4-13 |
| V-62 | T & B | N | N | N | N | WRR 12-4-13 |
| V-63 | T & B | N | N | N | N | WRR 12-4-13 |
| V-64 | T & B | N | N | N | N | WRR 12-4-13 |
| V-65 | T & B | N | N | N | N | WRR 12-4-13 |
| V-66 | T & B | N | N | N | N | WRR 12-4-13 |
| V-67 | T & B | N | N | N | N | WRR 12-4-13 |
| V-68 | T & B | N | N | N | N | WRR 12-4-13 |
| V-69 | T & B | N | N | N | N | WRR 12-4-13 |
| V-70 | T & B | N | N | N | N | WRR 12-4-13 |
| V-71 | T & B | N | N | N | N | WRR 12-4-13 |
| V-72 | T & B | N | N | N | N | WRR 12-4-13 |

* Evidence of oil at threaded connection is acceptable providing it is not excessive. This is oil that has separated from grease and is common.

** This is evidence of corrosion that resulted in metal loss and wastage that may affect the ability of the grease cap to contain the sheathing filler grease.

PSC
PRECISION SURVEILLANCE

N1091 PSC PROCEDURE SQ 8.5
GREASE CAP INSPECTION
Data Sheet 8.5
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Revision 0

## TMI UNIT 1 TENDON ANCHORAGE GREASE CAP INSPECTION

| TENDON ID | LOCATION OR BUTTRESS | EVIDENCE OF FREE WATER YES/NO | EVIDENCE OF GREASE LEAKAGE * YES/NO | EVIDENCE OF GREASE CAP DEFORMATION YES/NO | EVIDENCE OF CORROSION ** YES/NO | INSPECTOR'S INITIALS AND DATE |
|---|---|---|---|---|---|---|
| V-73 | T & B | N | N | N | N | WRR 12-4-13 |
| V-74 | T & B | N | N | N | N | WRR 12-4-13 |
| V-75 | T & B | N | N | N | N | WRR 12-4-13 |
| V-76 | T & B | N | N | N | N | WRR 12-4-13 |
| V-77 | T & B | N | N | N | N | WRR 12-4-13 |
| V-78 | T & B | N | N | N | N | WRR 12-4-13 |
| V-79 | T & B | N | N | N | N | WRR 12-4-13 |
| V-80 | T & B | N | N | N | N | WRR 12-4-13 |
| V-81 | T & B | N | N | N | N | WRR 12-4-13 |
| V-82 | T & B | N | N | N | N | WRR 12-4-13 |
| V-83 | T & B | N | N | N | N | WRR 12-4-13 |
| V-84 | T & B | N | N | N | N | WRR 12-4-13 |
| V-85 | T & B | N | N | N | N | WRR 12-4-13 |
| V-86 | T & B | N | N | N | N | WRR 12-4-13 |
| V-87 | T & B | N | N | N | N | WRR 12-4-13 |
| V-88 | T & B | N | N | N | N | WRR 12-4-13 |
| V-89 | T & B | N | N | N | N | WRR 12-4-13 |
| V-90 | T & B | N | N | N | N | WRR 12-4-13 |
| V-91 | T & B | N | N | N | N | WRR 12-4-13 |
| V-92 | T & B | N | N | N | N | WRR 12-4-13 |
| V-93 | T & B | N | N | N | N | WRR 12-4-13 |
| V-94 | T & B | N | N | N | N | WRR 12-4-13 |
| V-95 | T & B | N | N | N | N | WRR 12-4-13 |
| V-96 | T & B | N | N | N | N | WRR 12-4-13 |
| V-97 | T & B | N | N | N | N | WRR 12-4-13 |
| V-98 | T & B | N | N | N | N | WRR 12-4-13 |
| V-99 | T & B | N | N | N | N | WRR 12-4-13 |
| V-100 | T & B | N | N | N | N | WRR 12-4-13 |
| V-101 | T & B | N | N | N | N | WRR 12-4-13 |
| V-102 | T & B | N | N | N | N | WRR 12-4-13 |
| V-103 | T & B | N | N | N | N | WRR 12-4-13 |
| V-104 | T & B | N | N | N | N | WRR 12-4-13 |
| V-105 | T & B | N | N | N | N | WRR 12-4-13 |
| V-106 | T & B | N | N | N | N | WRR 12-4-13 |
| V-107 | T & B | N | N | N | N | WRR 12-14-13 |
| V-108 | T & B | N | N | N | N | WRR 12-14-13 |

* Evidence of oil at threaded connection is acceptable providing it is not excessive. This is oil that has separated from grease and is common.

** This is evidence of corrosion that resulted in metal loss and wastage that may affect the ability of the grease cap to contain the sheathing filler grease.

PRECISION SURVEILLANCE

N1091 PSC PROCEDURE SQ 8.5
GREASE CAP INSPECTION
Data Sheet 8.5
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## TMI UNIT 1 TENDON ANCHORAGE GREASE CAP INSPECTION

| TENDON ID | LOCATION OR BUTTRESS | EVIDENCE OF FREE WATER YES/NO | EVIDENCE OF GREASE LEAKAGE * YES/NO | EVIDENCE OF GREASE CAP DEFORMATION YES/NO | EVIDENCE OF CORROSION ** YES/NO | INSPECTOR'S INITIALS AND DATE |
|---|---|---|---|---|---|---|
| V-109 | T&B | N | N | N | N | WRR 12-4-13 |
| V-110 | T&B | N | N | N | N | WRR 12-4-13 |
| V-111 | T&B | N | N | N | N | WRR 12-4-13 |
| V-112 | T&B | N | N | N | N | WRR 12-4-13 |
| V-113 | T&B | N | N | N | N | WRR 12-4-13 |
| V-114 | T&B | N | N | N | N | WRR 12-4-13 |
| V-115 | T&B | N | N | N | N | WRR 12-4-13 |
| V-116 | T&B | N | N | N | N | WRR 12-4-13 |
| V-117 | T&B | N | N | N | N | WRR 12-4-13 |
| V-118 | T&B | N | N | N | N | WRR 12-4-13 |
| V-119 | T&B | N | N | N | N | WRR 12-4-13 |
| V-120 | T&B | N | N | N | N | WRR 12-4-13 |
| V-121 | T&B | N | N | N | N | WRR 12-4-13 |
| V-122 | T&B | N | N | N | N | WRR 12-4-13 |
| V-123 | T&B | N | N | N | N | WRR 12-4-13 |
| V-124 | T&B | N | N | N | N | WRR 12-4-13 |
| V-125 | T&B | N | N | N | N | WRR 12-4-13 |
| V-126 | T&B | N | N | N | N | WRR 12-4-13 |
| V-127 | T&B | N | N | N | N | WRR 12-4-13 |
| V-128 | T&B | N | N | N | N | WRR 12-4-13 |
| V-129 | T&B | N | N | N | N | WRR 12-4-13 |
| V-130 | T&B | N | N | N | N | WRR 12-4-13 |
| V-131 | T&B | N | N | N | N | WRR 12-4-13 |
| V-132 | T&B | N | N | N | N | WRR 12-4-13 |
| V-133 | T&B | N | N | N | N | WRR 12-4-13 |
| V-134 | T&B | N | N | N | N | WRR 12-4-13 |
| V-135 | T&B | N | N | N | N | WRR 12-4-13 |
| V-136 | T&B | N | N | N | N | WRR 12-4-13 |
| V-137 | T&B | N | N | N | N | WRR 12-4-13 |
| V-138 | T&B | N | N | N | N | WRR 12-4-13 |
| V-139 | T&B | N | N | N | N | WRR 12-4-13 |
| V-140 | T&B | N | N | N | N | WRR 12-4-13 |
| V-141 | T&B | N | N | N | N | WRR 12-4-13 |
| V-142 | T&B | N | N | N | N | WRR 12-4-13 |
| V-143 | T&B | N | N | N | N | WRR 12-4-13 |
| V-144 | T&B | N | N | N | N | WRR 12-4-13 |

* Evidence of oil at threaded connection is acceptable providing it is not excessive. This is oil that has separated from grease and is common.

** This is evidence of corrosion that resulted in metal loss and wastage that may affect the ability of the grease cap to contain the sheathing filler grease.

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## TMI UNIT 1 TENDON ANCHORAGE GREASE CAP INSPECTION

| TENDON ID | LOCATION OR BUTTRESS | EVIDENCE OF FREE WATER YES/NO | EVIDENCE OF GREASE LEAKAGE * YES/NO | EVIDENCE OF GREASE CAP DEFORMATION YES/NO | EVIDENCE OF CORROSION ** YES/NO | INSPECTOR'S INITIALS AND DATE |
|---|---|---|---|---|---|---|
| V-145 | T & B | N | N | N | N | WRR 12-4-13 |
| V-146 | T & B | N | N | N | N | WRR 12-4-13 |
| V-147 | T & B | N | N | N | N | WRR 12-4-13 |
| V-148 | T & B | N | N | N | N | WRR 12-4-13 |
| V-149 | T & B | N | N | N | N | WRR 12-4-13 |
| V-150 | T & B | N | N | N | N | WRR 12-4-13 |
| V-151 | T & B | N | N | N | N | WRR 12-4-13 |
| V-152 | T & B | N | N | N | N | WRR 12-4-13 |
| V-153 | T & B | N | N | N | N | WRR 12-4-13 |
| V-154 | T & B | N | N | N | N | WRR 12-4-13 |
| V-155 | T & B | N | N | N | N | WRR 12-4-13 |
| V-156 | T & B | N | N | N | N | WRR 12-4-13 |
| V-157 | T & B | N | N | N | N | WRR 12-4-13 |
| V-158 | T & B | N | N | N | N | WRR 12-4-13 |
| V-159 | T & B | N | N | N | N | WRR 12-4-13 |
| V-160 | T & B | N | N | N | N | WRR 12-4-13 |
| V-161 | T & B | N | N | N | N | WRR 12-4-13 |
| V-162 | T & B | N | N | N | N | WRR 12-4-13 |
| V-163 | T & B | N | N | N | N | WRR 12-4-13 |
| V-164 | T & B | N | N | N | N | WRR 12-4-13 |
| V-165 | T & B | N | N | N | N | WRR 12-4-13 |
| V-166 | T & B | N | N | N | N | WRR 12-4-13 |
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* Evidence of oil at threaded connection is acceptable providing it is not excessive. This is oil that has separated from grease and is common.

** This is evidence of corrosion that resulted in metal loss and wastage that may affect the ability of the grease cap to contain the sheathing filler grease.

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## TMI UNIT 1 TENDON ANCHORAGE GREASE CAP INSPECTION

| TENDON ID | LOCATION OR BUTTRESS | EVIDENCE OF FREE WATER YES/NO | EVIDENCE OF GREASE LEAKAGE * YES/NO | EVIDENCE OF GREASE CAP DEFORMATION YES/NO | EVIDENCE OF CORROSION ** YES/NO | INSPECTOR'S INITIALS AND DATE |
|---|---|---|---|---|---|---|
| D101 | SW & N.E. | N | N | N | N | WRR 10-23-13 |
| D102 | SW – N.E. | N | WRR 10-23-13 ~~N~~ Y < than 1oz. (SW) | N | N | WRR 10-23-13 |
| D103 | SW – N.E. | N | N | N | N | WRR 10-23-13 |
| D104 | SW – N.E. | N | WRR 10-23-13 ~~N~~ Y < than 1oz. (SW) | N | N | WRR 10-23-13 |
| D105 | SW – NE | N | WRR 10-23-13 ~~N~~ Y < than 1oz (SW) | N | N | WRR 10-23-13 |
| D106 | SW – NE | N | N | N | N | WRR 10-23-13 |
| D107 | SW – NE | N | N | N | N | WRR 10-23-13 |
| D108 | SW – NE | N | N | N | N | WRR 10-23-13 |
| D109 | SW – NE | N | N | N | N | WRR 10-23-13 |
| D110 | SW – NE | N | N | N | N | WRR 10-23-13 |
| D111 | SW – NE | N | N | N | N | WRR 10-23-13 |
| D112 | SW – NE | N | N | N | N | WRR 10-23-13 |
| D113 | SW-N.E | N | Y < than 2oz. (NE) | N | N | WRR 10-23-13 |
| D114 | SW-NE | N | N | N | N | WRR 10-23-13 |
| D115 | SW-N.E. | N | Y < than 2oz (NE) | N | N | WRR 10-23-13 |
| D116 | SW – NE | N | N | N | N | WRR 10-23-13 |
| D117 | SW – NE | N | N | N | N | WRR 10-23-13 |
| D118 | SW – NE | N | N | N | N | WRR 10-23-13 |
| D119 | SW – NE | N | N | N | N | WRR 10-23-13 |
| D120 | SW – NE | N | N | N | N | WRR 10-23-13 |
| D121 | SW – NE | N | N | N | N | WRR 10-23-13 |
| D122 | SW – NE | N | N | N | N | WRR 10-23-13 |
| D121 | SW – NE | N | N | N | N | WRR 10-23-13 |
| D122 | SW – NE | N | N | N | N | WRR 10-23-13 |
| D123 | SW-NE | N | N | N | N | WRR 10-23-13 |
| D124 | SW-NE | N | N | N | N | WRR 10-23-13 |
| D125 | SW-NE | N | N | N | N | WRR 10-23-13 |
| D126 | SW-NE | N | N | N | N | ~~WRR~~ WRR 10-23-13 |
| D127 | SW- NE | N | N | N | N | WRR 10-23-13 |
| D128 | SW-NE | N | N | N | N | WRR 10-23-13 |
| D129 | SW-NE | N | N | N | N | WRR 10-23-13 |
| D130 | SW-NE | N | N | N | N | WRR 10-23-13 |
| D131 | SW-NE | N | N | N | N | WRR 10-23-13 |
| D132 | SW-NE | N | N | N | N | WRR 10-23-13 |
| D133 | SW-NE | N | N | N | N | WRR 10-23-13 |
| D134 | SW-NE | N | N | N | N | WRR 10-23-13 |

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## TMI UNIT 1 TENDON ANCHORAGE GREASE CAP INSPECTION

| TENDON ID | LOCATION OR BUTTRESS | EVIDENCE OF FREE WATER YES/NO | EVIDENCE OF GREASE LEAKAGE * YES/NO | EVIDENCE OF GREASE CAP DEFORMATION YES/NO | EVIDENCE OF CORROSION ** YES/NO | INSPECTOR'S INITIALS AND DATE |
|---|---|---|---|---|---|---|
| D135 | SW-NE | N | N | N | N | WRR 10-23-13 |
| D136 | SW-NE | N | N | N | N | WRR 10-23-13 |
| D137 | SW-NE | N | N | N | N | WRR 10-23-13 |
| D138 | SW-NE | N | N | N | N | WRR 10-23-13 |
| D139 | SW-NE | N | N | N | N | WRR 10-23-13 |
| D140 | SW-NE | N | N | N | N | WRR 10-23-13 |
| D141 | SW-NE | N | N | N | N | WRR 10-23-13 |
| D142 | SW-NE | N | N | N | N | WRR 10-23-13 |
| D143 | SW-NE | N | N | N | N | WRR 10-23-13 |
| D144 | SW-NE | N | N | N | N | WRR 10-23-13 |
| D145 | SW-NE | N | N | N | N | WRR 10-23-13 |
| D146 | SW-NE | N | N | N | N | WRR 10-23-13 |
| D147 | SW-NE | N | N | N | N | WRR 10-23-13 |
| D148 | SW-NE | N | N | N | N | WRR 10-23-13 |
| D149 | SW-NE | N | N | N | N | WRR 10-23-13 |
| D201 | E-W | N | N | N | N | WRR 10-23-13 |
| D202 | E-W | N | N | N | N | WRR 10-23-13 |
| D203 | E-W | N | N | N | N | WRR 10-23-13 |
| D204 | E-W | N | N | N | N | WRR 10-23-13 |
| D205 | E-W | N | N | N | N | WRR 10-23-13 |
| D206 | E-W | N | N | N | N | WRR 10-23-13 |
| D207 | E-W | N | N | N | N | WRR 10-23-13 |
| D208 | E-W | N | N | N | N | WRR 10-23-13 |
| D209 | E-W | N | N | N | N | WRR 10-23-13 |
| D210 | E-W | N | N | N | N | WRR 10-23-13 |
| D211 | E-W | N | N | N | N | WRR 10-23-13 |
| D212 | E-W | N | N | N | N | WRR 10-23-13 |
| D213 | E-W | N | N | N | N | WRR 10-23-13 |
| D214 | E-W | N | N | N | N | WRR 10-23-13 |
| D215 | E-W | N | N | N | N | WRR 10-23-13 |
| D216 | E-W | N | N | N | N | WRR 10-23-13 |
| D217 | E-W | N | N | N | N | WRR 10-23-13 |
| D218 | E-W | N | N | N | N | WRR 10-23-13 |
| D219 | E-W | N | N | N | N | WRR 10-23-13 |
| D220 | E-W | N | N | N | N | WRR 10-23-13 |
| D221 | E-W | N | N | N | N | WRR 10-23-13 |

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** This is evidence of corrosion that resulted in metal loss and wastage that may affect the ability of the grease cap to contain the sheathing filler grease.

## TMI UNIT 1 TENDON ANCHORAGE GREASE CAP INSPECTION

| TENDON ID | LOCATION OR BUTTRESS | EVIDENCE OF FREE WATER YES/NO | EVIDENCE OF GREASE LEAKAGE * YES/NO | EVIDENCE OF GREASE CAP DEFORMATION YES/NO | EVIDENCE OF CORROSION ** YES/NO | INSPECTOR'S INITIALS AND DATE |
|---|---|---|---|---|---|---|
| D222 | E-W | N | N | N | N | WRR 10-23-13 |
| D223 | E-W | N | N | N | N | WRR 10-23-13 |
| D224 | E-W | N | N | N | N | WRR 10-23-13 |
| D225 | E-W | N | N | N | N | WRR 10-23-13 |
| D226 | E-W | N | N | N | N | WRR 10-23-13 |
| D227 | E-W | N | N | N | N | WRR 10-23-13 |
| D228 | E-W | N | N | N | N | WRR 10-23-13 |
| D229 | E-W | N | Y LG. oilstain 12"x14" W. Approx 2oz | N | N | WRR 10-23-13 |
| D230 | E-W | N | N | N | N | WRR 10-23-13 |
| D231 | E-W | N | N | N | N | WRR 10-23-13 |
| D232 | E-W | N | N | N | N | WRR 10-23-13 |
| D233 | E-W | N | N | N | N | WRR 10-23-13 |
| D234 | E-W | N | N | N | N | WRR 10-23-13 |
| D235 | E-W | N | N | N | N | WRR 10-23-13 |
| D236 | E-W | N | N | N | N | WRR 10-23-13 |
| D237 | E-W | N | N | N | N | WRR 10-23-13 |
| D238 | E-W | N | N | N | N | WRR 10-23-13 |
| D239 | E-W | N | N | N | N | WRR 10-23-13 |
| D240 | E-W | N | N | N | N | WRR 10-23-13 |
| D241 | E-W | N | N | N | N | WRR 10-23-13 |
| D242 | E-W | N | N | N | N | WRR 10-23-13 |
| D243 | E-W | N | N | N | Y (E) Light corr. 25% No Pitting. | WRR 10-23-13 |
| D244 | E-W | N | N | N | N | WRR 10-23-13 |
| D245 | E-W | N | N | N | N | WRR 10-23-13 |
| D246 | E-W | N | N | N | N | WRR 10-23-13 |
| D247 | E-W | N | N | N | N | WRR 10-23-13 |
| D248 | E-W | N | N | N | N | WRR 10-23-13 |
| D249 | E-W | N | N | N | N | WRR 10-23-13 |
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| D301 | N-S | N | N | N | N | WRR 10-23-13 |
| D302 | N-S | N | N | N | N | WRR 10-23-13 |
| D303 | N-S | N | N | N | N | WRR 10-23-13 |
| D304 | N-S | N | N | N | N | WRR 10-23-13 |
| D305 | N-S | N | N | N | N | WRR 10-23-13 |
| D306 | N-S | N | N | N | N | WRR 10-23-13 |
| D307 | N-S | N | N | N | N | WRR 10-23-13 |

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| TENDON ID | LOCATION OR BUTTRESS | EVIDENCE OF FREE WATER YES/NO | EVIDENCE OF GREASE LEAKAGE * YES/NO | EVIDENCE OF GREASE CAP DEFORMATION YES/NO | EVIDENCE OF CORROSION ** YES/NO | INSPECTOR'S INITIALS AND DATE |
|---|---|---|---|---|---|---|
| D308 | N-S | N | N | N | N | WRR 10-23-13 |
| D309 | N-S | N | N | N | N | WRR 10-23-13 |
| D310 | N-S | N | N | N | N | WRR 10-23-13 |
| D311 | N-S | N | N | N | N | WRR 10-23-13 |
| D312 | N-S | N | N | N | N | WRR 10-23-13 |
| D313 | N-S | N | N | N | N | WRR 10-23-13 |
| D314 | N-S | N | N | N | N | WRR 10-23-13 |
| D315 | N-S | N | N | N | N | WRR 10-23-13 |
| D316 | N-S | N | N | N | N | WRR 10-23-13 |
| D317 | N-S | N | N | N | N | WRR 10-23-13 |
| D318 | N-S | N | N | N | N | WRR 10-23-13 |
| D319 | N-S | N | N | N | N | WRR 10-23-13 |
| D320 | N-S | N | N | N | N | WRR 10-23-13 |
| D321 | N-S | N | N | N | N | WRR 10-23-13 |
| D322 | N-S | N | N | N | N | WRR 10-23-13 |
| D323 | N-S | N | N | N | N | WRR 10-23-13 |
| D324 | N-S | N | N | N | N | WRR 10-23-13 |
| D325 | N-S | N | N | N | N | WRR 10-23-13 |
| D326 | N-S | N | N | N | N | WRR 10-23-13 |
| D327 | N-S | N | N | N | N | WRR 10-23-13 |
| D328 | N-S | N | N | N | N | WRR 10-23-13 |
| D329 | N-S | N | N | N | N | WRR 10-23-13 |
| D330 | N-S | N | N | N | N | WRR 10-23-13 |
| D331 | N-S | N | N | N | N | WRR 10-23-13 |
| D332 | N-S | N | N | N | N | WRR 10-23-13 |
| D333 | N-S | N | N | N | N | WRR 10-23-13 |
| D334 | N-S | N | N | N | N | WRR 10-23-13 |
| D335 | N-S | N | N | N | N | WRR 10-23-13 |
| D336 | N-S | N | N | N | N | WRR 10-23-13 |
| D337 | N-S | N | N | N | N | WRR 10-23-13 |
| D338 | N-S | N | N | N | N | WRR 10-23-13 |
| D339 | N-S | N | N | N | N | WRR 10-23-13 |
| D340 | N-S | N | N | N | N | WRR 10-23-13 |
| D341 | N-S | N | N | N | N | WRR 10-23-13 |
| D342 | N-S | N | N | N | N | WRR 10-23-13 |
| D343 | N-S | N | N | N | N | WRR 10-23-13 |

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|---|---|---|---|---|---|---|
| D344 | N-S | N | N | N | N | WRR 10-23-13 |
| D345 | N-S | N | N | N | N | WRR 10-23-13 |
| D346 | N-S | N | N | N | N | WRR 10-23-13 |
| D347 | N-S | N | N | N | N | WRR 10-23-13 |
| D348 | N-S | N | N | N | N | WRR 10-23-13 |
| D349 | N-S | N | N | N | N | WRR 10-23-13 |
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** This is evidence of corrosion that resulted in metal loss and wastage that may affect the ability of the grease cap to contain the sheathing filler grease.

## TMI UNIT 1 TENDON ANCHORAGE GREASE CAP INSPECTION

| TENDON ID | LOCATION OR BUTTRESS | EVIDENCE OF FREE WATER YES/NO | EVIDENCE OF GREASE LEAKAGE * YES/NO | EVIDENCE OF GREASE CAP DEFORMATION YES/NO | EVIDENCE OF CORROSION ** YES/NO | INSPECTOR'S INITIALS AND DATE |
|---|---|---|---|---|---|---|
| H13-1 | B 1-3 | N | N | N | N | WRR 11-20-13 |
| H13-2 | B 1-3 | N | N | N | N | WRR 11-20-13 |
| H13-3 | B 1-3 | N | N | N | N | WRR 11-20-13 |
| H13-4 | B 1-3 | N | N | N | N | WRR 11-20-13 |
| H13-5 | B 1-3 | N | N | N | N | WRR 11-20-13 |
| H13-6 | B 1-3 | N | N | N | N | WRR 11-20-13 |
| H13-7 | B 1-3 | N | N | N | N | WRR 11-20-13 |
| H13-8 | B 1-3 | N | N | N | N | WRR 11-20-13 |
| H13-9 | B 1-3 | N | N | N | N | WRR 11-20-13 |
| H13-10 | B 1-3 | N | N | N | N | WRR 11-20-13 |
| H13-11 | B 1-3 | N | N | N | N | WRR 11-20-13 |
| H13-12 | B 1-3 | N | N | N | N | WRR 11-20-13 |
| H13-13 | B 1-3 | N | N | N | N | WRR 11-20-13 |
| H13-14 | B 1-3 | N | N | N | N | WRR 11-20-13 |
| H13-15 | B 1-3 | N | N | N | N | WRR 11-20-13 |
| H13-16 | B 1-3 | N | N | N | N | WRR 11-20-13 |
| H13-17 | B 1-3 | N | N | N | N | WRR 11-20-13 |
| H13-17 | B 1-3 | N | N | N | N | WRR 11-20-13 |
| H13-18 | B 1-3 | N | N | N | N | WRR 11-20-13 |
| H13-19 | B 1-3 | N | N | N | N | WRR 11-20-13 |
| H13-20 | B 1-3 | N | N | N | N | WRR 11-20-13 |
| H13-21 | B 1-3 | N | N | N | N | WRR 11-20-13 |
| H13-22 | B 1-3 | N | N | N | N | WRR 11-20-13 |
| H13-23 | B 1-3 | N | N | N | N | WRR 11-20-13 |
| H13-24 | B 1-3 | N | N | N | N | WRR 11-20-13 |
| H13-25 | B 1-3 | N | N | N | N | WRR 11-20-13 |
| H13-26 | B 1-3 | N | N | N | N | WRR 11-20-13 |
| H13-27 | B 1-3 | N | N | N | N | WRR 11-20-13 |
| H13-28 | B 1-3 | N | N | N | N | WRR 11-20-13 |
| H13-29 | B 1-3 | N | N | N | N | WRR 11-20-13 |
| H13-30 | B 1-3 | N | N | N | N | WRR 11-20-13 |
| H13-31 | B 1-3 | N | N | N | N | WRR 11-20-13 |
| H13-32 | B 1-3 | N | N | N | N | WRR 11-20-13 |
| H13-33 | B 1-3 | N | N | N | N | WRR 11-20-13 |
| H13-34 | B 1-3 | N | N | N | N | WRR 11-20-13 |
| H13-35 | B 1-3 | N | N | N | N | WRR 11-20-13 |

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## TMI UNIT 1 TENDON ANCHORAGE GREASE CAP INSPECTION

| TENDON ID | LOCATION OR BUTTRESS | EVIDENCE OF FREE WATER YES/NO | EVIDENCE OF GREASE LEAKAGE * YES/NO | EVIDENCE OF GREASE CAP DEFORMATION YES/NO | EVIDENCE OF CORROSION ** YES/NO | INSPECTOR'S INITIALS AND DATE |
|---|---|---|---|---|---|---|
| H13-36 | B 1-3 | N | N | N | N | WRR 11-20-13 |
| H13-37 | B 1-3 | N | N | N | N | WRR 11-20-13 |
| H13-38 | B 1-3 | N | N | N | N | WRR 11-20-13 |
| H13-39 | B 1-3 | N | N | N | N | WRR 11-20-13 |
| H13-40 | B 1-3 | N | N | N | N | WRR 11-20-13 |
| H13-41 | B 1-3 | N | N | N | N | WRR 11-20-13 |
| H13-42 | B 1-3 | N | N | N | N | WRR 11-20-13 |
| H13-43 | B 1-3 | N | N | N | N | WRR 11-20-13 |
| H13-44 | B 1-3 | N | N | N | N | WRR 11-20-13 |
| H13-45 | B 1-3 | N | N | N | N | WRR 10-24-13 |
| H13-46 | B 1-3 | N | N | N | N | WRR 10-24-13 |
| H13-47 | B 1-3 | N | N | N | N | WRR 10-24-13 |
| H13-48 | B 1-3 | N | N | N | N | WRR 10-24-13 |
| H13-49 | B 1-3 | N | N | N | N | WRR 10-24-13 |
| H13-50 | B 1-3 | N | N | N | N | WRR 10-24-13 |
| H13-51 | B 1-3 | N | Y Approx 2 oz present | N | N | WRR 10-24-13 |
| H13-52 | B 1-3 | N | N | N | N | WRR 10-24-13 |
| H13-53 | B 1-3 | N | N | N | N | WRR 10-24-13 |
| H13-54 | B 1-3 | N | N | N | N | WRR 10-24-13 |
| H13-55 | B 1-3 | N | Y Approx 3 oz present | N | N | WRR 10-24-13 |
| | | | | | | |
| H24-1 | B 2-4 | N | N | N | N | WRR 12-4-13 |
| H24-2 | B 2-4 | N | N | N | N | WRR 12-4-13 |
| H24-3 | B 2-4 | N | N | N | N | WRR 12-4-13 |
| H24-4 | B 2-4 | N | N | N | N | WRR 12-4-13 |
| H24-5 | B 2-4 | N | N | N | N | WRR 12-4-13 |
| H24-6 | B 2-4 | N | N | N | N | WRR 12-4-13 |
| H24-7 | B 2-4 | N | N | N | N | WRR 12-4-13 |
| H24-8 | B 2-4 | N | N | N | N | WRR 12-4-13 |
| H24-9 | B 2-4 | N | N | N | N | WRR 12-4-13 |
| H24-10 | B 2-4 | N | N | N | N | WRR 12-4-13 |
| H24-11 | B 2-4 | N | N | N | N | WRR 12-4-13 |
| H24-12 | B 2-4 | N | N | N | N | WRR 12-4-13 |
| H24-13 | B 2-4 | N | N | N | N | WRR 12-4-13 |
| H24-14 | B 2-4 | N | N | N | N | WRR 12-4-13 |
| H24-15 | B 2-4 | N | N | N | N | WRR 12-4-13 |

* Evidence of oil at threaded connection is acceptable providing it is not excessive. This is oil that has separated from grease and is common.

** This is evidence of corrosion that resulted in metal loss and wastage that may affect the ability of the grease cap to contain the sheathing filler grease.

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## TMI UNIT 1 TENDON ANCHORAGE GREASE CAP INSPECTION

| TENDON ID | LOCATION OR BUTTRESS | EVIDENCE OF FREE WATER YES/NO | EVIDENCE OF GREASE LEAKAGE * YES/NO | EVIDENCE OF GREASE CAP DEFORMATION YES/NO | EVIDENCE OF CORROSION ** YES/NO | INSPECTOR'S INITIALS AND DATE |
|---|---|---|---|---|---|---|
| H24-16 | B 2-4 | N | N | N | N | WRR 12-4-13 |
| H24-17 | B 2-4 | N | N | N | N | WRR 12-4-13 |
| H24-18 | B 2-4 | N | N | N | N | WRR 12-4-13 |
| H24-19 | B 2-4 | N | N | N | N | WRR 12-4-13 |
| H24-20 | B 2-4 | N | N | N | N | WRR 12-4-13 |
| H24-21 | B 2-4 | N | N | N | N | WRR 12-4-13 |
| H24-22 | B 2-4 | N | N | N | N | WRR 12-4-13 |
| H24-23 | B 2-4 | N | N | N | N | WRR 12-4-13 |
| H24-24 | B 2-4 | N | N | N | N | WRR 12-4-13 |
| H24-25 | B 2-4 | N | N | N | N | WRR 12-4-13 |
| H24-26 | B 2-4 | N | N | N | N | WRR 12-4-13 |
| H24-27 | B 2-4 | N | N | N | N | WRR 12-4-13 |
| H24-28 | B 2-4 | N | N | N | N | WRR 12-4-13 |
| H24-29 | B 2-4 | N | N | N | N | WRR 12-4-13 |
| H24-30 | B 2-4 | N | N | N | N | WRR 12-4-13 |
| H24-31 | B 2-4 | N | N | N | N | WRR 12-4-13 |
| H24-32 | B 2-4 | N | N | N | N | WRR 12-4-13 |
| H24-33 | B 2-4 | N | N | N | N | WRR 12-4-13 |
| H24-34 | B 2-4 | N | N | N | N | WRR 12-4-13 |
| H24-35 | B 2-4 | N | N | N | N | WRR 12-4-13 |
| H24-36 | B 2-4 | N | N | N | N | WRR 12-4-13 |
| H24-37 | B 2-4 | N | N | N | N | WRR 12-4-13 |
| H24-38 | B 2-4 | N | N | N | N | WRR 12-4-13 |
| H24-39 | B 2-4 | N | N | N | N | WRR 12-4-13 |
| H24-40 | B 2-4 | N | N | N | N | WRR 12-4-13 |
| H24-41 | B 2-4 | N | N | N | N | WRR 12-4-13 |
| H24-42 | B 2-4 | N | N | N | N | WRR 12-4-13 |
| H24-43 | B 2-4 | N | N | N | N | WRR 12-4-13 |
| H24-44 | B 2-4 | N | N | N | N | WRR 12-4-13 |
| H24-45 | B 2-4 | N | N | N | N | WRR 10-24-13 |
| H24-46 | B 2-4 | N | N | N | N | WRR 10-24-13 |
| H24-47 | B 2-4 | N | N | N | N | WRR 10-24-13 |
| H24-48 | B 2-4 | N | N | N | N | WRR 10-24-13 |
| H24-49 | B 2-4 | N | N | N | N | WRR 10-24-13 |
| H24-50 | B 2-4 | N | N | N | N | WRR 10-24-13 |
| H24-51 | B 2-4 | N | N | N | N | WRR 10-24-13 |

* Evidence of oil at threaded connection is acceptable providing it is not excessive. This is oil that has separated from grease and is common.

** This is evidence of corrosion that resulted in metal loss and wastage that may affect the ability of the grease cap to contain the sheathing filler grease.

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## TMI UNIT 1 TENDON ANCHORAGE GREASE CAP INSPECTION

| TENDON ID | LOCATION OR BUTTRESS | EVIDENCE OF FREE WATER YES/NO | EVIDENCE OF GREASE LEAKAGE * YES/NO | EVIDENCE OF GREASE CAP DEFORMATION YES/NO | EVIDENCE OF CORROSION ** YES/NO | INSPECTOR'S INITIALS AND DATE |
|---|---|---|---|---|---|---|
| H24-52 | B 2-4 | N | N | N | N | WRR 10-24-13 |
| H24-53 | B 2-4 | N | N | N | N | WRR 10-24-13 |
| H24-54 | B 2-4 | N | N | N | N | WRR 10-24-13 |
| H24-55 | B 2-4 | N | N | N | N | WRR 10-24-13 |
| | | | | | | |
| H35-1 | B 3-5 | N | N | N | N | WRR 10-24-13 |
| H35-2 | B 3-5 | N | N | N | N | WRR 10-24-13 |
| H35-3 | B 3-5 | N | N | N | N | WRR 10-24-13 |
| H35-4 | B 3-5 | N | N | N | N | WRR 10-24-13 |
| H35-5 | B 3-5 | N | N | N | N | WRR 10-24-13 |
| H35-6 | B 3-5 | N | N | N | N | WRR 10-24-13 |
| H35-7 | B 3-5 | N | N | N | N | WRR 10-24-13 |
| H35-8 | B 3-5 | N | N | N | N | WRR 10-24-13 |
| H35-9 | B 3-5 | N | N | N | N | WRR 10-24-13 |
| H35-10 | B 3-5 | N | N | N | N | WRR 10-24-13 |
| H35-11 | B 3-5 | N | N | N | N | WRR 10-24-13 |
| H35-12 | B 3-5 | N | N | N | N | WRR 10-24-13 |
| H35-13 | B 3-5 | N | N | N | N | WRR 10-24-13 |
| H35-14 | B 3-5 | N | N | N | N | WRR 10-24-13 |
| H35-15 | B 3-5 | N | N | N | N | WRR 10-24-13 |
| H35-16 | B 3-5 | N | N | N | N | WRR 10-24-13 |
| H35-17 | B 3-5 | N | N | N | N | WRR 10-24-13 |
| H35-18 | B 3-5 | N | N | N | N | WRR 10-24-13 |
| H35-19 | B 3-5 | N | N | N | N | WRR 10-24-13 |
| H35-20 | B 3-5 | N | N | N | N | WRR 10-24-13 |
| H35-21 | B 3-5 | N | N | N | N | WRR 10-24-13 |
| H35-22 | B 3-5 | N | N | N | N | WRR 10-24-13 |
| H35-23 | B 3-5 | N | N | N | N | WRR 10-24-13 |
| H35-24 | B 3-5 | N | N | N | N | WRR 10-24-13 |
| H35-26 | B 3-5 | N | N | N | N | WRR 10-24-13 |
| H35-25 | B 3-5 | N(*) B-5 end → Y(*) | | N | N | WRR 10-24-13 |

* Evidence of oil at threaded connection is acceptable providing it is not excessive. This is oil that has separated from grease and is common.

** This is evidence of corrosion that resulted in metal loss and wastage that may affect the ability of the grease cap to contain the sheathing filler grease.

(*) (*) (H35-25 @ Buttress 5 end) has a small qty. < than 2 oz of grease/oil leaked onto the bearing plate and wall below. Buttress 3 end is good.

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## TMI UNIT 1 TENDON ANCHORAGE GREASE CAP INSPECTION

| TENDON ID | LOCATION OR BUTTRESS | EVIDENCE OF FREE WATER YES/NO | EVIDENCE OF GREASE LEAKAGE * YES/NO | EVIDENCE OF GREASE CAP DEFORMATION YES/NO | EVIDENCE OF CORROSION ** YES/NO | INSPECTOR'S INITIALS AND DATE |
|---|---|---|---|---|---|---|
| H35-27 | B 3-5 | N | N | N | N | WRR 10-24-13 |
| H35-28 | B 3-5 | N | N | N | N | WRR 10-24-13 |
| H35-29 | B 3-5 | N | N | N | N | WRR 10-24-13 |
| H35-30 | B 3-5 | N | N | N | N | WRR 10-24-13 |
| H35-31 | B 3-5 | N | N | N | N | WRR 10-24-13 |
| H35-32 | B 3-5 | N | N | N | N | WRR 10-24-13 |
| H35-33 | B 3-5 | N | N | N | N | WRR 10-24-13 |
| H35-34 | B 3-5 | N | N | N | N | WRR 10-24-13 |
| H35-35 | B 3-5 | N | N | N | N | WRR 10-24-13 |
| H35-36 | B 3-5 | N | N | N | N | WRR 10-24-13 |
| H35-37 | B 3-5 | N | N | N | N | WRR 10-24-13 |
| H35-38 | B 3-5 | N | N | N | N | WRR 10-24-13 |
| H35-39 | B 3-5 | N | N | N | N | WRR 10-24-13 |
| H35-40 | B 3-5 | N | N | N | N | WRR 10-24-13 |
| H35-41 | B 3-5 | N | N | N | N | WRR 10-24-13 |
| H35-42 | B 3-5 | N | N | N | N | WRR 10-24-13 |
| H35-43 | B 3-5 | N | N | N | N | WRR 10-24-13 |
| H35-44 | B 3-5 | N | N | N | N | WRR 10-24-13 |
| H35-46 | B 3-5 | N | N | N | N | WRR 10-24-13 |
| H35-47 | B 3-5 | N | N | N | N | WRR 10-24-13 |
| H35-48 | B 3-5 | N | N | N | N | WRR 10-24-13 |
| H35-49 | B 3-5 | N | N | N | N | WRR 10-24-13 |
| H35-50 | B 3-5 | N | N | N | N | WRR 10-24-13 |
| H35-51 | B 3-5 | N | N | N | N | WRR 10-24-13 |
| H35-52 | B 3-5 | N | N | N | N | WRR 10-24-13 |
| H35-53 | B 3-5 | N | N | N | N | WRR 10-24-13 |
| H35-54 | B 3-5 | N | N | N | N | WRR 10-24-13 |
| H35-55 | B 3-5 | N | N | N | N | WRR 10-24-13 |

* Evidence of oil at threaded connection is acceptable providing it is not excessive. This is oil that has separated from grease and is common.

** This is evidence of corrosion that resulted in metal loss and wastage that may affect the ability of the grease cap to contain the sheathing filler grease.

## TMI UNIT 1 TENDON ANCHORAGE GREASE CAP INSPECTION

| TENDON ID | LOCATION OR BUTTRESS | EVIDENCE OF FREE WATER YES/NO | EVIDENCE OF GREASE LEAKAGE * YES/NO | EVIDENCE OF GREASE CAP DEFORMATION YES/NO | EVIDENCE OF CORROSION ** YES/NO | INSPECTOR'S INITIALS AND DATE |
|---|---|---|---|---|---|---|
| H46-1 | B 4-6 | N | N | N | N | WRR 12-4-13 |
| H46-2 | B 4-6 | N | N | N | N | WRR 12-4-13 |
| H46-3 | B 4-6 | N | N | N | N | WRR 12-4-13 |
| H46-4 | B 4-6 | N | N | N | N | WRR 12-4-13 |
| H46-5 | B 4-6 | N | N | N | N | WRR 12-4-13 |
| H46-6 | B 4-6 | N | N | N | N | WRR 12-4-13 |
| H46-7 | B 4-6 | N | N | N | N | WRR 10-24-13 |
| H46-8 | B 4-6 | N | N | N | N | WRR 10-24-13 |
| H46-9 | B 4-6 | N | N | N | N | WRR 10-24-13 |
| H46-10 | B 4-6 | N | N | N | N | WRR 10-24-13 |
| H46-11 | B 4-6 | N | N | N | N | WRR 10-24-13 |
| H46-12 | B 4-6 | N | N | N | N | WRR 10-24-13 |
| H46-13 | B 4-6 | N | N | N | N | WRR 10-24-13 |
| H46-14 | B 4-6 | N | N | N | N | WRR 10-24-13 |
| H46-15 | B 4-6 | N | N | N | N | WRR 10-24-13 |
| H46-16 | B 4-6 | N | N | N | N | WRR 10-24-13 |
| H46-17 | B 4-6 | N | N | N | N | WRR 10-24-13 |
| H46-18 | B 4-6 | N | N | N | N | WRR 10-24-13 |
| H46-19 | B 4-6 | N | N | N | N | WRR 10-24-13 |
| H46-20 | B 4-6 | N | N | N | N | WRR 10-24-13 |
| H46-21 | B 4-6 | N | N | N | N | WRR 10-24-13 |
| H46-22 | B 4-6 | N | N | N | N | WRR 10-24-13 |
| H46-23 | B 4-6 | N | N | N | N | WRR 10-24-13 |
| H46-24 | B 4-6 | N | N | N | N | WRR 10-24-13 |
| H46-25 | B 4-6 | N | N | N | N | WRR 10-24-13 |
| H46-26 | B 4-6 | N | N | N | N | WRR 10-24-13 |
| H46-27 | B 4-6 | N | N | N | N | WRR 10-24-13 |
| H46-28 | B 4-6 | N | N | N | N | WRR 10-24-13 |
| H46-29 | B 4-6 | N | N | N | N | WRR 10-24-13 |
| H46-30 | B 4-6 | N | N | N | N | WRR 10-24-13 |
| H46-31 | B 4-6 | N | N | N | N | WRR 10-24-13 |
| H46-32 | B 4-6 | N | N | N | N | WRR 10-24-13 |
| H46-33 | B 4-6 | N | N | N | N | WRR 10-24-13 |
| H46-34 | B 4-6 | N | N | N | N | WRR 10-24-13 |
| H46-35 | B 4-6 | N | N | N | N | WRR 10-24-13 |
| H46-36 | B 4-6 | N | N | N | N | WRR 10-24-13 |

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** This is evidence of corrosion that resulted in metal loss and wastage that may affect the ability of the grease cap to contain the sheathing filler grease.

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| TENDON ID | LOCATION OR BUTTRESS | EVIDENCE OF FREE WATER YES/NO | EVIDENCE OF GREASE LEAKAGE * YES/NO | EVIDENCE OF GREASE CAP DEFORMATION YES/NO | EVIDENCE OF CORROSION ** YES/NO | INSPECTOR'S INITIALS AND DATE |
|---|---|---|---|---|---|---|
| H46-37 | B 4-6 | N | N | N | N | WRR 10-24-13 |
| H46-38 | B 4-6 | N | N | N | N | WRR 10-24-13 |
| H46-39 | B 4-6 | N | N | N | N | WRR 10-24-13 |
| H46-40 | B 4-6 | N | N | N | N | WRR 10-24-13 |
| H46-41 | B 4-6 | N | N | N | N | WRR 10-24-13 |
| H46-42 | B 4-6 | N | N | N | N | WRR 10-24-13 |
| H46-43 | B 4-6 | N | N | N | N | WRR 10-24-13 |
| H46-44 | B 4-6 | N | N | N | N | WRR 10-24-13 |
| H46-45 | B 4-6 | N | N | N | N | WRR 10-24-13 |
| H46-46 | B 4-6 | N | N | N | N | WRR 10-24-13 |
| H46-47 | B 4-6 | N | N | N | N | WRR 10-24-13 |
| H46-48 | B 4-6 | N | N | N | N | WRR 10-24-13 |
| H46-49 | B 4-6 | N | N | N | N | WRR 10-24-13 |
| H46-50 | B 4-6 | N | N | N | N | WRR 10-24-13 |
| H46-51 | B 4-6 | N | N | N | N | WRR 10-24-13 |
| H46-51 | B 4-6 | N | N | N | N | WRR 10-24-13 |
| H46-52 | B 4-6 | N | N | N | N | WRR 10-24-13 |
| H46-53 | B 4-6 | N | N | N | N | WRR 10-24-13 |
| H46-54 | B 4-6 | N | N | N | N | WRR 10-24-13 |
| H46-55 | B 4-6 | N | N | N | N | WRR 10-24-13 |
| | | | | | | |
| H51-1 | B 5-1 | N | N | N | N | WRR 11-20-13 |
| H51-2 | B 5-1 | N | N | N | N | WRR 11-20-13 |
| H51-3 | B 5-1 | N | N | N | N | WRR 11-20-13 |
| H51-4 | B 5-1 | N | N | N | N | WRR 11-20-13 |
| H51-5 | B 5-1 | N | N | N | N | WRR 11-20-13 |
| H51-6 | B 5-1 | N | N | N | N | WRR 11-20-13 |
| H51-7 | B 5-1 | N | N | N | N | WRR 10-24-13 |
| H51-8 | B 5-1 | N | N | N | N | WRR 10-24-13 |
| H51-9 | B 5-1 | N | N | N | N | WRR 10-24-13 |
| H51-10 | B 5-1 | N | N | N | N | WRR 10-24-13 |
| H51-11 | B 5-1 | N | N | N | N | WRR 10-24-13 |
| H51-12 | B 5-1 | N | N | N | N | WRR 10-24-13 |
| H51-13 | B 5-1 | N | N | N | N | WRR 10-24-13 |
| H51-14 | B 5-1 | N | N | N | N | WRR 10-24-13 |
| H51-15 | B 5-1 | N | N | N | N | WRR 10-24-13 |

* Evidence of oil at threaded connection is acceptable providing it is not excessive. This is oil that has separated from grease and is common.

** This is evidence of corrosion that resulted in metal loss and wastage that may affect the ability of the grease cap to contain the sheathing filler grease.

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|---|---|---|---|---|---|---|
| H51-16 | B 5-1 | N | N | N | N | WRR 10-24-13 |
| H51-17 | B 5-1 | N | N | N | N | WRR 10-24-13 |
| H51-18 | B 5-1 | N | N | N | N | WRR 10-24-13 |
| H51-19 | B 5-1 | N | N | N | N | WRR 10-24-13 |
| H51-20 | B 5-1 | N | N | N | N | WRR 10-24-13 |
| H51-21 | B 5-1 | N | N | N | N | WRR 10-24-13 |
| H51-22 | B 5-1 | N | N | N | N | WRR 10-24-13 |
| H51-23 | B 5-1 | N | N | N | N | WRR 10-24-13 |
| H51-24 | B 5-1 | N | N | N | N | WRR 10-24-13 |
| H51-25 | B 5-1 | N | N | N | N | WRR 10-24-13 |
| H51-26 | B 5-1 | N | N | N | N | WRR 10-24-13 |
| H51-27 | B 5-1 | N | N | N | N | WRR 10-24-13 |
| H51-28 | B 5-1 | N | N | N | N | WRR 10-24-13 |
| H51-29 | B 5-1 | N | N | N | N | WRR 10-24-13 |
| H51-30 | B 5-1 | N | N | N | N | WRR 10-24-13 |
| H51-31 | B 5-1 | N | N | N | N | WRR 10-24-13 |
| H51-32 | B 5-1 | N | N | N | N | WRR 10-24-13 |
| H51-33 | B 5-1 | N | N | N | N | WRR 10-24-13 |
| H51-34 | B 5-1 | N | N | N | N | WRR 10-24-13 |
| H51-35 | B 5-1 | N | N | N | N | WRR 10-24-13 |
| H51-36 | B 5-1 | N | N | N | N | WRR 10-24-13 |
| H51-37 | B 5-1 | N | N | N | N | WRR 10-24-13 |
| H51-38 | B 5-1 | N | N | N | N | WRR 10-24-13 |
| H51-39 | B 5-1 | N | N | N | N | WRR 10-24-13 |
| H51-40 | B 5-1 | N | N | N | N | WRR 10-24-13 |
| H51-41 | B 5-1 | N | N | N | N | WRR 10-24-13 |
| H51-42 | B 5-1 | N | N | N | N | WRR 10-24-13 |
| H51-43 | B 5-1 | N | N | N | N | WRR 10-24-13 |
| H51-44 | B 5-1 | N | N | N | N | WRR 10-24-13 |
| H51-45 | B 5-1 | N | N | N | N | WRR 10-24-13 |
| H51-46 | B 5-1 | N | N | N | N | WRR 10-24-13 |
| H51-47 | B 5-1 | N | N | N | N | WRR 10-24-13 |
| H51-48 | B 5-1 | N | N | N | N | WRR 10-24-13 |
| H51-49 | B 5-1 | N | N | N | N | WRR 10-24-13 |
| H51-50 | B 5-1 | N | N | N | N | WRR 10-24-13 |
| H51-51 | B 5-1 | N | N | N | N | WRR 10-24-13 |

* Evidence of oil at threaded connection is acceptable providing it is not excessive. This is oil that has separated from grease and is common.

** This is evidence of corrosion that resulted in metal loss and wastage that may affect the ability of the grease cap to contain the sheathing filler grease.

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## TMI UNIT 1 TENDON ANCHORAGE GREASE CAP INSPECTION

| TENDON ID | LOCATION OR BUTTRESS | EVIDENCE OF FREE WATER YES/NO | EVIDENCE OF GREASE LEAKAGE * YES/NO | EVIDENCE OF GREASE CAP DEFORMATION YES/NO | EVIDENCE OF CORROSION ** YES/NO | INSPECTOR'S INITIALS AND DATE |
|---|---|---|---|---|---|---|
| H51-52 | B 5-1 | N | N | N | N | WRR 10-24-13 |
| H51-53 | B 5-1 | N | N | N | N | WRR 10-24-13 |
| H51-54 | B 5-1 | N | N | N | N | WRR 10-24-13 |
| H51-55 | B 5-1 | N | N | N | N | WRR 10-24-13 |
| | | | | | | |
| H62-1 | B 6-2 | N | N | N | N | WRR 11-20-13 |
| H62-2 | B 6-2 | N | N | N | N | WRR 11-20-13 |
| H62-3 | B 6-2 | N | N | N | N | WRR 11-20-13 |
| H62-4 | B 6-2 | N | N | N | N | WRR 11-20-13 |
| H62-5 | B 6-2 | N | N | N | N | WRR 11-20-13 |
| H62-6 | B 6-2 | N | N | N | N | WRR 11-20-13 |
| H62-7 | B 6-2 | N | N | N | N | WRR 10-24-13 |
| H62-8 | B 6-2 | N | N | N | N | WRR 10-24-13 |
| H62-9 | B 6-2 | N | N | N | N | WRR 10-24-13 |
| H62-10 | B 6-2 | N | N | N | N | WRR 10-24-13 |
| H62-11 | B 6-2 | N | N | N | N | WRR 10-24-13 |
| H62-12 | B 6-2 | N | N | N | N | WRR 10-24-13 |
| H62-13 | B 6-2 | N | N | N | N | WRR 10-24-13 |
| H62-14 | B 6-2 | N | N | N | N | WRR 10-24-13 |
| H62-15 | B 6-2 | N | N | N | N | WRR 10-24-13 |
| H62-16 | B 6-2 | N | N | N | N | WRR 10-24-13 |
| H62-17 | B 6-2 | N | N | N | N | WRR 10-24-13 |
| H62-18 | B 6-2 | N | N | N | N | WRR 10-24-13 |
| H62-19 | B 6-2 | N | N | N | N | WRR 10-24-13 |
| H62-20 | B 6-2 | N | N | N | N | WRR 10-24-13 |
| H62-21 | B 6-2 | N | N | N | N | WRR 10-24-13 |
| H62-21 | B 6-2 | N | N | N | N | WRR 10-24-13 |
| H62-22 | B 6-2 | N | N | N | N | WRR 10-24-13 |
| H62-23 | B 6-2 | N | N | N | N | WRR 10-24-13 |
| H62-24 | B 6-2 | N | N | N | N | WRR 10-24-13 |
| H62-25 | B 6-2 | N | N | N | N | WRR 10-24-13 |
| H62-26 | B 6-2 | N | N | N | N | WRR 10-24-13 |
| H62-27 | B 6-2 | N | N | N | N | WRR 10-24-13 |
| H62-28 | B 6-2 | N | N | N | N | WRR 10-24-13 |
| H62-29 | B 6-2 | N | N | N | N | WRR 10-24-13 |
| H62-30 | B 6-2 | N | N | N | N | WRR 10-24-13 |

* Evidence of oil at threaded connection is acceptable providing it is not excessive. This is oil that has separated from grease and is common.

** This is evidence of corrosion that resulted in metal loss and wastage that may affect the ability of the grease cap to contain the sheathing filler grease.

PSC
PRECISION SURVEILLANCE

N1091 PSC PROCEDURE SQ 8.5
**GREASE CAP INSPECTION**
**Data Sheet 8.5**
09/03/13
Page 15 of 20
Revision 0

## TMI UNIT 1 TENDON ANCHORAGE GREASE CAP INSPECTION

| TENDON ID | LOCATION OR BUTTRESS | EVIDENCE OF FREE WATER YES/NO | EVIDENCE OF GREASE LEAKAGE * YES/NO | EVIDENCE OF GREASE CAP DEFORMATION YES/NO | EVIDENCE OF CORROSION ** YES/NO | INSPECTOR'S INITIALS AND DATE |
|---|---|---|---|---|---|---|
| H62-31 | B 6-2 | N | N | N | N | WRR 10-24-13 |
| H62-32 | B 6-2 | N | N | N | N | WRR 10-24-13 |
| H62-33 | B 6-2 | N | N | N | N | WRR 10-24-13 |
| H62-34 | B 6-2 | N | N | N | N | WRR 10-24-13 |
| H62-35 | B 6-2 | N | N | N | N | WRR 10-24-13 |
| H62-36 | B 6-2 | N | N | N | N | WRR 10-24-13 |
| H62-37 | B 6-2 | N | N | N | N | WRR 10-24-13 |
| H62-38 | B 6-2 | N | N | N | N | WRR 10-24-13 |
| H62-39 | B 6-2 | N | N | N | N | WRR 10-24-13 |
| H62-40 | B 6-2 | N | N | N | N | WRR 10-24-13 |
| H62-41 | B 6-2 | N | N | N | N | WRR 10-24-13 |
| H62-42 | B 6-2 | N | N | N | N | WRR 10-24-13 |
| H62-43 | B 6-2 | N | N | N | N | WRR 10-24-13 |
| H62-44 | B 6-2 | N | N | N | N | WRR 10-24-13 |
| H62-45 | B 6-2 | N | N | N | N | WRR 10-24-13 |
| H62-46 | B 6-2 | N | N | N | N | WRR 10-24-13 |
| H62-47 | B 6-2 | N | N | N | N | WRR 10-24-13 |
| H62-48 | B 6-2 | N | N | N | N | WRR 10-24-13 |
| H62-49 | B 6-2 | N | N | N | N | WRR 10-24-13 |
| H62-50 | B 6-2 | N | N | N | N | WRR 10-24-13 |
| H62-51 | B 6-2 | N | N | N | N | WRR 10-24-13 |
| H62-52 | B 6-2 | N | N | N | N | WRR 10-24-13 |
| H62-53 | B -6-2 | N | N | N | N | WRR 10-24-13 |
| H62-54 | B 6-2 | N | N | N | N | WRR 10-24-13 |
| H62-55 | B 6-2 | N | N | N | N | WRR 10-24-13 |
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* Evidence of oil at threaded connection is acceptable providing it is not excessive. This is oil that has separated from grease and is common.

** This is evidence of corrosion that resulted in metal loss and wastage that may affect the ability of the grease cap to contain the sheathing filler grease.

# ATTACHMENT 3

## Exelon Approval of PSC Procedures and Personnel

**Table of Contents**

Exelon Generation.

**Memorandum**

Date: March 28, 2014

To: File

Cc: Topical Report 213
Mark Torborg
John Piazza
Sean Taylor

From: Michael Grimm

Subject: Documentation of Responsible Engineer for TMI Pre-stressed Containment Inspection

No. of Pages: 1

This memorandum serves to document that Howard Hill; P.E. (CA license # C22265) has been designated as the Responsible Engineer (R.E.) for the Three Mile Island Nuclear Generating Station's 40th year In-Service Inspection of the Unit 1 Reactor Building Pre-stressed Containment System. Mr. Hill's qualifications have been reviewed and determined to meet the requirements set forth by the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, Section XI, Subsection IWL, 2004 edition no addenda. Mr. Hill's responsibility for serving in this capacity is documented and outlined in Exelon Generation Contract number 502247.

Michael Grimm, ISI Program Engineer

Mark Torborg, Manager – Programs Engineering

This page shall be removed, and mailed or faxed to:

Precision Surveillance Corporation
Quality Assurance
3468 Watling Street
East Chicago, IN 46312

Phone: 219-397-5826
Fax: 219-397-5867

The signed return of this Acceptance form will indicate approval of the Precision Surveillance Corporation In-Service Inspection Tendon Surveillance Manual for document control purposes.

**RETURN OF THIS FORM CONSTITUTES APPROVAL OF THE CONTENTS HEREIN.**

Date: 16 Sep 13

Name: Howard T. Hill / Michael R. Grimm

Signature:

Title: Resp. Engr. / ISI Prog. Eng.

Company: Exelon / TMI

Project: TMI 40TH YEAR SURVEILLANCE

Contract:

| In-Service Inspection Manual | |
|---|---|
| Issue Date | 09-03-13 |
| Revision | 0 |

N1091 TENDON SURVEILLANCE PROGRAM
**ACKNOWLEDGEMENT OF RECEIPT FORM**
09/03/13
Page 1 of 1
Revision 0

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Quality Assurance
3468 Watling Street
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Date of Submittal: 9/16/2013
Date of Receipt: 9/16/2013
Name: Michael R. Grimm
Signature:
Title: ISI Prog. Eng.
Company: EXELON
Project: TMI 40TH YEAR TENDON SURVEILLANCE
Contract:

| In-Service Inspection Manual | |
|---|---|
| Issue Date | 09/03/13 |
| Revision | 0 |

## DATA SHEET 17
## Review / Acceptance of Contractor Procedures

| Procedure Number / Title | Revision | Reviewed/Accepted by | Date |
|---|---|---|---|
| Manual Control Policy | 0 | | 9/16/2013 |
| Definitions | 0 | | |
| PS 1.0 – Personnel Safety | 0 | | |
| SQ 1.0 – Surveillance Purpose | 0 | | |
| SQ 2.0 – Surveillance Scope | 0 | | |
| SQ 3.0 – Construction Eq. List | 0 | | |
| SQ 4.0 – Q.C. Eq. List | 0 | | |
| SQ 5.0 – Prerequisite Checklist | 0 | | |
| SQ 6.0 – Grease Cap Removal | 0 | | |
| SQ 6.1 – Inspect for Water | 0 | | |
| SQ 6.2 – Water Sample Analysis | 0 | | |
| SQ 7.0 – Sheathing Filler Analysis | 0 | | |
| SQ 7.1 – Thread Measurement | 0 | | |
| SQ 8.0 – Anchorage Inspection | 0 | | |
| SQ 8.3 – Bearing Plate Concrete Insp. | 0 | | |
| SQ 8.4 – Concrete Exterior | 0 | | |
| SQ 8.5 – Anchorage Cap Insp. | 0 | | |
| SQ 9.0 – Monitor Tendon Force | 0 | | |
| SQ 9.1 – Prestress Forces | 0 | | |
| SQ 10.0 – Detension Tendon | 0 | | |
| SQ 10.1 – Detension Anchorage Insp. | 0 | | |
| SQ 10.2 – Test Wire Removal | 0 | | |
| SQ 10.3 – Testing Tendon Wires | 0 | | |
| SQ 10.5 – Continuity Test | 0 | | |
| SQ 11.0 – Retension Tendons | 0 | | |

## DATA SHEET 17
## Review / Acceptance of Contractor Procedures

| Procedure Number / Title | Revision | Reviewed/Accepted by | Date |
|---|---|---|---|
| SQ 11.1 – PSC Engineering Data | 0 | | 9/16/2013 |
| SQ 12.0 – Grease Cap Replacement | 0 | | |
| SQ 12.1 – Grease Replacement | 0 | | |
| SQ 12.2 – Grease Volumes | 0 | | |
| QA 1.0 – Program Purpose | 0 | | |
| QA 2.0 – Program Scope | 0 | | |
| QA 3.0 – Quality Organization | 0 | | |
| QA 4.0 – Q.C. Responsibility | 0 | | |
| QA 4.1 – Personnel Qualifications | 0 | | |
| QA 5.0 – Personnel Training | 0 | | |
| QA 6.0 – Procurement | 0 | | |
| QA 7.0 – Field Change Request | 0 | | |
| QA 8.0 – Document Control | 0 | | |
| QA 8.1 – Revision Control | 0 | | |
| QA 9.0 – Nonconformances | 0 | | |
| QA 10.0 – Calibrations | 0 | | |
| QA 10.1 – Calibration Verification | 0 | | |
| QA 11.0 – Q.C. Inspection | 0 | | |
| QA 12.0 - Audits | 0 | | |

N1091 TENDON SURVEILLANCE PROGRAM
**ACCEPTANCE FORM**
09/03/13
Page 1 of 1
Revision 0
Revision: 1, 10/04/13

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Date: 10/9/13
Name: Sean Taylor
Signature: Sean Taylor
Title: Program Engineer
Company: Exelon Generation
Project: TMI 40TH YEAR SURVEILLANCE
Contract:

| In-Service Inspection Manual | |
|---|---|
| Issue Date | 09-03-13 |
| Revision | 1 10/04/13 |

PSC PRECISION SURVEILLANCE

N1091 TENDON SURVEILLANCE PROGRAM
**ACKNOWLEDGEMENT OF RECEIPT FORM**
09/03/13
Page 1 of 1
Revision 0
Revision: 1, 10/04/13

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For more information regarding responsibility of the attendant of this manual, refer to the Manual Control Policy Statement.

Date of Submittal: 10/9/13
Date of Receipt: 10/9/13
Name: Sean Taylor
Signature: Sean Taylor
Title: Program Engineer
Company: EXELON
Project: TMI 40TH YEAR TENDON SURVEILLANCE
Contract:

| In-Service Inspection Manual | |
|---|---|
| Issue Date | 09/03/13 |
| Revision | 1 10/04/13 |

## DATA SHEET 17
## Review / Acceptance of Contractor Procedures

| Procedure Number / Title | Revision | Reviewed/Accepted by | Date |
|---|---|---|---|
| SQ 8.0 - Anchorage Inspection | 1 | Sean Taylor | 10/9/13 |

**ATTACHMENT 1**
**DATA SHEETS**

**DATA SHEET 16**
**Examiner Qualification**

| Name of Examiner | Employer | Method | Level |
|---|---|---|---|
| W. RANCE ROBBINS | PSC | GENERAL + DETAILED VISUAL | II |
| CLINTON WEST | PSC | GENERAL + DETAILED VISUAL | II |
| | | | |
| | | | |
| | | | |
| | | | |

I have reviewed the records relevant to the experience and training of the above named individuals and have, as necessary, trained these individuals in the requirements applicable to the performance of visual examinations of the containment concrete surface. Based on this review and, if applicable, training, I find that these individuals are qualified to perform said examinations.

Responsible Engineer: Name HOWARD T. HILL

Registration CA (State) C22265 (~~License No.~~) 30 SEP 15 (Expiration)

Signature Date 16 SEP 13

Exelon NDE Services Concurrence James L Newcomb Date 9/17/13
JAMES L NEWCOMB II / L III

ANII Concurrence Date 9/17/13

## DATA SHEET 16

### Examiner Qualification

| Name of Examiner | Employer | Method | Level |
|---|---|---|---|
| RONALD A. PERRY | PSC | GENERAL/DETAILED VISUAL | II |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

I have reviewed the records relevant to the experience and training of the above named individuals and have, as necessary, trained these individuals in the requirements applicable to the performance of visual examinations of the containment concrete surface. Based on this review and, if applicable, training, I find that these individuals are qualified to perform said examinations.

Responsible Engineer: Name HOWARD T. HILL

Registration CA C22265 15 SEP 15
State License No. Expiration

Signature Date 06 NOV 13

Exelon NDE Services Concurrence James L Newcomb II Date 11/7/13
JAMES L NEWCOMB II EXELON LIII

ANII Concurrence Date 11/7/13

QUALIFICATION OF QUALITY CONTROL INSPECTORS-PROC. QA 2.10.6.1.1.

CERTIFICATION FORM QA 2.10.6.1.1.B.

# CERTIFICATE OF QUALIFICATION

This is to certify that

W. RANCE ROBBINS SSN [redacted]

has been qualified through on-the-job experience and formal training to meet the requirements of ANSI N45.2.6-1973 and 1978 as:

QUALITY CONTROL INSPECTOR LEVEL II with the following limitations

CERTIFIED FOR ALL ASPECTS OF POST-TENSIONING INSPECTIONS AND CALIBRATIONS,

This certification will qualify the named individual to perform quality control inspections, examinations and testing for the various manufactured products or services supplied, to meet the requirements of the projects for the Precision Surveillance Corporation and within the limitations of this qualification.

This qualification becomes effective 2/8/12 and shall remain in effect until the recertification date of 2/8/15 or until such time that the named individual leaves the employment of PSC, gives just cause for termination of the certification or requires additional training to maintain a proper Quality Control disposition.

Physical Requirements: EYE Exam Date 1/19/12 to 1/19/13 by OPTOMETRIST
Exam Date 5/14/12 to 5/14/13 by RS - PSC
Exam Date 5/10/13 to 5/10/14 by OPTOMETRIST

Approved by: GBussone

Quality Control Inspector Level III

Date: 2/8/12

0025Q

P

QUALIFICATION OF QUALITY CONTROL INSPECTORS-PROC. QA 2.10.6.1.1.

CERTIFICATION FORM QA 2.10.6.1.1.B.

# CERTIFICATE OF QUALIFICATION

This is to certify that

W. RANCE ROBBINS SSN [redacted]

has been qualified through on-the-job experience and formal training to meet the requirements of ANSI N45.2.6-1973 and 1978 as:

QUALITY CONTROL INSPECTOR LEVEL II with the following limitations

CERTIFIED FOR ALL ASPECTS OF POST-TENSIONING INSPECTIONS AND CALIBRATIONS,

This certification will qualify the named individual to perform quality control inspections, examinations and testing for the various manufactured products or services supplied, to meet the requirements of the projects for the Precision Surveillance Corporation and within the limitations of this qualification.

This qualification becomes effective 2/8/12 and shall remain in effect until the recertification date of 2/8/15 or until such time that the named individual leaves the employment of PSC, gives just cause for termination of the certification or requires additional training to maintain a proper Quality Control disposition.

Physical Requirements: EYE Exam Date 1/19/12 to 1/19/13 by OPTOMETRIST

Exam Date 5/14/12 to 5/14/13 by PCS – PSC

Exam Date 5/10/13 to 5/10/14 by OPTOMETRIST

Approved by: G Bussone

Quality Control Inspector Level III

Date: 2/8/12

0025Q

PSC Formerly
Inryco Surveillance

R

QUALIFICATION OF QUALITY CONTROL INSPECTORS PROC. QA 2.10.6.1.1.

CERTIFICATION FORM QA 2.10.6.1.1.B.

## CERTIFICATE OF QUALIFICATION

This is to [redacted]y that

W. RANCE ROBBINS SSN

has been qualified through on-the-job experience and formal training to meet the requirements of ANSI N45.2.6-1973 and 1978 as:

QUALITY CONTROL INSPECTOR LEVEL II with the following limitations

CERTIFIED FOR ALL ASPECTS OF POST-TENSIONING INSPECTIONS AND CALIBRATIONS.

This certification will qualify the named individual to perform quality control inspections, examinations and testing for the various manufactured products or services supplied, to meet the requirements of the projects for the Precision Surveillance Corporation and within the limitations of this qualification.

This qualification becomes effective 2/9/09 and shall remain in effect until the recertification date of 2/9/12 or until such time that the named individual leaves the employment of PSC, gives just cause for termination of the certification or requires additional training to maintain a proper Quality Control disposition.

Physical Requirements: EYE Exam Date 9/9/08 to 9/9/09 by PSC -
EYE Exam Date 2/9/10 to 2/9/11 by OPTOMETRIST
EYE Exam Date 3/4/10 to 3/4/11 by DR. BRAD COOK, OD.
EYE EXAM DATE 2/14/11 to 2/14/12 by OPTOMETRIST

Approved by: G Burwash

Quality Control Inspector Level III

Date: 2/9/09

0025Q

1033N

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Inryco Surveillance

QUALIFICATION OF QUALITY CONTROL INSPECTORS-PROC. QA 2.10.6.1.1.

PERFORMANCE EVALUATION FORM QA 2.10.6.1.1.A.

## PERFORMANCE EVALUATION FOR QUALITY CONTROL INSPECTORS

To be performed at periodic intervals not to exceed three years. This evaluation shall constitute continuation of certification ~~or~~ AS A QUALITY CONTROL INSPECTOR LEVEL II.

This is to certify that the performance of Quality Control Inspec[redacted]r Level II
Name W. RANCE ROBBINS Social Security No. [redacted] has
been evaluated by the undersigned on this date 2/4/13.

Performance is evaluated as follows:

Based on a record review, he has performed satisfactorily and was active in the examination and inspection activities of post tensioning systems and components during the past year.

☒ Performance is satisfactory.

☐ Performance is unsatisfactory and requires additional training in the following areas:

N/A

This individual has been removed from inspection, examination and testing activities effective N/A.

Signed: Gerald Bussone Date: 2/4/13

Title: QA Manager

Approved: Gerald Bussone Date: 2/4/13
Manager, Quality Assurance

This document shall be placed into the certification file for the Inspector being evaluated.

**QUALIFICATION OF QUALITY CONTROL INSPECTORS-PROC. QA 2.10.6.1.1.**

**PERFORMANCE EVALUATION FORM QA 2.10.6.1.1.A.**

## PERFORMANCE EVALUATION FOR QUALITY CONTROL INSPECTORS

To be performed at periodic intervals not to exceed three years. This evaluation shall constitute continuation of certification ~~or~~ AS A QUALITY CONTROL INSPECTOR LEVEL II.

This is to certify that the performance of Quality Control In[redacted]r Level II
Name W. RANCE ROBBINS Social Security No. [redacted] has
been evaluated by the undersigned on this date 2/6/12.

Performance is evaluated as follows:

Based on a record review, he has performed satisfactorily and was active in the examination and inspection activities of post-tensioning systems and components during the past year.

☒ Performance is satisfactory.

☐ Performance is unsatisfactory and requires additional training in the following areas:

N/A

This individual has been removed from inspection, examination and testing activities effective N/A.

Signed: Gerald Bussone Date: 2/6/12.
Title: QA Manager
Approved: Gerald Bussone Date: 2/6/12
Manager, Quality Assurance

This document shall be placed into the certification file for the Inspector being evaluated.

0025Q

1033N

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QUALIFICATION OF QUALITY CONTROL INSPECTORS-PROC. QA 2.10.6.1.1.

PERFORMANCE EVALUATION FORM QA 2.10.6.1.1.A.

## PERFORMANCE EVALUATION FOR QUALITY CONTROL INSPECTORS

To be performed at periodic intervals not to exceed three years. This evaluation shall constitute continuation of certification ~~or~~ AS A QUALITY CONTROL INSPECTOR LEVEL II.

This is to certify that the performance of Quality Control Inspector Level II
Name W. RANCE ROBBINS Social Security No. [redacted] has
been evaluated by the undersigned on this date 2/7/11.

Performance is evaluated as follows:

Based on a record review, he has performed satisfactorily and was active in the examination and inspection activities of post tensioning systems and components during the past year.

☒ Performance is satisfactory.

☐ Performance is unsatisfactory and requires additional training in the following areas:

N/A

This individual has been removed from inspection, examination and testing activities effective N/A.

Signed: Gerald Busone Date: 2/7/11.

Title: QA Manager

Approved: Gerald Busone Date: 2/7/11
Manager, Quality Assurance

This document shall be placed into the certification file for the Inspector being evaluated.

0025Q

1033N

QUALIFICATION OF QUALITY CONTROL INSPECTORS-PROC. QA 2.10.6.1.1.

PERFORMANCE EVALUATION FORM QA 2.10.6.1.1.A.

## PERFORMANCE EVALUATION FOR QUALITY CONTROL INSPECTORS

To be performed at periodic intervals not to exceed three years. This evaluation shall constitute continuation of certification ~~of~~ AS A QUALITY CONTROL INSPECTOR LEVEL II

This is to certify that the performance of Quality Control Inspector Level II Name W. RANCE ROBBINS Social Security No. [redacted] has been evaluated by the undersigned on this date 2/8/10.

Performance is evaluated as follows:

Based on a record review, has performed satisfactorily and was active in the inspection, examination activities of post tensioning systems and components during the past year.

☒ Performance is satisfactory.

☐ Performance is unsatisfactory and requires additional training in the following areas:

N/A

This individual has been removed from inspection, examination and testing activities effective N/A.

Signed: Gerald F. Bussone Date: 2/8/10.

Title: QA Manager / Level III

Approved: Gerald F. Bussone Date: 2/8/10

Manager, Quality Assurance

This document shall be placed into the certification file for the Inspector being evaluated.

0025Q

1033N

FSC Formerly
Inryco Surveillance

QUALIFICATION OF QUALITY CONTROL INSPECTORS PROC. QA 2.10.6.1.1.

PERFORMANCE EVALUATION FORM QA 2.10.6.1.1.A.

## PERFORMANCE EVALUATION FOR QUALITY CONTROL INSPECTORS

To be performed at periodic intervals not to exceed three years. This evaluation shall constitute continuation of certification as AS A QUALITY CONTROL INSPECTOR LEVEL II

This is to certify that the performance of Quality Control Inspector Level II Name W. RANCE ROBBINS Social Security No. [redacted] has been evaluated by the undersigned on this date 2/[redacted]9.

Performance is evaluated as follows:

Based on a record review has performed satisfactorily and was active in the inspection, examination activities of post-tensioning systems and components during the past year.

☒ Performance is satisfactory.

☐ Performance is unsatisfactory and requires additional training in the following areas:

N/A

This individual has been removed from inspection, examination and testing activities effective N/A.

Signed: Gerald F. Bussone
Date: 2/9/09.

Title: Level III

Approved: Gerald F. Bussone
Manager, Quality Assurance
Date: 2/9/09

This document shall be placed into the certification file for the Inspector being evaluated.

0025Q

1033N

PSC Formerly
Intyco Surveillance

**QUALIFICATION OF QUALITY CONTROL INSPECTORS-PROC. QA 2.10.6.1.1.**

**PERFORMANCE EVALUATION FORM QA 2.10.6.1.1.A.**

## PERFORMANCE EVALUATION FOR QUALITY CONTROL INSPECTORS

To be performed at periodic intervals not to exceed three years. This evaluation shall constitute continuation of certification ~~or~~ AS A QUALITY CONTROL INSPECTOR LEVEL II

This is to certify that the performance of Quality Cont[redacted]r Level II
Name W. RANCE ROBBINS Social Security No. [redacted] has been evaluated by the undersigned on this date 2/29/08.

Performance is evaluated as follows:

Based on a record review has performed satisfactorily and was active in the inspection, examination activities of post-tensioning systems and components during the past year.

☒ Performance is satisfactory.

☐ Performance is unsatisfactory and requires additional training in the following areas:

N/A

This individual has been removed from inspection, examination and testing activities effective N/A.

Signed: Gerald F. Bussone Date: 2/29/08

Title: Level III

Approved: Gerald F. Bussone Date: 2/29/08
Manager, Quality Assurance

This document shall be placed into the certification file for the Inspector being evaluated.

0025Q

1033N

## 7. 1. PHYSICAL TESTING FORM QA 2.10.6.1.1.1

**PSC** Formerly
Inryco Surveillance
PHYSICAL TESTING OF INSPECTORS-PROC. QA 2.10.6.1.1.1.

PHYSICAL TESTING FORM QA 2.10.6.1.1.1

Name W. Rance Robbins Date 5-10-13 Retest Date ____
Title Quality Control Wears Glasses ____

1. PHYSICAL CHARACTERISTICS
Rating Acceptable Limitations None
Comments None

2. VISUAL - FAR RANGE Test Device Snellen
Vision rating % L 20/20 R 20/30 Both 20/20
Comments uncorrected

3. VISUAL - NEAR RANGE Test Device Snellen
Vision rating grade L J 20/20 R J 20/20 Both J 20/20
Comments corrected

4. COLOR PERCEPTION Test Device Quick Six (18plates)

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Plate | 1 | 12 | 2 | | 3 | | 4 | | 5 | |
| | 6 | | 7 | | 8 | | 9 | | 10 | |
| | 11 | | 12 | | 13 | | 14 | | 15 | |

Score 14 of 14 Perception Normal
Score shall not be less than 10 to be acceptable for perception.
Comments passed 18 of 18

5. OVERALL RATING
Capability Good

Examiner Dr Greg Pierangeli Title Optometry Date 5-10-13
0028Q

0028Q/7

PSC PROCEDURE VT1.FORMS
CERTIFICATION OF EXAMINERS
EXHIBIT A
Revision 0, April 26, 1999
Page 1 of 1
Revision 1, 4/28/99; Revision 2, 7/6/99; Revision 3, 2/24/05;
Revision 4, 08/31/07; Revision 5, 8/1/08; Revision 6, 09/04/08

# LEVEL II CERTIFICATION RECORD

Name: W. Rance Robbins
Social Security Number: [redacted]
Certification Date: 05/17/12

Visual Method: *VT-1
Certification Level: II

*VT-1 Certification is limited to tendon related activities

| Level II | | | |
|---|---|---|---|
| General | 95% | Date | 05/15/12 |
| Specific | 95% | Date | 05/15/12 |
| Practical | 100% | Date | 05/16/12 |
| | 100% | | 05/16/12 |
| | Practical Ave.: 100% | | |
| **Composite** | **96.67%** | **Date** | **05/17/12** |

The composite grade shall be an equally weighted average of all applicable examination grades for each category.

Training Courses Completed

| Type | Given By | Location | Hours | Date | Instructor |
|---|---|---|---|---|---|
| General | n/a | n/a | n/a | n/a | n/a |
| Specific | n/a | n/a | n/a | n/a | n/a |
| Practical | n/a | n/a | n/a | n/a | n/a |

We certify that the above named employee meets all of the qualification requirements of the PSC Procedure IWL VT1.CERT for certification/recertification as a VT-1 Examiner , Level II .

This certificate expires after 05/17/2015 Approval Signature:
PSC P.E.

PSC PROCEDURE VT1.FORMS
**CERTIFICATION OF EXAMINER**
**EXHIBIT F**
Revision 0, April 26, 1999
Page 1 of 2
Revision 1, 4/28/99; Revision 2, 7/6/99; Revision 3, 2/24/05;
Revision 4, 08/31/07; Revision 5, 08/01/08; Revision 6, 09/04/08

# LEVEL II RECORD OF EXPERIENCE

Mr./Ms W. Rance Robbins has worked at PSC (Location) Since 12/2005 to date.

During that time he/she has participated in the following activities which involve visual examinations similar to the Visual inspection VT-1 examination required by ASME, Section XI, Subsection IWL.

| | |
|---|---|
| **OPERATING NUCLEAR STATION(S)** | |
| Visual Examination(s): | V.C. Summer Nuclear Plant, Arkansas Nuclear One, Calvert Cliffs Nuclear Plant<br>Turkey Point Nuclear Plant, Fort Calhoun Nuclear Plant, South Texas Project, Millstone Nuclear Plant<br>Point Beach Nuclear Plant, Palisades Nuclear Plant, LaSalle Nuclear Plant, Braidwood Nuclear Plant |
| Repair / Replacement: | |
| Modification(s): | |
| Periodic test(s): | |
| **MANUFACTURING, CONSTRUCTION, FABRICATION OR INSTALLATION** | |
| Visual Examination(s): | |
| Dimensional Verification: | |

The above also meets the following Level II PSC Procedure VT1.CERT requirement:

| | | |
|---|---|---|
| X High School Graduate<br>1 year | ____ Two-Year Associate Degree<br>6 months | ____ Four-Year College Degree<br>3 months |

Completed by (Candidate): W. Rance Robbins — Date: 05/15/12

Social Security Number: 430-31-6556

Verified and Accepted by: PSC P.E — Date: 05/17/12

## PRECISION SURVEILLANCE CORPORATION
## VISUAL EXAMINATION TRAINING

---

NAME: W. Rance Robbins DATE: 5-14-2012

SOCIAL SECURITY [redacted]

EXAM: VISUAL GENERAL LEVEL II FOR VT-1

GRADE: 95% GRADED BY: Christopher E. Cox, P.E. 5/15/12

I have neither given, received nor observed any aid or information regarding this exam prior to or during its administration that could compromise this exam's integrity. I also understand my obligation to report any exam compromise by others prior, during, or subsequent to the exam administration.

I acknowledge that this examination is a way of demonstrating my knowledge of the subject associated with this examination and that I have had the opportunity, on my request, to review this entire examination with the instructor to ensure my understanding of the subject matter.

I have read and understand the above statements: W. Rance Robbins 5-14-2012
Student Signature Date

---

FILL IN ONE CIRCLE AS THE ANSWER FOR EACH QUESTION

| | A | B | C | D | | A | B | C | D | | A | B | C | D | | A | B | C | D |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | ○ | ● | ○ | ○ | 6 | ● | ○ | ○ | ○ | 11 | ○ | ○ | ○ | ● | 16 | ● | ○ | ○ | ○ |
| 2 | ○ | ● | ○ | ○ | 7 | ○ | ● | ○ | ○ | 12 | ○ | ○ | ○ | ● | 17 | ○ | ○ | ● | ○ |
| 3 | ● | ○ | ○ | ○ | 8 | ○ | ● | ○ | ○ | 13 | ○ | ○ | ○ | ● | 18 | ○ | ● | ○ | ○ |
| 4 | ○ | ● | ○ | ○ | 9 | ● | ○ | ○ | ○ | 14 | ○ | ○ | ○ | ● | 19 | ○ | ○ | ○ | ● |
| 5 | ○ | ○ | ● | ○ | 10 | ● | ○ | ○ | ○ | 15 | ○ | ○ | ● | ○ | 20 | ○ | ○ | ● | ○ |

EXAM "05/14/12"

May 14, 2012

## VT-1 GENERAL EXAM

1. What type of containment is not inspected to IWL?

A. Concrete Containment
B. Steel Containment

2. What is the character height of the lower case letters for VT-1?

A. 0.500"
B. 0.044"
C. 0.105"
D. 0.010"

3. Per IWL what tendon anchorages are exempt from VT-1 examination?

A. Inaccessible due to structural obstructions
B. Inaccessible due to radiological hazards
C. Inaccessible due to safety concerns
D. All of the above

4. PSC Procedure for VT-1 Level II certifications comply to?

A. ACI 301.
B. IWL 2001 edition with 2003 addenda.
C. IWE 92.
D. IWL 98.

5. Level II minimum education required for certification is:

A. No education.
B. One year of college.
C. High school or equivalent.
D. MBA degree.

6. VT-1 Level II minimum education required for certification is?

A. High school or equivalent.
B. MBA degree.
C. No education.
D. One year of college.

7. At a two unit site such as Braidwood Station, what reduction in Containment Tendon System anchorage inspection examination frequency is permitted?

A. Can be reduced if the Utility can not afford to expend the money for it
B. None; each unit must have selected tendon anchorages VT-1 examined every 5 years
C. Reduction is permitted only if both containments are post-tensioned
D. Each unit is examined only once every ten years

8. PSC Procedure for Level II certifications comply to:

A. IWE 92.
B. IWL 2001 edition with 2003 addenda.
C. IWL 98.
D. ACI 301.

9. Which subsection of ASME Section XI applies to VT-1 examinations of Containment Post Tensioning Systems?

A. IWL
B. IWE
C. IWC
D. IWB

10. Level II minimum education required for certification is?

A. High school or equivalent
B. MBA degree
C. No education
D. One year of college

11. What is an optical comparator?

A. A device to measure surface lighting intensity
B. A device to evaluate vision
C. A device to determine color resolution
D. None of the above

12. Who may perform VT- 1 examinations without VT-1 certification?

A. A manager or supervisor of ISI programs
B. Level II ISI personnel
C. QC Personnel
D. None of the above

13. What amendment to 10 CFR 50 incorporated by reference the requirements of ASME Section XI, 2001 Edition with 2003 Addenda?

A. Appendix A
B. 10 CFR 10.30
C. 1992 Addenda
D. 10 CFR 50.55a

14. How often is VT-1 Level II re-certification required?

A. Every 5 years.
B. Every 3 months.
C. Every year.
D. Every 3 years.

15. When should the character height of near-distance test charts be measured?

A. When a Relevant Condition is found
B. After the inspection
C. Before use of it
D. When requested by the Registered Engineer

16. For VT-1 examinations what is the minimum near distance vision acuity the examiner must have?

A. at least 20/25 Snellen in at least one eye.
B. None
C. 20/20
D. 40/40 or better

17. PSC's Procedure for Level II certifications complies to?

A. ACI 301
B. IWE 92
C. IWL 2001 edition with 2003 addenda
D. IWL 98

18. For nuclear plants that completed their Structural Integrity Test 20 years ago how often must the Containment Post-Tensioning System VT-1 examination of tendon anchorages be performed on tendons selected for in-service inspection per IWL?

A. Every 6 months
B. Every 5 years
C. Every 3 years
D. Every 2 years

19. Which of the following conditions is typically recorded as a Recordable Condition during a VT-1 examination of tendon anchorages?

A. Broken wires
B. Missing button heads
C. Cracks in anchor heads
D. All of the above

20. VT-1 inspection is required to be performed on?

A. Jacks/Rams used for stressing
B. All of the above
C. Tendon Anchorages
D. Exterior Containment concrete surface and grease cans

May 14, 2012

## VT-1 GENERAL EXAM ANSWER KEY

1. B 2. B 3. D 4. B 5. C 6. A 7. B 8. B 9. A 10. A 11. D
12. D 13. D 14. D 15. C 16. A 17. C 18. B 19. D 20. C

## PRECISION SURVEILLANCE CORPORATION
## VISUAL EXAMINATION TRAINING

---

NAME: W. Rance Robbins )ATE: 5-14-2012

SOCIAL SECURITY NUMBER: [redacted]

EXAM: VISUAL SPECIFIC LEVEL II FOR VT-1

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GRADE: 95% GRADED BY: P.E. 5/15/12

---

I have neither given, received nor observed any aid or information regarding this exam prior to or during its administration that could compromise this exam's integrity. I also understand my obligation to report any exam compromise by others prior, during, or subsequent to the exam administration.

I acknowledge that this examination is a way of demonstrating my knowledge of the subject associated with this examination and that I have had the opportunity, on my request, to review this entire examination with the instructor to ensure my understanding of the subject matter.

I have read and understand the above statements: W. Rance Robbins 5-14-2012
Student Signature Date

---

FILL IN ONE CIRCLE AS THE ANSWER FOR EACH QUESTION

| | A | B | C | D | E | | A | B | C | D | | A | B | C | D | | A | B | C | D |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~~1~~ | ○ | ~~●~~ | ○ | ○ | ● | 6 | ○ | ○ | ○ | ● | 11 | ○ | ○ | ● | ○ | 16 | ○ | ● | ○ | ○ |
| 2 | ● | ○ | ○ | ○ | | 7 | ○ | ○ | ● | ○ | 12 | ○ | ● | ○ | ○ | 17 | ○ | ○ | ○ | ● |
| 3 | ○ | ● | ○ | ○ | | 8 | ○ | ● | ○ | ○ | 13 | ● | ○ | ○ | ○ | 18 | ○ | ○ | ● | ○ |
| 4 | ○ | ● | ○ | ○ | | 9 | ● | ○ | ○ | ○ | 14 | ● | ○ | ○ | ○ | 19 | ○ | ● | ○ | ○ |
| 5 | ○ | ○ | ○ | ● | | 10 | ● | ○ | ○ | ○ | 15 | ○ | ○ | ● | ○ | 20 | ○ | ○ | ○ | ● |

**EXAM "05/14/12"**

VT1SPECIFIC EXAM FORM 051412

May 14, 2012

## VT-1 SPECIFIC EXAM

1. Subsection IWL contains requirements for a Responsible Engineer. He must be an experienced Registered Professional Engineer. What is he responsible for?

A. Submittal of the report to the Owner documenting results of examinations and repairs.
B. Evaluation of examination results.
C. Approval, instruction, and training of concrete examination personnel.
D. Development of plans and procedures for examination of concrete surfaces.
E. All of the above.

2. Per ASME Section XI, subsection IWL what are to be given a VT-1 examination?

A. Containment tendon strand wedges or wire button heads
B. The safety shoes craft personnel are wearing
C. None of the above
D. The condition of hard hats worn by personnel

3. What is VT-1 examination used to detect on Containment Post Tensioning Systems (tendon anchorage) selected for in-service inspection?

A. Grease coverage on the concrete
B. Protruding wires
C. Bushing diameter
D. Thread tolerance

4. A VT-1 examination requires the inspector to be within how many inches of the surface being examined?

A. 3 inches
B. 24 inches
C. 90 inches
D. 60 inches

5. What is VT-1 examination used to detect on Containment Post Tensioning Systems (tendon anchorage) selected for in-service inspection?

A. Dissolved water in the grease
B. Amount of grease in the grease can
C. Grease can grease level
D. Evidence of free water

6. The tendon bearing plate is to be given what kind of visual inspection?

A. VT-3C
B. Cursory
C. VT-1C
D. VT-1

7. What is the typical PSC procedure used for Anchorage Inspection?

A. SQ 2.0
B. SQ 12.1
C. SQ 8.0
D. SQ 4.0

8. The tendon wire button heads are to be given what kind of visual inspection?

A. General
B. VT-1
C. VT-1C
D. VT-3C

9. Following the re-tensioning of a tendon that has been de-tensioned a VT-1 inspection is used to detect:

A. Broken wires or strands.
B. Amount of nitrates in the grease.
C. Temperature of the concrete.
D. If the grease can has been galvanized.

10. Which of the following is not typical equipment used for VT-1 examination?

A. Pressure gage
B. Flashlight
C. Camera
D. Optical Comparator

11. Mirrors and supplemental lighting are aids for?

A. General visual inspection.
B. VT-2B inspection.
C. VT-1 inspection.
D. VT-3 inspection.

12. Following the re-tensioning a tendon that has been de-tensioned a VT-1 inspection is used to detect:

A. Amount of sulfides in the grease.
B. If proper shim gaps have been maintained.
C. Time re-tensioning was completed.
D. If tools have been cleaned up from the area.

13. Per PSC Procedures for VT examinations who approves the qualifications of VT Examiners?

A. Responsible Engineer (P.E.)
B. VT Supervisor
C. Project Manager
D. Project Superintendent

14. What is VT-1 examination used to detect on Containment Post Tensioning Systems (tendon anchorage) selected for in-service inspection?

A. Broken wires
B. Concrete finish
C. All of the above
D. Wire diameter

15. What is VT-1 examination used to detect on Containment Post Tensioning Systems (tendon anchorage) selected for in-service inspection?

A. Type of galvanizing on Grease can
B. Gasket seal on Grease Can
C. Cracks in anchorage hardware
D. None of the above

16. Per ASME Section XI, subsection IWL what are to be given a VT-1 examination?

A. Temperature of the anchorhead
B. Containment tendon shims
C. All of the above
D. Temperature of the concrete

17. On tendons selected for in-service inspection VT-1 inspection is used to detect:

A. Missing button heads.
B. Protruding wires.
C. Broken wires.
D. All of the above.

18. What is VT-1 examination used to detect on Containment Post Tensioning Systems (tendon anchorage) selected for in-service inspection?

A. Chemistry of shim material
B. Material type of shim material
C. Displacement of shims
D. Diameter of Shims

19. What is VT-1 examination used to detect on Containment Post Tensioning Systems (tendon anchorage) selected for in-service inspection?

A. Shim finish
B. Missing button heads
C. Anchor head finish
D. Bushing hardness

20. Tendon shims are to be given what kind of visual inspection?

A. VT-3C
B. Cursory
C. VT-1C
D. VT-1

May 14, 2012

## VT-1 SPECIFIC EXAM ANSWER KEY

1. E 2. A 3. B 4. B 5. D 6. D 7. C 8. B 9. A 10. A 11. C
12. B 13. A 14. A 15. C 16. B 17. D 18. C 19. B 20. D

PRECISION SURVEILLANCE CORPORATION
Visual Examination Training
PRACTICAL EXAMINATION CHECKLIST

NAME: W. Rance Robbins DATE: 5-14-2012

SOCIAL SECURITY NUMBER: [redacted]

EXAM METHOD: [✓ VT-1] or VT-1C or VT-3C EXAM NUMBER: #1

GRADE: 100% INSTRUCTOR/ GRADED BY: PSC P.E 5/14/12

I have neither given, received or observed any aid or information regarding this exam prior to or during its administration that could compromise this exam's integrity. I also understand my obligation to report any exam compromise by others prior, during, or subsequent to the exam administration.

I acknowledge that this examination is a way of demonstrating my knowledge of the subject associated with this examination and that I have had the opportunity, on my request, to review this entire examination with the instructor to ensure my understanding of the subject matter.

I have read and understand the above statements: W. Rance Robbins 5-14-2012
Student Signature Date

| POINT VALUE | INSPECTION POINTS | POINTS GRANTED/COMMENTS |
|---|---|---|
| 10 | Select procedure<br>Verify revision | +10 |
| 10 | Select form<br>Verify revision | +10 |
| 5 | Select equipment<br>Verify calibration/resolution | +5 |
| 5 | Verify adequacy of lighting<br>Prior to and during inspection | +5 |
| 5 | Record part/item number<br>On inspection form | +5 |
| 15 | Inspect component/part<br>Identify discontinuities | +15 |
| 15 | Compare discontinuities to<br>Recording criteria in procedure | +15 |
| 25 | Correctly record<br>discontinuities | +25 |
| 5 | Sign and date form | +5 |
| 5 | Complete form<br>Accurate and legible | +5 |

PSC PRECISION SURVEILLANCE

N1076 PSC PROCEDURE SQ 8.0
ANCHORAGE INSPECTION
Data Sheet 8.0
January 10, 2012
Page 1 of 1
Revision 0

Project: TURKEY POINT 40TH YEAR TENDON SURVEILLANCE ☒ UNIT 3 ☐ UNIT 4

(7.3)Tendon No.: V-03 Tendon End: Gallery ☐ Shop ☒ Field

## ANCHORAGE INSPECTION CRITERIA

☒ As-Found ☐ Post De-Tensioning / Pre-Wire Removal ☐ Post Re-Tensioning — Q.C. Signoff

**9.0 & 10.0 - CORROSION & CRACK INSPECTION**

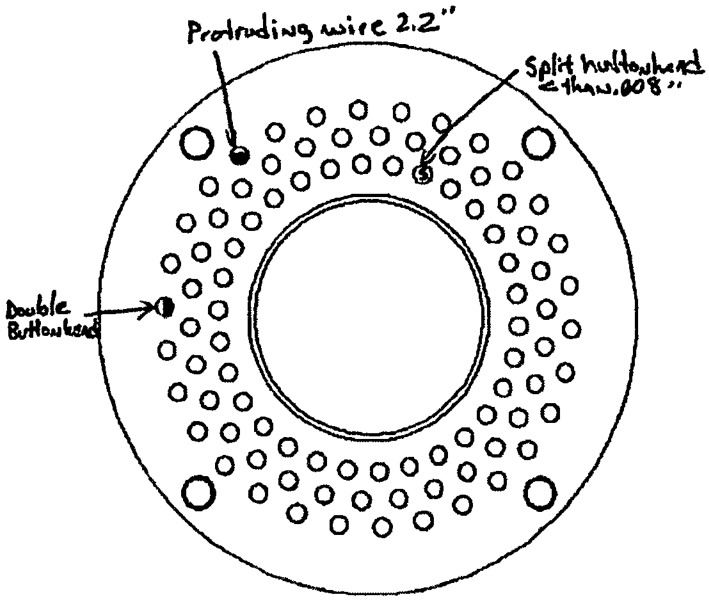
| | | | | | | | |
|---|---|---|---|---|---|---|---|
| (9.2) Buttonheads | Level: A [1] | (10.1) Cracks | ☐ Yes [2] | ☑ No | ☐ N/A | |
| (9.2) Anchorhead | Level: 2 [1] | (10.1) Cracks | ☐ Yes [2] | ☑ No | ☐ N/A | |
| (9.2) Shims | Level: 1 [1] | (10.1) Cracks | ☐ Yes [2] | ☑ No | ☐ N/A | |
| (9.2) Bearing Plate | Level: 2 [1] | (10.1) Cracks | ☐ Yes [2] | ☑ No | ☐ N/A | WRR 5-15-12 |

*Refer to SQ 10.1 – DETENSIONED ANCHORAGE INSPECTION* (8.3.1) Wire Coating: Corrosion Level: N/A — N/A

[1] – Corrosion Levels of 3, 4 or 5, or E require an NCR. [2] Compose a sketch of the cracks on Sketch Sheet 8.0 and initiate an NCR.

**11.0 - BUTTONHEAD INSPECTION**

| | |
|---|---|
| ◗ | Offsize (Malformed) |
| ◒ | Protruding/unseated wire/buttonheads |
| Ø | Broken/missing wire/buttonheads |
| ● | Previously identified as missing |
| ☒ | Discontinuous – removed |
| ⊗ | wire(s) removed during this surveillance for testing |



(11.2) Anchorhead I.D. None
Located on Sketch: N/A ☐ Yes ☐ No
(11.4) Missing Buttonheads Found: N/A
☐ Yes ☐ No Quantity:

Additional Information:
Shim stack ht. 5"
1 3/4, 1 3/4, 1/2, 1/4, 1/4, 1/8, 1/4

WRR 5-15-12

(12.2) Number of Protruding Buttonheads (◒): 1 — (8.3) Light Meter ID: LM-901 Cal Due: 9-19-12
(12.3) Number of Missing Buttonheads (Ø, ☒): 0
(12.4) Total of Protruding + Missing Buttonheads: 1 — (12.6) Continuity Test Requested ? ☐ Yes ☒ No
(12.5) Total # of Effective Buttonheads Seated: 89 — Wires Identified? N/A ☐ Yes ☐ No
(12.7) Overall Results ☒ Acceptable ☐ Un-Acceptable Customer Notified NCR#: N/A — WRR 5-15-12

QC Reviewed: Level: Date:

19 SQ 8.0.TP.11 ISI

**PRECISION SURVEILLANCE CORPORATION**
**Visual Examination Training**
**PRACTICAL EXAMINATION CHECKLIST**

NAME: W. Rance Robbins DATE: 5-14-2012

SOCIAL SECURITY NUMBER: [redacted]

EXAM METHOD: [✓ VT-1] or VT-1C or VT-3C EXAM NUMBER: #2

GRADE: 100% INSTRUCTOR/ GRADED BY: PSC P.E 5/14/12

I have neither given, received or observed any aid or information regarding this exam prior to or during its administration that could compromise this exam's integrity. I also understand my obligation to report any exam compromise by others prior, during, or subsequent to the exam administration.

I acknowledge that this examination is a way of demonstrating my knowledge of the subject associated with this examination and that I have had the opportunity, on my request, to review this entire examination with the instructor to ensure my understanding of the subject matter.

I have read and understand the above statements: W. Rance Robbins 5-14-2012
Student Signature Date

| POINT VALUE | INSPECTION POINTS | POINTS GRANTED/COMMENTS |
|---|---|---|
| 10 | Select procedure<br>Verify revision | +10 |
| 10 | Select form<br>Verify revision | +10 |
| 5 | Select equipment<br>Verify calibration/resolution | +5 |
| 5 | Verify adequacy of lighting<br>Prior to and during inspection | +5 |
| 5 | Record part/item number<br>On inspection form | +5 |
| 15 | Inspect component/part<br>Identify discontinuities | +15 |
| 15 | Compare discontinuities to<br>Recording criteria in procedure | +15 |
| 25 | Correctly record<br>discontinuities | +25 |
| 5 | Sign and date form | +5 |
| 5 | Complete form<br>Accurate and legible | +5 |

Vtpsctest.practical

PRECISION SURVEILLANCE

**N1076 PSC PROCEDURE SQ 8.0**
**ANCHORAGE INSPECTION**
**Data Sheet 8.0**
**January 10, 2012**
**Page 1 of 1**
**Revision 0**

Project: TURKEY POINT 40TH YEAR TENDON SURVEILLANCE ☒ UNIT 3 ☐ UNIT 4

(7.3)Tendon No.: V-03 Tendon End: ~~G~~ Dome WRR 5-15-12 ☒ Shop ☐ Field

## ANCHORAGE INSPECTION CRITERIA

☒ As-Found ☐ Post De-Tensioning / Pre-Wire Removal ☐ Post Re-Tensioning — Q.C. Signoff

### 9.0 & 10.0 - CORROSION & CRACK INSPECTION

| | | | | | | |
|---|---|---|---|---|---|---|
| (9.2) Buttonheads | Level: A (1) | (10.1) Cracks | ☐ Yes (2) | ☑ No | ☐ N/A | |
| (9.2) Anchorhead | Level: 1 (1) | (10.1) Cracks | ☐ Yes (2) | ☑ No | ☐ N/A | |
| (9.2) Shims | Level: 1 (1) | (10.1) Cracks | ☐ Yes (2) | ☑ No | ☐ N/A | |
| (9.2) Bearing Plate | Level: 2 (1) | (10.1) Cracks | ☐ Yes (2) | ☑ No | ☐ N/A | WRR 5-15-12 |

***Refer to SQ 10.1 – DETENSIONED ANCHORAGE INSPECTION*** (8.3.1) Wire Coating: Corrosion Level: N/A — N/A

(1) – Corrosion Levels of 3, 4 or 5, or E require an NCR. (2) Compose a sketch of the cracks on Sketch Sheet 8.0 and initiate an NCR.

### 11.0 - BUTTONHEAD INSPECTION

| | |
|---|---|
| ◗ | Offsize (Malformed) |
| ◒ | Protruding/unseated wire/buttonheads |
| Ø | Broken/missing wire/buttonheads |
| ● | Previously identified as missing |
| ⊘ | Discontinuous – removed |
| ⊗ | wire(s) removed during this surveillance for testing |

(11.2) Anchorhead I.D. None

Located on Sketch: N/A ☐ Yes ☐ No

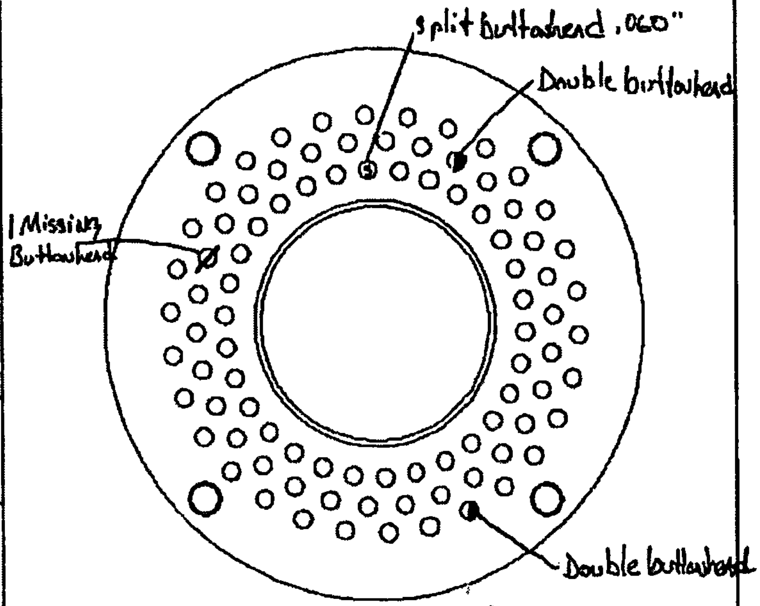
(11.4) Missing Buttonheads Found: N/A

☐ Yes ☒ No Quantity: N/A

Additional Information:

Shim stack ht. - 4 1/2"

1,1,1,7/8,7/8,7/8,1



WRR 5-15-12

(12.2) Number of Protruding Buttonheads (◒): 0 (8.3) Light Meter ID: LM901 Cal Due: 9-19-12

(12.3) Number of Missing Buttonheads (Ø, ⊘): 1

(12.4) Total of Protruding + Missing Buttonheads: 1 (12.6) Continuity Test Requested ? ☐ Yes ☒ No

(12.5) Total # of Effective Buttonheads Seated: 89 Wires Identified? N/A ☐ Yes ☐ No

(12.7) Overall Results ☒ Acceptable ☐ Un-Acceptable Customer Notified NCR#: N/A WRR 5-15-12

QC Reviewed: Level: Date:

PSC PROCEDURE VT1C/3C.FORMS
CERTIFICATION OF EXAMINER
EXHIBIT A
Revision 0, April 28, 1999
Page 1 of 1
Revision 1, 4/28/99; Revision 2, 7/6/99; Revision 3, 2/24/05;
Revision 4, 08/31/07; Revision 5, 08/01/08; Revision 6, 09/04/08

# LEVEL II CERTIFICATION RECORD

Name: W. Rance Robbins

Social Security Number: [redacted]

Certification Date: 05/17/12

Visual Method: VT-1C/3C

Certification Level: II

| Level II | | | |
|---|---|---|---|
| General | 90% | Date | 05/15/12 |
| Specific | 95% | Date | 05/15/12 |
| Practical | VT-1C: 98% | Date | 05/16/12 |
| | VT-1C: 98% | | 05/16/12 |
| | VT-3C: 96% | | 05/16/12 |
| | VT-3C: 100% | | 05/16/12 |
| | Practical Ave: 98% | | |
| **Composite** | **94.33%** | **Date** | **05/17/12** |

The composite grade shall be an equally weighted average of all applicable examination grades for each category.

Training Courses Completed

| Type | Given By | Location | Hours | Date | Instructor |
|---|---|---|---|---|---|
| General | n/a | n/a | n/a | n/a | n/a |
| Specific | n/a | n/a | n/a | n/a | n/a |
| Practical | n/a | n/a | n/a | n/a | n/a |

We certify that the above named employee meets all of the qualification requirements of the PSC Procedure IWL VT1C/3C.CERT for certification/[✓ recertification] as a VT-1C/3C Examiner Level II

This certificate expires after 05/17/15

Approval Signature:
PSC P.E.

PSC PROCEDURE VT1C/3C.FORMS
**CERTIFICATION OF EXAMINER**
**EXHIBIT F**
Revision 0, April 26, 1999
Page 1 of 2
Revision 1, 4/28/99; Revision 2, 7/6/99; Revision 3, 2/24/05;
Revision 4, 08/31/07; Revision 5, 08/01/08; Revision 6, 09/04/08

# LEVEL II RECORD OF EXPERIENCE

Mr./Ms W. Rance Robbins has worked at PSC (Location) Since 12/2005 to date.

During that time he/she has participated in the following activities which involve visual examinations similar to the Visual inspection DIRECT (VT-1C) OR GENERAL (VT-3C) examination required by ASME, Section XI, Subsection IWL.

| | |
|---|---|
| **OPERATING NUCLEAR STATION(S)** | |
| Visual Examination(s): | V.C. Summer Nuclear Plant, Arkansas Nuclear One, Calvert Cliffs Nuclear Plant<br>Turkey Point Nuclear Plant, Fort Calhoun Nuclear Plant, Crystal River Nuclear Plant, Millstone Nuclear Plant<br>Point Beach Nuclear Plant, Palisades Nuclear Plant, LaSalle Nuclear Plant, Braidwood Nuclear Plant |
| Repair / Replacement: | |
| Modification(s): | |
| Periodic test(s): | |
| **MANUFACTURING, CONSTRUCTION, FABRICATION OR INSTALLATION** | |
| Visual Examination(s): | |
| Dimensional Verification: | |

The above also meets the following Level II PSC Procedure VT1C/3C.CERT requirement:

| | | |
|---|---|---|
| __X__ High School Graduate<br>1 year | ____ Two-Year Associate Degree<br>6 months | ____ Four-Year College Degree<br>3 months |

Completed by (Candidate): W. Rance Robbins — Date 05/15/12

Social Security Number: 430-31-6556

Verified and Accepted by: PSC P.E — Date 05/17/12

## PRECISION SURVEILLANCE CORPORATION
## VISUAL EXAMINATION TRAINING

NAME: William Rance Robbins DATE: 5-14-2012

SOCIAL SECURITY NUMBER: [redacted]

EXAM: VISUAL GENERAL LEVEL II FOR VT-1C/3C

GRADE: 90% GRADED BY: Christopher E. Cox, P.E. 5/15/12

I have neither given, received nor observed any aid or information regarding this exam prior to or during its administration that could compromise this exam's integrity. I also understand my obligation to report any exam compromise by others prior, during, or subsequent to the exam administration.

I acknowledge that this examination is a way of demonstrating my knowledge of the subject associated with this examination and that I have had the opportunity, on my request, to review this entire examination with the instructor to ensure my understanding of the subject matter.

I have read and understand the above statements: W. Rance Robbins 5-14-2012
Student Signature Date

### FILL IN ONE CIRCLE AS THE ANSWER FOR EACH QUESTION

WRR 5-14-2012

|  | A | B | C | D |  | A | B | C | D |  | A | B | C | D |  | A | B | C | D |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | ○ | ○ | ○ | ● | 6 | ○ | ○ | ● | ● | 11 | ○ | ● | ○ | ○ | 16 | ○ | ○ | ● | ○ |
| 2 | ○ | ○ | ● | ○ | 7 | ○ | ○ | ○ | ● | 12 | ○ | ○ | ● | ○ | 17 | ○ | ○ | ○ | ● |
| 3 | ○ | ● | ○ | ○ | 8 | ○ | ● | ○ | ○ | 13 | ● | ○ | ○ | ○ | 18 | ○ | ● | ○ | ○ |
| 4 | ○ | ● | ○ | ○ | 9 | ○ | ○ | ○ | ● | 14 | ○ | ○ | ● | ○ | 19 | ● | ○ | ○ | ○ |
| 5 | ○ | ○ | ○ | ● | 10 | ● | ○ | ○ | ○ | 15 | ○ | ○ | ○ | ● | 20 | ○ | ● | ○ | ○ |

EXAM "5/14/12"

VT1C3CGENERAL EXAM FORM 051412

May 14, 2012

## VT-C GENERAL EXAM

1. What is the function of the ANII?

A. To verify compliance with NRC regulations
B. To provide another approval signature on forms
C. To ensure nuclear safety
D. To verify compliance with applicable requirements of the ASME Code

2. What is the character height of the lower case letters for VT-1C?

A. 0.010"
B. 0.105"
C. 0.044"
D. 0.500"

3. PSC's Procedure for Level II certifications complies to?

A. ACI 301
B. IWL 2001 edition with 2003 addenda
C. IWL 98
D. IWE 92

4. What are some examples of aids used for "remote" VT-3C visual examinations?

A. None of the above
B. Binoculars, telescopes or transits
C. Mirrors
D. Feeler gauges

5. What is an optical comparator?

A. A device to determine color resolution
B. A device to evaluate vision
C. A device to measure surface lighting intensity
D. None of the above

6. What is the effective date of the amendment to 10 CFR 50 that incorporated by reference the requirements of ASME Section XI, 1992 Edition with 1992 Addenda?

A. 9-9-96
B. 9-9-97
C.  9-9-96
D. 9-9-01
E. 9-9-00

7. Who may perform VT- 1C examinations without VT-1C certification?

A. QC Personnel
B. Level II ISI personnel
C. A manager or supervisor of ISI programs
D. None of the above

8. What type of containment is Quad City?

A. Steel Containment
B. Concrete Containment

9. When should the character height of near-distance test charts be measured?

A. After the inspection
B. When requested by the Registered Engineer
C. When a Relevant Condition is found
D. Before use of it

10. Which code specifies the general requirement for certification?

A. IWA
B. IWL
C. IWE
D. IWB

11. What amendment to 10 CFR 50 incorporated by reference the requirements of ASME Section XI, 1992 Edition with 1992 Addenda?

A. 1992 Addenda
B. 10 CFR 50.55a.
C. Appendix A
D. 10 CFR 10.30

12. Which subsection of ASME Section XI applies to VT-1C/3C examinations of concrete containments?

A. IWE
B. IWA
C. IWL
D. AWL

13. Section XI, IWL exempts what areas of concrete surfaces of containments to be examined:

A. Areas covered by the steel liner, foundation material or backfill, or are otherwise obstructed by adjacent structures, components parts, or appurtenances.
B. Areas as determined by the ANII
C. Areas requiring the use of a ladder, chair or other equipment to reach them.
D. Areas as determined by the Responsible Engineer

14. For VT-3C examinations what is the minimum far-distance vision acuity the examiner must have?

A. 40/40 or better
B. None
C. at least 20/25 Snellen in at least one eye.
D. 20/20

15. VT-3C visual examination is required to be performed on?

A. All of the above
B. Tendon buttonheads
C. Jacks/Rams used for stressing
D. Exterior Containment concrete surface and grease cans

16. Mirrors and supplemental lighting are aids for?

A. General visual inspection
B. VT-3 inspection
C. VT-1C inspection
D. VT-2B inspection

17. What are the methods of visual inspection PSC certifies it's examiners to?

A. VT-1
B. VT-1C
C. VT-3C
D. All of the above

18. How often is Level II re-certification required?

A. Every 5 years
B. Every 3 years
C. Every 3 months
D. Every year

19. For VT-1C examinations what is the minimum near distance vision acuity the examiner must have?

A. at least 20/25 Snellen in at least one eye.
B. 40/40 or better
C. 20/20
D. None

20. Level II minimum education required for certification is?

A. MBA degree
B. High school or equivalent
C. No education
D. One year of college

May 14, 2012

## VT-C GENERAL EXAM ANSWER KEY

1. D 2. C 3. B 4. B 5. D 6. C 7. D 8. A 9. D 10. B 11. B
12. C 13. A 14. C 15. D 16. C 17. D 18. B 19. A 20. B

## PRECISION SURVEILLANCE CORPORATION
## VISUAL EXAMINATION TRAINING

---

NAME: William Rance Robbins DATE: 5-14-2012
SOCIAL SECURITY NUMBER: [redacted]
EXAM: VISUAL SPECIFIC LEVEL II FOR VT-1

---

GRADE: 95% GRADED BY: Christopher E. Cox, P.E. 5/15/12

---

I have neither given, received nor observed any aid or information regarding this exam prior to or during its administration that could compromise this exam's integrity. I also understand my obligation to report any exam compromise by others prior, during, or subsequent to the exam administration.

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I have read and understand the above statements: W. Rance Robbins 5-14-2012
Student Signature Date

---

FILL IN ONE CIRCLE AS THE ANSWER FOR EACH QUESTION

| | A | B | C | D | | A | B | C | D | | A | B | C | D | | A | B | C | D |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | ○ | ● | ○ | ○ | 6 | ● | ○ | ○ | ○ | 11 | ○ | ○ | ● | ○ | 16 | ○ | ○ | ○ | ● |
| 2 | ○ | ○ | ● | ○ | 7 | ● | ○ | ○ | ○ | 12 | ● | ○ | ○ | ○ | 17 | ● | ○ | ○ | ○ |
| 3 | ○ | ● | ○ | ○ | 8 | ○ | ● | ○ | ○ | ~~13~~ | ◎ | ~~●~~ | ○ | ○ | 18 | ○ | ○ | ● | ○ |
| 4 | ● | ○ | ○ | ○ | 9 | ○ | ○ | ○ | ● | 14 | ○ | ● | ○ | ○ | 19 | ○ | ○ | ● | ○ |
| 5 | ○ | ○ | ○ | ● | 10 | ○ | ○ | ○ | ● | 15 | ○ | ○ | ● | ○ | 20 | ○ | ● | ○ | ○ |

EXAM "05/14/12"

VTISPECIFIC EXAM FORM 051412

May 14, 2012

## VT-C SPECIFIC EXAM

1. Per PSC Procedures for VT examinations who approves the qualifications of VT Examiners?

A. VT Supervisor
B. Responsible Engineer (P.E.)
C. Project Manager
D. Project Superintendent

2. What degradation is defined by the breaking away of small portions of a concrete surface due to localized internal pressure which leaves a shallow, typically conical depression?

A. Exudation.
B. Laitance.
C. Popout.
D. Encrustation.
E. Stratification.

3. Visual concrete exams are performed under the direction of what qualified individual?

A. Corporate Vice President
B. Responsible Engineer
C. Job Superintendent
D. Project Manager

4. VT-3C inspection is required to be performed on:

A. Exterior Containment concrete surface and grease caps.
B. All of the above.
C. Tendon button heads.
D. Jacks/Rams used for stressing.

5. Per ASME Section XI, subsection IWL what are to be given a VT-3C examination?

A. Tendon anchor head
B. Roof of turbine building
C. Containment tendon bearing plates
D. Containment concrete walls

6. Efflorescence is a sign of:

A. Mineral leaching.
B. Surface coating.
C. Nothing.
D. Concrete additives.

7. Efflorescence is a sign of

A. Mineral leaching
B. Concrete additives
C. Nothing
D. Surface coating

8. Per ASME Section XI, subsection IWL what are to be given a VT-3C examination?

A. The safety shoes craft personnel are wearing
B. The tendon gallery ceiling
C. Containment tendon strand wedges or wire button heads
D. The condition of hard hats worn by personnel

9. When is a VT-1C examination performed?

A. At night
B. On a sunny day
C. When the examiner feels like doing something different
D. suspect areas are detected by VT-3C examination.

10. A VT-1C concrete examination requires what minimum illumination?

A. 100fc
B. 300fc
C. 200fc
D. 50fc

11. Detailed VT-1C inspection can apply to:

A. Tendon force level.
B. Proper torque applied to bolts.
C. Concrete cracks.
D. Back filled section of containment.

12. In tendon anchorage areas, acceptable cracks in the concrete adjacent to the bearing plates do not exceed.

A. 0.010 inch in width.
B. 0.100 inch in width.
C. 0.001 inch in width.
D. 1.000 inch in width.

13. When may devices for remote VT-1C examination be used?

A. Health physics considerations make direct VT-1C examination inaccessible
B. NRC allows remote
C. Health physics allows remote
D. When it is raining

14. A detailed VT-1C concrete inspection requires what maximum examination distance?

A. 7 feet
B. 2 feet
C. 35 feet
D. 4 feet

15. How often is a vision test required for VT Examiners?

A. Every other month
B. Every 5 years
C. Every 12 months
D. Every 10 years

16. What kinds of concrete deterioration and distress are defined in ACI 201.1R-68 & 92?

A. Concrete cracking.
B. Concrete deterioration.
C. Concrete spalling.
D. All of the above.

17. At a Nuclear Unit how may dirt, contamination or other debris that could interfere with the concrete examination be removed?

A. Mechanical cleaning methods or approved solvents if approved by the Responsible Engineer
B. Acid if approved by the ANII
C. Fire hose
D. All of the above

18. What type of degradation often initiates as microscopic cracking at the reinforcing steel-to-concrete bond interface, resulting from periodic applications of load or stress?

A. Abrasion/erosion.
B. Cement-aggregate reactions.
C. Fatigue.
D. Irradiation.

19. Which of the following degradation mechanisms to rebar is associated with changes in the permeability of concrete, presence of an electrolyte, or microbiological attack?

A. Irradiation.
B. Fatigue.
C. Corrosion.
D. Thermal effects.

20. VT-3C visual examination is required to be performed on?

A. Jacks/Rams used for stressing
B. Exterior Containment concrete surface and grease cans
C. Tendon buttonheads
D. All of the above

May 14, 2012

## VT-C SPECIFIC EXAM ANSWER KEY

1. B 2. C 3. B 4. A 5. D 6. A 7. A 8. B 9. D 10. D 11. C
12. A 13. A 14. B 15. C 16. D 17. A 18. C 19. C 20. B

## PRECISION SURVEILLANCE CORPORATION
## Visual Examination Training
## PRACTICAL EXAMINATION CHECKLIST

NAME: W. Rance Robbins DATE: 5-14-2012

SOCIAL SECURITY NUMBER: [redacted]

EXAM METHOD: VT-1 or [✓ VT-1C] or VT-3C EXAM NUMBER: # 1

GRADE: 98% INSTRUCTOR/ GRADED BY: P.E. 5/16/12
PSC P.E

I have neither given, received or observed any aid or information regarding this exam prior to or during its administration that could compromise this exam's integrity. I also understand my obligation to report any exam compromise by others prior, during, or subsequent to the exam administration.

I acknowledge that this examination is a way of demonstrating my knowledge of the subject associated with this examination and that I have had the opportunity, on my request, to review this entire examination with the instructor to ensure my understanding of the subject matter.

I have read and understand the above statements: W. Rance Robbins 5-14-2012
Student Signature Date

| POINT VALUE | INSPECTION POINTS | POINTS GRANTED/COMMENTS |
|---|---|---|
| 10 | Select procedure<br>Verify revision | +10 |
| 10 | Select form<br>Verify revision | +10 |
| 5 | Select equipment<br>Verify calibration/resolution | +5 |
| 5 | Verify adequacy of lighting<br>Prior to and during inspection | +5 |
| 5 | Record part/item number<br>On inspection form | +5 |
| 15 | Inspect component/part<br>Identify discontinuities | +15 |
| 15 | Compare discontinuities to<br>Recording criteria in procedure | +15 |
| 25 | Correctly record<br>discontinuities | +25 |
| 5 | Sign and date form | +5 |
| 5 | Complete form<br>Accurate and legible | +3 |

Vtpsctest.practical

PSC PRECISION SURVEILLANCE

**N1076 PSC PROCEDURE SQ 8.3**
**BEARING PLATE INSPECTION**
**DATA SHEET SQ 8.3**
January 10, 2012
Page 1 of 1
Revision 0

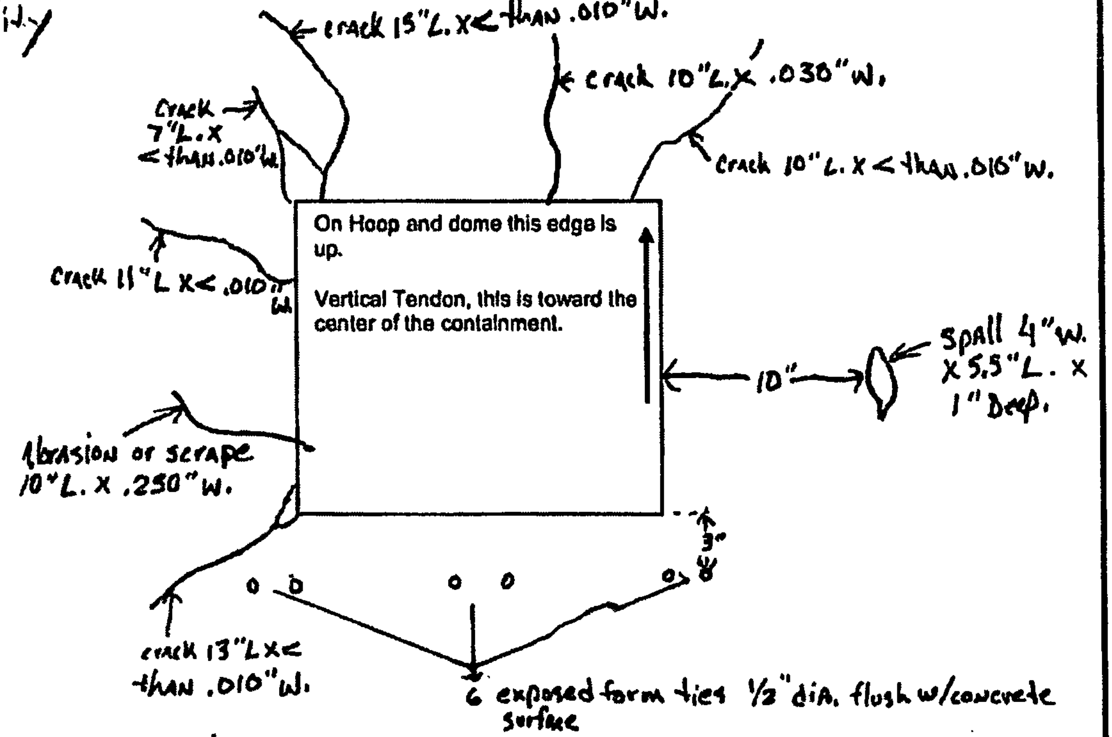
Project: TURKEY POINT 40th YEAR TENDON SURVEILLANCE ☒ UNIT 3 ☐ UNIT 4

Tendon No.: V-03 Tendon End: Top (East) ☒ Shop ☐ Field

(7.4) Bearing Plate Identification #: Unable to locate

1. Orient the bearing plate with the sketch below.
2. Locate the bearing plate identification and document the location on the sketch.
3. Sketch all cracks, including other defects, existing on the concrete in the area surrounding the tendon anchorage for a distance of 24 inches from the edge of the bearing plate.
4. For cracks equal to or wider than 0.010 inches, document condition on a Nonconformance Report in accordance with Procedure QA 9.0, NONCONFORMANCES, for Florida Power & Light approval.

-2: Legibility



24" Scale 2-1b Cal. due: 11-15-12 / Feeler Gauge F-70 Cal. due: 11-14-12 / Optical Comparator OC-4 Cal due 11-[illegible]-12

Light Conditions 50fc or greater: ☒ Yes ☐ No Auxiliary Light Source used: ☐ Yes ☒ No Describe: N/A

(7.3) Light Meter ID: LM 901 Date due calibration: 9-19-2012

(7.5) Cracks ≥ 0.010" ☒ Yes ☐ No Quantity: 1 Max. Width: .030" Max Length: 10" NCR#: 001

QC Inspector: W. Lance [illegible] Level: II Date: 5-14-2012

QC Reviewed: Level: Date:

## PRECISION SURVEILLANCE CORPORATION
### Visual Examination Training
### PRACTICAL EXAMINATION CHECKLIST

NAME: W. Rance Robbins DATE: 5-14-2012

SOCIAL SECURITY NUMBER: [redacted]

EXAM METHOD: VT-1 or [✓ VT-1C] or VT-3C EXAM NUMBER: #2

GRADE: 98% INSTRUCTOR/ GRADED BY: P.E. 5/14/12
PSC P.E

I have neither given, received or observed any aid or information regarding this exam prior to or during its administration that could compromise this exam's integrity. I also understand my obligation to report any exam compromise by others prior, during, or subsequent to the exam administration.

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I have read and understand the above statements: W. Rance Robbins 5-14-2012
Student Signature Date

| POINT VALUE | INSPECTION POINTS | POINTS GRANTED/COMMENTS |
|---|---|---|
| 10 | Select procedure<br>Verify revision | +10 |
| 10 | Select form<br>Verify revision | +10 |
| 5 | Select equipment<br>Verify calibration/resolution | +5 |
| 5 | Verify adequacy of lighting<br>Prior to and during inspection | +5 |
| 5 | Record part/item number<br>On inspection form | +5 |
| 15 | Inspect component/part<br>Identify discontinuities | +15 |
| 15 | Compare discontinuities to<br>Recording criteria in procedure | +15 |
| 25 | Correctly record<br>discontinuities | +25 |
| 5 | Sign and date form | +5 |
| 5 | Complete form<br>Accurate and legible | +3 |

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PSC
PRECISION SURVEILLANCE

**N1076 PSC PROCEDURE SQ 8.3**
**BEARING PLATE INSPECTION**
**DATA SHEET SQ 8.3**
January 10, 2012
Page 1 of 1
Revision 0

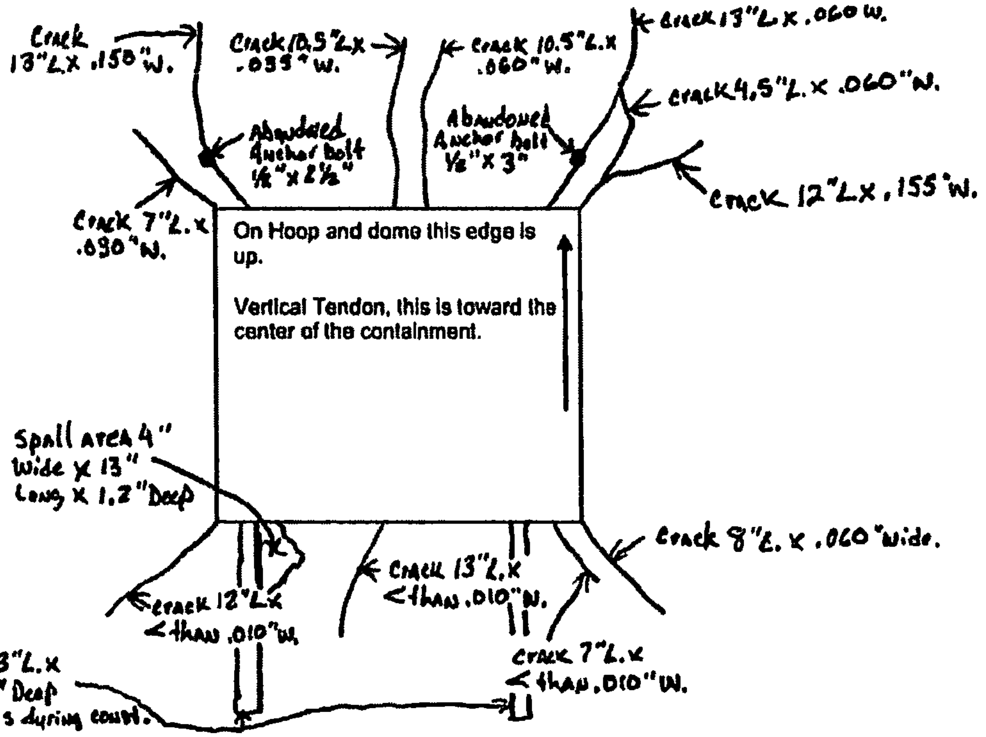
Project: TURKEY POINT 40th YEAR TENDON SURVEILLANCE ☒ UNIT 3 ☐ UNIT 4

Tendon No.: V-03 Tendon End: Gallery (west) ☐ Shop ☒ Field

(7.4) Bearing Plate Identification #: Unable to locate

1. Orient the bearing plate with the sketch below.
2. Locate the bearing plate identification and document the location on the sketch.
3. Sketch all cracks, including other defects, existing on the concrete in the area surrounding the tendon anchorage for a distance of 24 inches from the edge of the bearing plate.
4. For cracks equal to or wider than 0.010 inches, document condition on a Nonconformance Report in accordance with Procedure QA 9.0, NONCONFORMANCES, for Florida Power & Light approval.

-2 iLegibility



24" Scale R64b Cal.due: 11-15-12 / Feeler Gauge F70 Cal. due: 11-14-12 / Optical Comparator OC-CC Cal. due: 11-14-12

Light Conditions 50fc or greater: ☒ Yes ☐ No Auxiliary Light Source used: ☐ Yes ☒ No Describe: N/A

(7.3) Light Meter ID: LM901 Date due calibration: 9-19-2012

(7.5) Cracks ≥ 0.010" ☒ Yes ☐ No Quantity: 8 Max. Width: .155" Max Length: 13" NCR#: 002

QC Inspector: W. Bruce Patton Level: II Date: 5-14-12

QC Reviewed: Level: Date:

## PRECISION SURVEILLANCE CORPORATION
Visual Examination Training
## PRACTICAL EXAMINATION CHECKLIST

NAME: W. Rance Robbins DATE: 5-14-2012

SOCIAL SECURITY NUMBER: [redacted]

EXAM METHOD: VT-1 or VT-1C or [✓ VT-3C] EXAM NUMBER: #1

GRADE: 96% INSTRUCTOR/ GRADED BY: , P.E 5/14/12
PSC P.E

I have neither given, received or observed any aid or information regarding this exam prior to or during its administration that could compromise this exam's integrity. I also understand my obligation to report any exam compromise by others prior, during, or subsequent to the exam administration.

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I have read and understand the above statements: W. Rance Robbins 5-14-2012
Student Signature Date

| POINT VALUE | INSPECTION POINTS | POINTS GRANTED/COMMENTS |
|---|---|---|
| 10 | Select procedure<br>Verify revision | +10 |
| 10 | Select form<br>Verify revision | +10 |
| 5 | Select equipment<br>Verify calibration/resolution | +5 |
| 5 | Verify adequacy of lighting<br>Prior to and during inspection | +5 |
| 5 | Record part/item number<br>On inspection form | +5 |
| 15 | Inspect component/part<br>Identify discontinuities | +15 |
| 15 | Compare discontinuities to<br>Recording criteria in procedure | +15 |
| 25 | Correctly record<br>discontinuities | +21 |
| 5 | Sign and date form | +5 |
| 5 | Complete form<br>Accurate and legible | +5 |

Vtpsctest.practical

# VISUAL EXAMINATION – GENERAL VISUAL EXAMINATION

Project Turkey Point Surveillance # 10/40th Year 40th
Inspection Area: T001
Equipment Used LM 901 Cal. due: 9-19-12 / Scale R-16 Cal. due: 11-15-12 /
Light Meter

## Concrete Surface Condition

| Containment Surface (Findings and Description) | NI | IO | RI |
|---|---|---|---|
| 6 small abrasion areas | ☐ | ☒ | ☐ |
| 6 ~~7~~ small pop outs | ☐ | ☒ | ☐ |
| 1 dry stain from grease (-4) | ☐ | ☒ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |

***(Use as many sketch sheets (page 2) as needed to report any Recordable Indication (RI) or Information Only (IO) findings for the purpose of documentation and orientation.)***

## Recordable Indications to be Examined For (PSC Procedure 8.4)

| | |
|---|---|
| Leaching or Chemical Attack | Deterioration of any Concrete Coating (if applicable) |
| Abrasion or Erosion Degradation | Tendon Grease on Exposed Concrete Surfaces |
| Popouts and Voids | Corrosion on Grease Cans, Bearing Plates or Anchorage |
| Cracks | *Excessive Corrosion on Exposed Embedded Metal Surfaces |
| Scaling | *Detached Embedments or Loose Bolting |
| Spalls | *Indication of Degradation Due to Vibration |
| Corrosion Staining on the Concrete Surface | **(* The owner/agent must be notified for these noted conditions.)** |
| Exposed Reinforcing Steel | |
| Surface Patches or Repairs | |

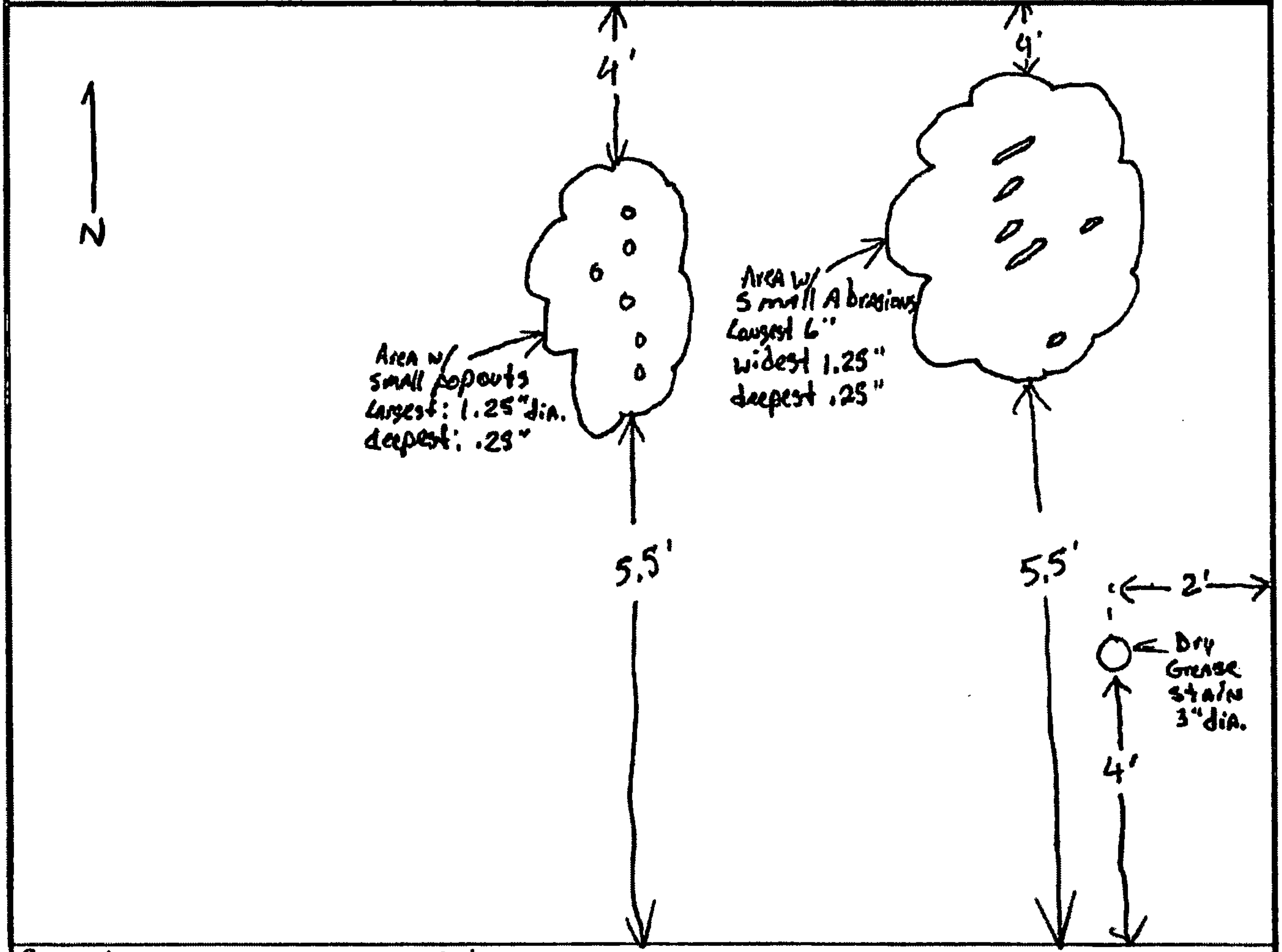
Comments and Disposition by Responsible Engineer ☐ Acceptable ☐ Unacceptable
Comments:

Inspector & Level: W. Bruce [illegible] Date: 5-14-12
Responsible Engineer: Date:
ANII: Date:

**Project:** TURKEY POINT NUCLEAR STATION 40TH YEAR TENDON SURVEILLANCE

**Inspection Area:** T001

1. Sketch or attach photographs to provide documentation or additional details as necessary.



Comments: Area is in good condition no cracks

QC Inspector: W. Bruce

Level: II

Date: 5-14-12

## PRECISION SURVEILLANCE CORPORATION
Visual Examination Training
## PRACTICAL EXAMINATION CHECKLIST

NAME: W. Rance Robbins DATE: 5-14-2012

SOCIAL SECURITY NUMBER: [redacted]

EXAM METHOD: VT-1 or VT-1C or [✓ VT-3C] EXAM NUMBER: #2

GRADE: 100% INSTRUCTOR/ GRADED BY: P.E. 5/14/12
PSC P.E

I have neither given, received or observed any aid or information regarding this exam prior to or during its administration that could compromise this exam's integrity. I also understand my obligation to report any exam compromise by others prior, during, or subsequent to the exam administration.

I acknowledge that this examination is a way of demonstrating my knowledge of the subject associated with this examination and that I have had the opportunity, on my request, to review this entire examination with the instructor to ensure my understanding of the subject matter.

I have read and understand the above statements: W. Rance Robbins 5-14-2012
Student Signature Date

| POINT VALUE | INSPECTION POINTS | POINTS GRANTED/COMMENTS |
|---|---|---|
| 10 | Select procedure<br>Verify revision | +10 |
| 10 | Select form<br>Verify revision | +10 |
| 5 | Select equipment<br>Verify calibration/resolution | +5 |
| 5 | Verify adequacy of lighting<br>Prior to and during inspection | +5 |
| 5 | Record part/item number<br>On inspection form | +5 |
| 15 | Inspect component/part<br>Identify discontinuities | +15 |
| 15 | Compare discontinuities to<br>Recording criteria in procedure | +15 |
| 25 | Correctly record<br>discontinuities | +25 |
| 5 | Sign and date form | +5 |
| 5 | Complete form<br>Accurate and legible | +5 |

PSC
PRECISION SURVEILLANCE

N1076 PSC PROCEDURE SQ 8.4
CONCRETE EXTERIOR
DATA SHEET SQ 8.4
January 10, 2012
Page 1 of 1
Revision 0

# VISUAL EXAMINATION – GENERAL VISUAL EXAMINATION

Project Turkey Point Surveillance # 10 Year 40th
Inspection Area: T002
Equipment Used Light Meter LM-901 Cal. due 9-19-12/SCALE R-16 Cal. due: 11-19-12/ Optical Comparator OC-CC (11-14-12 Cal. due) / Feeler Gage F-70 Cal. due: 11-14-12

## Concrete Surface Condition

| Containment Surface (Findings and Description) | NI | IO | RI |
|---|---|---|---|
| 1 crack less than .040" wide x 54" long. | ☐ | ☒ | ☐ |
| | ☐ | ☐ | ☐ |
| 1 abrasion or scrape 18" long x ½" wide x less than ⅛" deep. | ☐ | ☒ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |

***(Use as many sketch sheets (page 2) as needed to report any Recordable Indication (RI) or Information Only (IO) findings for the purpose of documentation and orientation.)***

## Recordable Indications to be Examined For (PSC Procedure 8.4)

Leaching or Chemical Attack
Abrasion or Erosion Degradation
Popouts and Voids
Cracks
Scaling
Spalls
Corrosion Staining on the Concrete Surface
Exposed Reinforcing Steel
Surface Patches or Repairs

Deterioration of any Concrete Coating (if applicable)
Tendon Grease on Exposed Concrete Surfaces
Corrosion on Grease Cans, Bearing Plates or Anchorage
*Excessive Corrosion on Exposed Embedded Metal Surfaces
*Detached Embedments or Loose Bolting
*Indication of Degradation Due to Vibration
**(* The owner/agent must be notified for these noted conditions.)**

Comments and Disposition by Responsible Engineer ☐ Acceptable ☐ Unacceptable
Comments:

Inspector & Level: Date: 5-14-2012
Responsible Engineer: Date:
ANII: Date:

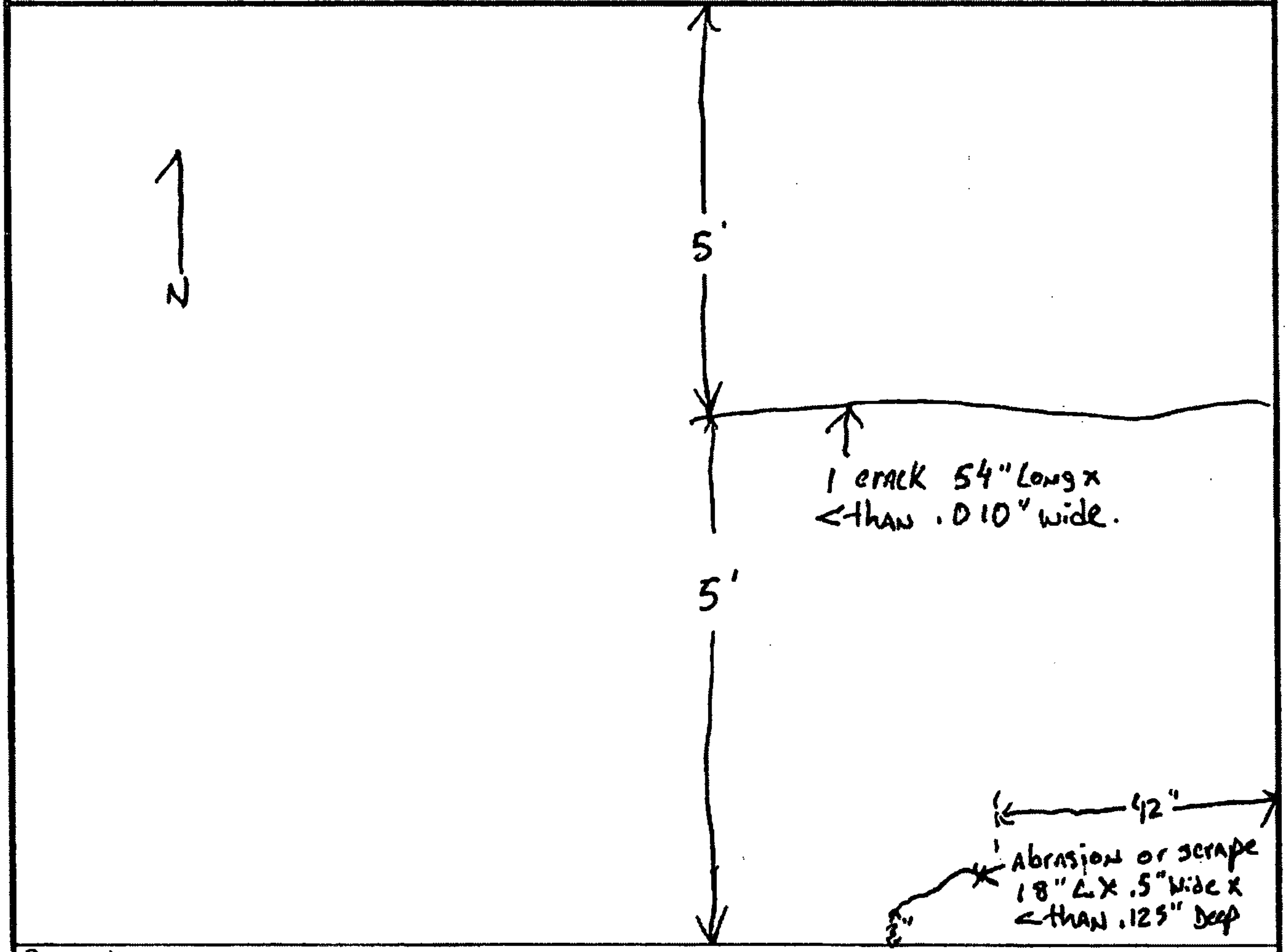
PRECISION SURVEILLANCE

N1076 PSC PROCEDURE SQ 8.4
CONCRETE EXTERIOR
SKETCH SHEET 8.4
January 10, 2012
Page 1 of 1
Revision 0

**Project:** TURKEY POINT NUCLEAR STATION 40TH YEAR TENDON SURVEILLANCE

**Inspection Area:** T002

1. Sketch or attach photographs to provide documentation or additional details as necessary.



**Comments:**

**QC Inspector:**

**Level:** II

**Date:** 5-14-2012

**QUALIFICATION OF QUALITY CONTROL INSPECTORS-PROCEDURE QA 2.10.6.1.1**

**CERTIFICATION FORM QA 2.10.6.1.1 B**

## CERTIFICATE OF QUALIFICATION

This is to certify that:

Clinton West SSN [redacted]

has been qualified through on-the-job experience and formal training to meet the requirements of ANSI N45.26-1973 and 1978 as:

QUALITY CONTROL INSPECTOR LEVEL II with the following limitations.

Inspections and Calibrations associated with Post-Tensioning Systems and Components.

This certification will qualify the named individual to perform Quality Control inspections, examinations and testing for the various manufactured products or services supplied, to meet the Requirements of the projects for the Precision Surveillance Corporation and within the limitations of this qualification.

This qualification becomes effective 8/21/13 and shall remain in effect until the Recertification date of 8/21/16 or until such time that the named individual leaves the employment of PSC, gives just cause for termination of the certification or requires additional training to maintain a proper Quality Control disposition.

PHYSICAL REQUIRMENTS: Eye Exam Date 6/17/13 to 6/17/14 by Optometrist

Eye Exam Date _________ to _________ by _________

Eye Exam Date _________ to _________ by _________

APPROVED BY: GBussone

Quality Control Inspector Level III

Date: 8/21/13

**QUALIFICATION OF QUALITY CONTROL INSPECTORS-PROCEDURE QA 2.10.6.1.1**

**QUALIFICATION LIMITATION FORM QA 2.10.6.1.1 C**

The named individual is hereby certified to perform Quality Control inspections, examinations and tests for the products of the Precision Surveillance Corporation and shall be limited in practicing those skills to those activities for which qualified as shown.

Name Clinton West SSN [redacted]

Quality Control Inspector Level II per ANSI N45.2.6 – 1973 or 1978

## ACTIVITIES

**POST TENSIONING SYSTEM:**

- SHOP: N/A
- VENDOR: N/A
- FIELD: All
- TESTING: N/A
- OTHER: N/A

**REINFORCING STEEL:**

- SHOP: N/A

**CONSTRUCTION METALS:**

- STRUCTURAL FAB: N/A
- WELDING: N/A
- PAINTING-ANSI 101.4: N/A
- OTHER: N/A

**GENERAL QUALITY ASSURANCE:**

- DOCUMENT CONTROL: Yes
- TEST REPORT APPROVAL: Yes
- PURCHASE ORDER APPROVAL: No
- NONCONFORMANCE REPORTING: Yes
- CALIBRATION: Yes
- 10CFR21 Yes
- 10CFR50 and PSC QUALITY ASSURANCE: Yes

APPROVED: Gerald Brasone DATE: 8/21/13

Quality Control Inspector Level III

*PROFESSIONAL SUMMARY*

A. NAME: CLINT WEST

B. POSITION: FIELD SUPERINTENDENT

Responsible for set-up, supervising and managing field crew as assigned for special construction projects with or without labor.

C. EDUCATION:

☐ 1985: Graduated from Belleville High School- Belleville, AR

☐ 1985-1986: Attended Bryan Institute of Computer Programming

☐ 1987-1991: U.S. Navy Aviation Machinist Mate 3rd Class (Jet Engineer Mechanic). Various commendations and medals. Assigned to U.S. Navy SEABEE Unit 406 Steel Workers

D. CERTIFICATIONS:

☐ Journeyman Ironworker, Local 321

☐ Certified Four Position Welder

☐ OSHA 30 Hour Training

☐ Qualified Rigger

E. WORK EXPERIENCE:

☐ 8/1991-12/1991: William's Construction

☐ 12/1991-12/1995: Truck Driver

☐ 1/1996-6/2000: Maintenance/Milwright at Wayne Farms- Danville, AR

☐ 8/2000-12/2000: Laborer at Arkansas Nuclear One Unit 2 SGR

☐ 6/2001-5/2004: IronWorker Local 591-Shreveport, LA
  - Several Foreman Positions, IW Steward
  - Numerous Structural Jobs

☐ 5/2004-Present: Iron Workers Local 321-Little Rock, AR
  - 5/2004-7/2005: Boyd Sanders Construction
  - 7/2005-1/2006: ANO Unit 1 SGR, Stone & Webster and SGT
  - 3 Reactor Head Changes with Bigge Crane and Rigging- San Leandro, CA
  - Superintendent on job in Bahamas rebuilding an oil transfer station off shore destroyed by Hurricane Katrina.

☐ 4/7/2008-Present: Precision Surveillance Corporation-East Chicago, IN
  - Worked as General Foreman, Foreman, Rigger, and Welder at various Nuclear Sites throughout the United States. Superintendent as of 9/2008.

## F. NUCLEAR JOBSITE ACTIVITY

Involvement in Construction Management and/or supervision of post-tensioning or structural systems for the following nuclear projects:

☐ ANO-Arkansas Nuclear One
☐ VC Summer Nuclear Plant
☐ Ginna Nuclear Station
☐ Millstone Nuclear Power Plant
☐ Byron Nuclear Plant
☐ Brunswick Nuclear Plant
☐ Fort Calhoun Nuclear Plant
☐ Point Beach Nuclear Plant
☐ Vogtle Nuclear Plant
☐ Palo Verde Nuclear Plant
☐ Braidwood Nuclear Plant
☐ Crystal River Nuclear Plant
☐ Palisades Nuclear Plant
☐ Waterford Nuclear Plant

# PHYSICAL TESTING OF INSPECTORS-PROC. QA 2.10.6.1.1.1
## PHYSICAL TESTING FORM QA 2.10.6.1.1.1

Name: Clint West Date 6-17-13 Retest Date
Title: Wears Glasses ✓ for near

### 1. PHYSICAL CHARACTERISTICS

Rating: 100% Limitations glasses for all visual task
Comments No apparent limitations

### 2. VISUAL – FAR RANGE

Test Device Snellen chart
Vision Rating %: 100 Left 20/20 Right 20/20 Both 20/15
Comments excell vision in the distance with glasses

### 3. VISUAL – NEAR RANGE

Test Device Snellen Acuity Chart
Vision Rating Grade 100% Left J-1 Right J-1 Both J-1
Comments

### 4. COLOR PERCEPTION

Test Device Ishihara Plate

| | | | | | |
|---|---|---|---|---|---|
| Plate: | 1 | 2 | 3 | 4 | 5 |
| | 6 | 7 | 8 | 9 | 10 |
| | 11 | 12 | 13 | 14 | 15 |

Score 14 Of 14 Perception 100%
Score shall not be less than 10 to be acceptable for perception.
Comments excellent color vision

### 5.OVERALL RATING

Capability excellent

Examiner James W [illegible] Title Optometrist Date 6-17-13

**PSC**
**Precision Surveillance Corporation**

## PRECISION SURVEILLANCE CORPORATION

## TRAINING SHEET

THE PSC PERSONNEL LISTED BELOW HAVE BEEN PROVIDED AN OVERVIEW AND INDOCTRINATED TO PRECISION SURVEILLANCE CORPORATION'S QUALITY ASSURANCE MANUAL REVISION 5 (ALL SECTIONS)

| NAME | SIGNATURE | SS# | DATE |
|---|---|---|---|
| CLINT WEST | Clint West | [redacted] | 6-19-13 |
| CARROll Hunt | Carroll Hunt | [redacted] | 6-19-13 |
| | | | |
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TRAINER: G Bussone

DATE: 6/19/13

Training Sheet

# PRECISION SURVEILLANCE CORPORATION

## TRAINING SHEET

THE PSC PERSONNEL LISTED BELOW HAVE BEEN PROVIDED COPIES OF 10CFR50 APPENDIX B, 10CFR PART 21, ANSI N45.2, ANSI N45.2.6, ANSI N45.2.10 FOR REVIEW AND UNDERSTANDING

| NAME | SIGNATURE | [redacted] | DATE |
|---|---|---|---|
| CLINT WEST | | [redacted] | -20-13 |
| CARROll Hunt | Carroll | [redacted] | 6-20-13 |
| | | | |
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TRAINER: Bussone

DATE: 6/20/13

Graduated 5-24-85 Class Rank 8/11

## BELLEVILLE PERMANENT HIGH SCHOOL RECORD

Name (reversed) West, Clinton Place of birth ______ Date of birth 8-1- 1967 Sex Male
Yr. successful vaccination 19____ Parent or guardian Clint and Glynice Occupation Raise Chickens
Residence at entrance ______ School last attended ______ Entered ______ 19____
Date of discharge ______ 19____ Age when discharged ______ Cause ______
Graduated in class of 19____ In what quartile (1, 2, 3, 4) ______ No in class ______ Rank ______

Junior High School

1981 1982 Grade 9th

| Subjects | Sem. 1 | Sem. 2 | Cr. |
|---|---|---|---|
| English | F | C | 1/2 |
| Ark. History | | B | 1/2 |
| Civics | F | | |
| Agri. | A | A | 1 |
| Algebra I | D | D | 1 |
| Gen. Science | C | C | 1 |
| P.E. | A | A | 1/2 |
| Principal | | | 4 1/2 |

1982 1983 Grade 10th

| Subjects | Sem. 1 | Sem. 2 | Cr. |
|---|---|---|---|
| English II | C | C | 1 |
| English I | | F | — |
| World History | B | C | 1 |
| Civics 1 | C | | 1/2 |
| Biology | D | D | 1 |
| P.E. | A | A | 1/4 |
| | | | |
| Principal | | | 3 3/4 |

1983 1984 Grade 11th

| Subjects | Sem. 1 | A | Cr. |
|---|---|---|---|
| Typing | B | | 1/2 |
| [illegible] | C | C- | 1 |
| Physics | D | | 1/2 |
| Amer. Hist. | D- | F | 1/2 |
| Auto mech. | A | | 1/2 |
| P.E. | A | A | 1/4 |
| Computer Math | | C | 1/2 |
| Principal | | | 4 1/4 |

1984 1985 Grade 12th

| Subjects | Sem. 1 | Sem. 2 | Cr. |
|---|---|---|---|
| Meat Dressing | | | |
| [illegible] | A | B | 1 |
| Bookkeeping | C | B- | 1 |
| English | B | B- | 1 |
| Spanish | B | | 1/2 |
| Computer Math | C | C | 1 |
| Amer. History | | C | 1/2 |
| Principal | | Cr. [illegible] | 6th |

Senior High School

[redacted] Grade [redacted]

| Subjects | Sem. 1 | Sem. 2 | Cr. |
|---|---|---|---|
| [redacted] | | | |
| Principal | | | |

19 19 Grade

| Subjects | Sem. 1 | Sem. 2 | Cr. |
|---|---|---|---|
| Principal | | | |

19 19 Grade

| Subjects | Sem. 1 | Sem. 2 | Cr. |
|---|---|---|---|
| Principal | | | |

Total Credits 18 3/4

1984 19 85 Grade 12th

| Subjects | Sem. 1 | Sem. 2 | Cr. |
|---|---|---|---|
| Contemp. SC | | C+ | 1/2 |
| English I | | C | 1/2 |
| P.E. | A | A | 1/4 |
| | | | 6 1/4 |
| Principal | | | |

A—Excellent B—Above Average C—Average D—Below Average F—Failure Form 3653

**WESTERN YELL COUNTY**
**ELEMENTARY SCHOOL**

PO Box 250 • Belleville, Arkansas 72824
Phone: 479/493-4100 • Fax: 479/493-4117

Keith Jones, Principal
e-mail: jonesk@wolverines.k12.ar.us

Lisa Lawrence, Counselor
e-mail: lawrencel@wolverines.k12.ar.us

Julie Lane, Curriculum Coordinator
e-mail: lanej@wolverines.k12.ar.us

Carol George, Secretary/Registrar
e-mail: georgec@wolverines.k12.ar.us

June 4, 2013

To Whom It May Concern:

Clint West graduated from Belleville High School on May 24, 1985.

I was Clint's school secretary as well as a family friend. He and my son were classmates.

We do not have documentation other than the Transcript.

Sincerely,

Carol George

Carol George

PSC
PRECISION SURVEILLANCE

5/31/13

Carol George
Western Yell County Elementary
300 North Grand Avenue
PO Box 250
Belleville, AR 72824

Dear Mrs. George,

Thank you for sending Clinton West's High School Record. Unfortunately, it does not state whether he completed High School. Therefore, we would also like to request any documentation/records that you may have of him completing/graduating High School. You may also provide a letter verifying he did graduate. Clint West is our employee and we need this information for his personnel file.

If you need any information from me, please call me at (219) 397-5826. Thank you in advance for your prompt attention to our request.

Sincerely,
Melissa Lara
Melissa Lara
Administrative Assistant

3468 Watling Street · East Chicago · IN · 46312
P (219) 397-5826 · F (219) 397-9867 · www.pscnuclear.com

PSC QC INSPECTOR TRAINEE: CLINT WEST DATE: 8-21-2013

TEST SCORE: 100% PSC INSTRUCTOR: GBussone 8/21/13

# PRECISION SURVEILLANCE CORPORATION
# QUALITY CONTROL INSPECTOR TRAINING PROGRAM

## EXAM

1) What is the proper way to correct an error recorded on a data sheet ie: typo, obvious omission?

   a) Write in changes or correct date
   [✓ b)] Any changes made, one line initial and date
   c) Write a nonconformance

2) When performing inspections what documents should you have with you?

   a) Quality Assurance Manual
   [✓ b)] Applicable Inspection Procedures
   c) Calibration reports on inspection tools

3) Quality Control Inspectors shall be completely independent from the pressures of ____________________.

   a) Customers
   b) Quality Assurance
   [✓ c)] Production

4) The distance a tendon/wire stretches when being stressed is called, ____________.

   a) Liftoff
   b) Relaxation
   [✓ c)] Elongation

5) During stressing operations, which of the following cautions shall be observed?

   a) Do not stand behind the jack when it is under load
   b) Keep fingers out of any pinch areas
   c) Be alert during shim placement and removal
   [✓ d)] All of the above

6) The tendon shall never be stressed beyond _____% of the minimum guaranteed ultimate tensile strength (Guts) of the effective wires remaining in that tendon

a) 60 %
[✓ b) 80 %]
c) 100 %

7) When tendon stressing is performed from both ends simultaneously the pressure at one end of the tendon shall not exceed the other by more than 1000 psi.

[✓ a) True]
b) False

8) The <u>minimum</u> temperature for grease being pumped into a tendon end is ________ degrees.

a) 120 degrees
[✓ b) 150 degrees]
c) 160 degrees

9) When cracks are detected for Anchor Heads, Shims or Bearing Plates, Turkey Point Engineering shall be notified by a nonconformance report.

[✓ a) True]
b) False

10) The Field Quality Control Inspectors operate under the <u>immediate</u> direction of:

a) Field Superintendent
[✓ b) Lead Quality Control Inspector]
c) PSC Manager Quality Assurance

11) Field Quality Control Inspectors and the Quality Assurance personnel have the authority to issue a "Stop Work Order" for any activity, material, or procedure not in conformance with:

a) Project specifications
b) Quality Assurance Manual
c) Surveillance I.S.I. Manual
[✓ d) All of the above]

12)

Field Changes that take place prior to the approval of a Field Change Request shall be documented on a NCR__________.

13) Prior to applying **ANY FORCE** to a tendon the stressing adaptor must be fully engaged.

[✓ a) True]
b) False

14) To find the actual liftoff/lock-off at a particular end of a tendon a 0.030" thick feeler gauge (shim stock) is inserted into the shim stack until __________ consecutive liftoff/lock-off readings have been taken.

a) Two (2)
[✓ b) Three (3)]
c) Four (4)

15) Steel rulers are calibrated every:

a) 6 months
[✓ b) 1year]
c) 5 years

16) When should Quality Control Documents be <u>signed</u> by the inspector?

a) Before the next step
b) At the end of the day
[✓ c) After all information for the inspections have been entered]

17) Who controls the Measuring and Test Equipment used by PSC Inspectors?

a) PSC Superintendent
b) Utility employees
[✓ c) PSC Quality Control or Quality Assurance personnel]

18) Where are all quality related documents pertaining to the project kept?

a) In the inspector's desk
[✓ b) Field office file or jobsite vault]
c) With the PSC Superintendent

19) All Lead Field Quality Control Inspectors shall be qualified to a minimum of Level __ capability in accordance with the requirements of ANSI N45.2.6.

a) I
[✓ b) II]
c) III

20) The person responsible for recording inspection information on Data Sheets is the ____________________.

a) Craft Crew Member
[✓ b)] PSC QC Inspector
c) Foreman
d) Any of the above

| | | |
|---|---|---|
| PSC PRECISION SURVEILLANCE | *IWL VISUAL EXAMINER CERTIFICATION RECORD (EXHIBIT A)* | Document: FRM-PQR-001<br>Revision: 0<br>Date: July 16, 2013<br>Document Type: Corporation Standards<br>Page: 1 of 1 |

## IWL GENERAL AND DETAILED VISUAL EXAMINER CERTIFICATION RECORD

| Training Requirements | Initials(Examinee/Instructor) | Date |
|---|---|---|
| Training in Section XI, Subsection IWL (4 hours minimum) | CW/CEC | 8/14/13 |
| Training shall include requirements for inservice and preservice examinations and reporting criteria for the following:(2 hours minimum) | | |
| 1) Concrete (conditions such as those described in ACI-201.1) | CW/CEC | 8/15/13 |
| 2) Reinforcing steel | CW/CEC | 8/15/13 |
| 3) Post-tensioning system items (e.g., wires, strands, anchorage hardware, corrosion protection medium, and free water) | CW/CEC | 8/20/13 |
| **Written Examination** | **Grade** | **Date** |
| Written examination covering Section XI, Subsection IWL requirements and plant-specific procedure requirements for visual examination containing at least 15 questions in the following: | | |
| 1) Concrete and Reinforcing Steel | 93.3% | 8/23/13 |
| 2) Post-tensioning system components(i.e., wires, strands, anchorage hardware, corrosion protection medium, and free water | 100.0% | 8/23/13 |
| **Practical Examination** | **Grade** | **Date** |
| A practical examination using test specimens with flaws or indications to be detected by the following visual examination techniques: | | |
| 1) General and detailed visual examination of concrete | 92% | 8/23/13 |
| 2) Detailed visual examination of reinforcing steel | 94% | 8/23/13 |
| 3) Detailed visual examination of post-tensioning system components (i.e., wires, strands, and anchorage hardware) | 96% | 8/23/13 |
| **Passing grades for visual examinations shall be as follows:** | **Final Grade** | **Date** |
| An average combined grade of 80% for written and practical examinations | 95.1% | 8/23/13 |
| A minimum grade of 70% for each written and practical examination | | |

Precision Surveillance Corporation certifies that the following individual meets the minimum qualifications set forth in the Corporation Standard Document STD-PQR-001 "Personnel Qualification Requirements for General and Detailed Visual Examinations for Nuclear Power Plants".

| | |
|---|---|
| IWL Visual Examiner (Print Name): | Clint B. West |
| IWL Visual Examiner (Signature): | Clint B West |
| SS #(Last Four Digits) | [redacted] |
| Certification Date: | 8-23-13 |
| Certification Expiration Date: | 8-22-18 |
| P.S.C. Professional Engineer Approval(Name) | Christopher E. Cox |
| P.S.C. Professional Engineer Approval(Signature) | Christopher E. Cox |

|  |  |  |
|---|---|---|
|  | *IWL-2000*<br>*WRITTEN EXAMINATION*<br><br>*CONCRETE & REINFORCING STEEL* | Document: EXM-PQR-001<br>Revision: 0<br>Date: July 16, 2013<br>Document Type: Corporation Standards<br>Page: 1 of 3 |

NAME: CLINTON WEST DATE: 8-23-13

SOCIAL SECURITY NUMBER: [redacted]

GRADE: 14/15 = 93.3% GRADED BY: P.E. 8/23/13

I have neither given, received nor observed any aid or information regarding this exam prior to or during its administration that could compromise this exam's integrity. I also understand my obligation to report any exam compromise by others prior, during, or subsequent to the exam administration.

I acknowledge that this examination is a way of demonstrating my knowledge of the subject associated with this examination and that I have had the opportunity, on my request, to review this entire examination with the instructor to ensure my understanding of the subject matter.

I have read and understand the above statements: 8-23-13

Student Signature Date

FILL IN ONE CIRCLE AS THE ANSWER FOR EACH QUESTION

|  | A | B | C | D |  |  | A | B | C | D |  |  | A | B | C | D |  |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | ○ | ○ | ○ | ● | ✓ | 6 | ● | ○ | ○ | ○ | ✓ | 11 | ○ | ● | ○ | ○ | ✓ |
| 2 | ● | ○ | ○ | ○ | ✓ | 7 | ○ | ○ | ○ | ● | ✓ | 12 | ○ | ● | ○ | ○ | ✓ |
| 3 | ○ | ○ | ● | ○ | ✓ | 8 | ○ | ● | ○ | ○ | ✓ | 13 | ● | ☒ | ○ | ○ | X |
| 4 | ○ | ○ | ● | ○ | ✓ | 9 | ○ | ○ | ● | ○ | ✓ | 14 | ○ | ○ | ● | ○ | ✓ |
| 5 | ○ | ○ | ○ | ● | ✓ | 10 | ● | ○ | ○ | ○ | ✓ | 15 | ○ | ● | ○ | ○ | ✓ |

1. What is the function of the ANII?

   a) To verify compliance with NRC regulations
   b) To provide another approval signature on forms
   c) To ensure nuclear safety
   [✓ d)] To verify compliance with applicable requirements of the ASME Code ✓

2. General Visual inspections are required to be performed on:

   [✓ a)] Exterior Containment concrete surface and grease caps. ✓
   b) Tendon button heads.
   c) Jacks/Rams used for stressing
   d) All of the above

3. What is the character height of the lower case letters for Detailed Visual Inspections? ✓

   a) 0.010"
   b) 0.105"
   [✓ c)] 0.044"
   d) 0.500"

4. What degradation is defined by the breaking away of small portions of a concrete surface due to localized internal pressure which leaves a shallow, typically conical depression? ✓

   a) Exudation
   b) Laitance
   [✓ c)] Popout
   d) Encrustation

5. What is an optical comparator? ✓

   a) A device to determine color resolution
   b) A device to evaluate vision
   c) A device to measure surface lighting intensity
   [✓ d)] None of the above

6. Efflorescence is a sign of ✓

   [✓ a)] Mineral leaching
   b) Concrete additives
   c) Nothing
   d) Surface coating

7. Who may perform IWL Visual examinations without certification? ✓

   a) QC Personnel
   b) Level II ISI personnel
   c) A manager or supervisor of ISI programs
   [✓ d)] None of the above

8. Per ASME Section XI, subsection IWL what are to be given a general visual examination? ✓

   a) The safety shoes craft personnel are wearing
   [✓ b)] The tendon gallery ceiling
   c) Containment tendon strand wedges or wire button heads
   d) The condition of hard hats worn by personnel

9. When should the character height of near-distance test charts be measured? ✓

   a) After the inspection
   b) When requested by the Registered Engineer
   c) When a Relevant Condition is found
   [✓ d)] Before use of it

10. In tendon anchorage areas, acceptable cracks in the concrete adjacent to the bearing plates do not exceed. ✓

   [✓ a)] 0.010 inch in width
   b) 0.100 inch in width
   c) 0.001 inch in width
   d) 1.000 inch in width

11. What amendment to 10 CFR 50 incorporated by reference the requirements of ASME Section XI, 1992 Edition with 1992 Addenda? ✓

   a) 1992 Addenda
   [✓ b)] 10 CFR 50.55a.
   c) Appendix A
   d) 10 CFR 10.30

12. A detailed visual inspection requires what maximum examination distance? ✓

   a) 7 feet
   [✓ b)] 2 feet
   c) 35 feet
   d) 4 feet

13. How often is Level II re-certification required? X

   [✓ a) Every 5 years]
   [✓ b)] Every 3 years
   c) Every 3 months
   d) Every year

14. Which of the following degradation mechanisms to rebar is associated with changes in the permeability of concrete, presence of an electrolyte, or microbiological attack? ✓

   a) Irradiation
   b) Fatigue
   [✓ c)] Corrosion
   d) Thermal effects

15. Level II minimum education required for certification is? ✓

   a) MBA degree
   [✓ b)] High school or equivalent
   c) No education
   d) One year of college

| | | |
|---|---|---|
| PSC | *IWL-2000*<br>*WRITTEN EXAMINATION*<br>*POST-TENSIONING COMPONENTS* | Document: EXM-PQR-002<br>Revision: 0<br>Date: July 16, 2013<br>Document Type: Corporation Standards<br>Page: 1 of 3 |

NAME: Clinton West DATE: 8-23-13

SOCIAL SECURITY NUMBER: [redacted]

GRADE: 15/15 = 100% GRADED BY: , P.E. 8/23/13

I have neither given, received nor observed any aid or information regarding this exam prior to or during its administration that could compromise this exam's integrity. I also understand my obligation to report any exam compromise by others prior, during, or subsequent to the exam administration.

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I have read and understand the above statements: 8-23-13

Student Signature Date

**FILL IN ONE CIRCLE AS THE ANSWER FOR EACH QUESTION**

| | A | B | C | D | | | A | B | C | D | | | A | B | C | D | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | ○ | ○ | ○ | ● | ✓ | 6 | ○ | ○ | ● | ○ | ✓ | 11 | ○ | ● | ○ | ○ | ✓ |
| 2 | ○ | ○ | ○ | ● | ✓ | 7 | ● | ○ | ○ | ○ | ✓ | 12 | ○ | ○ | ● | ○ | ✓ |
| 3 | ○ | ○ | ● | ○ | ✓ | 8 | ● | ○ | ○ | ○ | ✓ | 13 | ○ | ● | ○ | ○ | ✓ |
| 4 | ○ | ○ | ○ | ● | ✓ | 9 | ● | ○ | ○ | ○ | ✓ | 14 | ● | ○ | ○ | ○ | ✓ |
| 5 | ○ | ○ | ● | ○ | ✓ | 10 | ● | ○ | ○ | ○ | ✓ | 15 | ○ | ● | ○ | ○ | ✓ |

| | | | |
|---|---|---|---|
| PSC | *IWL-2000*<br>*WRITTEN EXAMINATION*<br><br>*POST-TENSIONING COMPONENTS* | Document: | EXM-PQR-002 |
| | | Revision: | 0 |
| | | Date: | July 16, 2013 |
| | | Document Type: | Corporation Standards |
| | | Page: | 2 of 3 |

1. Per IWL what tendon anchorages are exempt from Detailed Examination? ✓

   a) Inaccessible due to structural obstructions
   b) Inaccessible due to radiological hazards
   c) Inaccessible due to safety concerns
   [✓ d)] All of the above

2. Subsection IWL contains requirements for a Responsible Engineer. He must be an experienced Registered Professional Engineer. What is he responsible for? ✓

   a) Submittal of the report to the Owner documenting results of examinations and repairs
   b) Evaluation of examination results
   c) Approval, instruction, and training of concrete examination personnel
   [✓ d)] All of the above

3. PSC Qualification for IWL Examiners certifications comply to: ✓

   a) IWE 92
   b) IWL 2001 edition with 2003 addenda
   [✓ c)] IWL 2010 edition with 2011 addenda
   d) ACI 301

4. What is detailed examination used to detect on Containment Post Tensioning Systems (tendon anchorage) selected for in-service inspection? ✓

   a) Dissolved water in the grease
   b) Amount of grease in the grease can
   c) Grease can grease level
   [✓ d)] Evidence of free water

5. The tendon bearing plate is to be given what kind of visual inspection? ✓

   a) Close-Up
   b) General
   [✓ c)] Detailed
   d) None

6. What is the typical PSC procedure used for Anchorage Inspection? ✓

   a) SQ 2.0
   b) SQ 12.1
   [✓ c)] SQ 8.0
   d) SQ 4.0

7. Following the re-tensioning of a tendon that has been de-tensioned a Detailed inspection is used to detect:

   [✓ a)] Broken wires or strands.
   b) Amount of nitrates in the grease.
   c) Temperature of the concrete.
   d) If the grease can has been galvanized.

8. Which of the following is not typical equipment used for IWL examination?
   [✓ a)] Pressure gage
   b) Flashlight
   c) Camera
   d) Optical Comparator

9. Following the re-tensioning of a tendon that has been de-tensioned a Detailed inspection is used to detect: ✓

[✓ a)] Broken wires or strands.
b) Amount of nitrates in the grease.
c) Temperature of the concrete.
d) If the grease can has been galvanized.

10. Per PSC Qualification for IWL examinations who approves the qualifications of the Examiners? ✓

[✓ a)] Responsible Engineer (P.E.)
b) IWL Supervisor
c) Project Manager
d) Project Superintendent

11. What is General Examination used to detect on Containment Post Tensioning Systems (tendon anchorage) selected for in-service inspection? ✓

a) Type of galvanizing on Grease can
[✓ b)] Gasket seal on Grease Can
c) Cracks in anchorage hardware
d) None of the above

12. What is Detailed Examination used to detect on Containment Post Tensioning Systems (tendon anchorage) selected for in-service inspection? ✓

a) Chemistry of shim material
b) Material type of shim material
[✓ c)] Displacement of shims
d) Diameter of Shims

13. What is Detailed Examination used to detect on Containment Post Tensioning Systems (tendon anchorage) selected for in-service inspection? ✓

a) Shim finish
[✓ b)] Missing button heads
c) Anchor head finish
d) Bushing hardness

14. For General and Detailed Examinations what is the minimum near distance vision acuity the examiner must have? ✓

[✓ a)] at least 20/25 Snellen in at least one eye.
b) None
c) 20/20
d) 40/40 or better

15. For nuclear plants that completed their Structural Integrity Test 20 years ago how often must the Containment Post-Tensioning System IWL Examination of tendon anchorages be performed on tendons selected for in-service inspection per IWL? ✓

a) Every 6 months
[✓ b)] Every 5 years
c) Every 3 years
d) Every 2 years

| | | | |
|---|---|---|---|
| | *IWL-2000*<br>***DETAILED VISUAL EXAMINATION OF POST-TENSIONING SYSTEM COMPONENTS***<br>***PRACTICAL EXAMINATION CHECKLIST*** | Document:<br>Revision:<br>Date:<br>Document Type:<br>Page: | EXM-PQR-005<br>0<br>July 16, 2013<br>Corporation Standards<br>1 of 3 |

NAME: Clinton West DATE: 8-23-13

SOCIAL SECURITY NUMBER: [redacted]

EXAM NUMBER: 1

GRADE: 96% INSTRUCTOR/GRADED BY: Christopher E. Cox, P.E 8/23/13

I have neither given, received nor observed any aid or information regarding this exam prior to or during its administration that could compromise this exam's integrity. I also understand my obligation to report any exam compromise by others prior, during, or subsequent to the exam administration.

I acknowledge that this examination is a way of demonstrating my knowledge of the subject associated with this examination and that I have had the opportunity, on my request, to review this entire examination with the instructor to ensure my understanding of the subject matter.

I have read and understand the above statements: Clint West 8-23-13
Student Signature Date

| POINT VALUE | INSPECTION POINTS | POINTS GRANTED/COMMENTS |
|---|---|---|
| 10 | Select procedure<br>Verify revision | +10 |
| 10 | Select form<br>Verify revision | +10 |
| 5 | Select equipment<br>Verify calibration/resolution | +5 |
| 5 | Verify adequacy of lighting<br>Prior to and during inspection | +5 |
| 5 | Record part/item number<br>On inspection form | +5 |
| 15 | Inspect component/part<br>Identify discontinuities | +15 |
| 15 | Compare discontinuities to<br>Recording criteria in procedure | +11 / (-4) |
| 25 | Correctly record discontinuities | +25 |
| 5 | Sign and date form | +5 |
| 5 | Complete form<br>Accurate and legible | +5 |
| | TOTAL | +96/100 |

PSC PRECISION SURVEILLANCE

N1078 PSC PROCEDURE SQ 8.0
**ANCHORAGE INSPECTION**
**Data Sheet 8.0B**
February 29, 2012
Page 1 of 1
Revision 0

Project: FARLEY 2012 TENDON SURVEILLANCE ☒ UNIT 1 ☐ UNIT 2

(7.3)Tendon No.: 1 Tendon End: SOUTH ☐ Shop

## ANCHORAGE INSPECTION CRITERIA

☒ As-Found ☐ Post De-Tensioning / Pre-Wire Removal ☐ Post Re-Tensioning | Q.C. Signoff

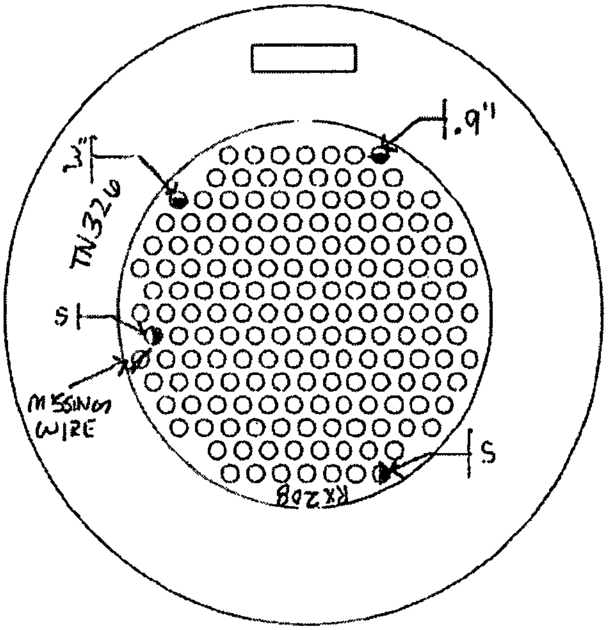
### 9.0 & 10.0 - CORROSION & CRACK INSPECTION

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| (9.2) Buttonheads | Level: B [1] | (10.1) Cracks | ☐ Yes [2] | ☒ No | ☐ N/A | |
| (9.2) Anchorhead | Level: B [1] | (10.1) Cracks | ☐ Yes [2] | ☒ No | ☐ N/A | |
| (9.2) Bushing | Level: B [1] | (10.1) Cracks | ☐ Yes [2] | ☒ No | ☐ N/A | |
| (9.2) Shims | Level: B [1] | (10.1) Cracks | ☐ Yes [2] | ☒ No | ☐ N/A | |
| (9.2) Bearing Plate | Level: B [1] | (10.1) Cracks | ☐ Yes [2] | ☒ No | ☐ N/A | CWH 8-23-13 |

[1] – Corrosion Level of C requires a NCR. [2] – Compose a sketch of the cracks on Sketch Sheet 8.0 and initiate a NCR.

### 11.0 - BUTTONHEAD INSPECTION

| | |
|---|---|
| ◗ | Offsize (Malformed) |
| ⏷ | Protruding/unseated wire/buttonheads |
| Ø | Broken/missing wire/buttonheads |
| ● | Previously identified as missing |
| [Ø] | Discontinuous – removed |
| ⊗ | wire(s) being removed during this surveillance for testing |



(11.2) Anchorhead I.D. RX208
Located on Sketch: ☒ Yes ☐ No
Bushing I.D. TN326
Located on Sketch: ☒ Yes ☐ No
(11.4) Missing Buttonheads Found:
☒ Yes ☐ No Quantity: 1
Additional Information: SHIM STACK HEIGHT 4" / ONE SET OF 4'S

CWH 8-23-13

(12.2) Number of Protruding Buttonheads (⏷): 2
(8.3) Light Meter ID: N/A Cal Due: N/A
(12.3) Number of Missing Buttonheads (Ø, [Ø]): 1
(12.4) Total of Protruding + Missing Buttonheads: 3
(12.6) Continuity Test Requested ? ☐ Yes ☐ No
(12.5) Total # of Effective Buttonheads Seated: 167
Wires Identified? ☐ Yes ☐ No
(12.7) Overall Results ☐ Acceptable ☐ Un-Acceptable Customer Notified NCR#:

CWH 8-23-13

QC Reviewed: Level: Date:

NOTE: SHIM GAP TO WIDE ON ONE SIDE: .6"
NO GAP ON OTHER SIDE

| | | | |
|---|---|---|---|
| PSC | *IWL-2000*<br>*DETAILED VISUAL EXAMINATION OF REINFORCING STEEL*<br><br>*PRACTICAL EXAMINATION CHECKLIST* | Document:<br>Revision:<br>Date:<br>Document Type:<br>Page: | EXM-PQR-004<br>0<br>July 16, 2013<br>Corporation Standards<br>1 of 3 |

NAME: CLINTON WEST DATE: 8-23-13

SOCIAL SECURITY NUMBER: [redacted]

EXAM NUMBER: 2

GRADE: 94% INSTRUCTOR/GRADED BY: P.E., 8/23/13

I have neither given, received nor observed any aid or information regarding this exam prior to or during its administration that could compromise this exam's integrity. I also understand my obligation to report any exam compromise by others prior, during, or subsequent to the exam administration.

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I have read and understand the above statements: 8-23-13
Student Signature Date

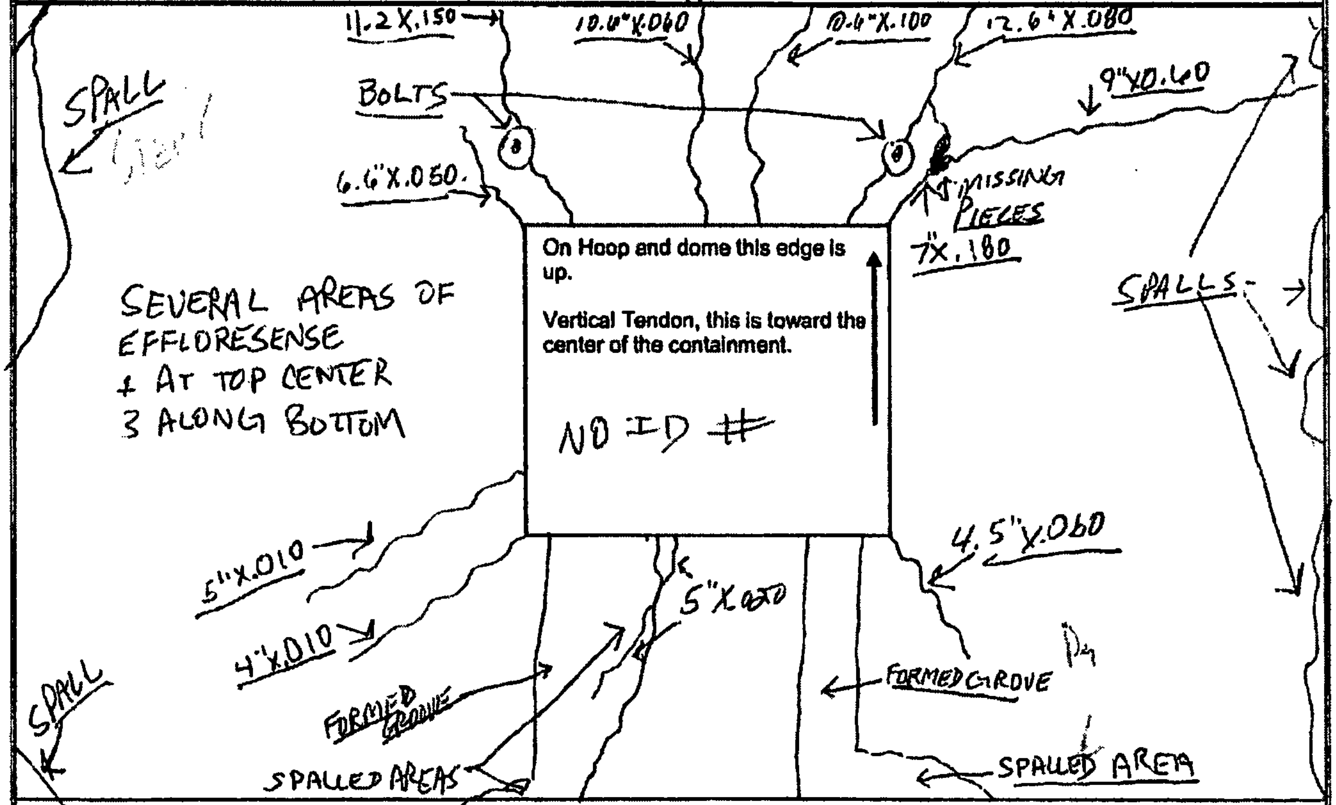
| POINT VALUE | INSPECTION POINTS | POINTS GRANTED/COMMENTS |
|---|---|---|
| 10 | Select procedure<br>Verify revision | +10 |
| 10 | Select form<br>Verify revision | +10 |
| 5 | Select equipment<br>Verify calibration/resolution | +5 |
| 5 | Verify adequacy of lighting<br>Prior to and during inspection | +5 |
| 5 | Record part/item number<br>On inspection form | +5 |
| 15 | Inspect component/part<br>Identify discontinuities | +15 |
| 15 | Compare discontinuities to<br>Recording criteria in procedure | +15 |
| 25 | Correctly record discontinuities | +21/(-4) |
| 5 | Sign and date form | |
| 5 | Complete form<br>Accurate and legible | +3/(-2) |
| | TOTAL | +94 |

Project: FARLEY 2012 TENDON SURVEILLANCE ☒ UNIT 1 ☐ UNIT 2

Tendon No.: 1 Tendon End: EAST ~~☐ Shop~~ N/A ~~☐ Field~~

(7.4) Bearing Plate Identification #: No ID #

1. Orient the bearing plate with the sketch below.
2. Locate the bearing plate identification and document the location on the sketch.
3. Sketch all cracks, including other defects, existing on the concrete in the area surrounding the tendon anchorage for a distance of 24 inches from the edge of the bearing plate.
4. For cracks equal to or wider than 0.010 inches, document condition on an Nonconformance Report in accordance with Procedure QA 9.0, NONCONFORMANCES, for Southern Nuclear approval.



SEVERAL AREAS OF EFFLORESENSE
1 AT TOP CENTER
3 ALONG BOTTOM

Light Conditions 50fc or greater: ☒ Yes ☐ No Auxiliary Light Source used: ☐ Yes ☒ No Describe: N/A

(7.3) Light Meter ID: N/A Date due calibration: N/A

(7.5) Cracks ≥ 0.010" ☒ Yes ☐ No Quantity: 11 Max. Width: .180 Max Length: 12.6" NCR#: -

QC Inspector: CLINT WEST / Clint West Level: Date: 8-23-13

QC Reviewed: Level: Date:

PSC

# IWL-2000
# GENERAL & DETAILED VISUAL EXAMINATION OF CONCRETE

## PRACTICAL EXAMINATION CHECKLIST

| | |
|---|---|
| Document: | EXM-PQR-003 |
| Revision: | 0 |
| Date: | July 16, 2013 |
| Document Type: | Corporation Standards |
| Page: | 1 of 3 |

NAME: Clinton West DATE: 8-23-13

SOCIAL SECURITY NUMBER: [redacted]

EXAM NUMBER: 3

GRADE: 92% INSTRUCTOR/GRADED BY: , P.E. 8/23/13

I have neither given, received nor observed any aid or information regarding this exam prior to or during its administration that could compromise this exam's integrity. I also understand my obligation to report any exam compromise by others prior, during, or subsequent to the exam administration.

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I have read and understand the above statements: 8-23-13
Student Signature Date

| POINT VALUE | INSPECTION POINTS | POINTS GRANTED/COMMENTS |
|---|---|---|
| 10 | Select procedure<br>Verify revision | +10 |
| 10 | Select form<br>Verify revision | +10 |
| 5 | Select equipment<br>Verify calibration/resolution | +3/(-2) |
| 5 | Verify adequacy of lighting<br>Prior to and during inspection | +5 |
| 5 | Record part/item number<br>On inspection form | +5 |
| 15 | Inspect component/part<br>Identify discontinuities | +15 |
| 15 | Compare discontinuities to<br>Recording criteria in procedure | +15 |
| 25 | Correctly record discontinuities | +19/(-6) |
| 5 | Sign and date form | +5 |
| 5 | Complete form<br>Accurate and legible | +5 |
| | TOTAL | +92 |

PSC PRECISION SURVEILLANCE

N1078 PSC PROCEDURE SQ 8.4
CONCRETE EXTERIOR
DATA SHEET SQ 8.4
February 29, 2012
Page 1 of 1
Revision 0

# VISUAL EXAMINATION – GENERAL VISUAL EXAMINATION

Project Farley Surveillance # ____ Year 2012
Inspection Area: 2
Equipment Used RULER, FEELER GAUGE, OPTICAL COMPARATOR

## Concrete Surface Condition

| Containment Surface (Findings and Description) | NI | IO | RI |
|---|---|---|---|
| POPOUTS NOTED ON SKETCH SHEET 8.4 ONE IS <2" DIA. | ☐ | ☐ | ☒ |
| ARRASIONS NOTED ON SKETCH SHEET 8.4 | ☐ | ☐ | ☑ |
| CRACKS " " " | ☐ | ☐ | ☒ |
| WELD SLAG BURN " " | ☐ | ☒ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |

***(Use as many sketch sheets (page 2) as needed to report any Recordable Indication (RI) or Information Only (IO) findings for the purpose of documentation and orientation.)***

### Recordable Indications to be Examined For (PSC Procedure 8.4)

Leaching or Chemical Attack
Abrasion or Erosion Degradation
Popouts and Voids
Cracks
Scaling
Spalls
Corrosion Staining on the Concrete Surface
Exposed Reinforcing Steel
Surface Patches or Repairs

Deterioration of any Concrete Coating (if applicable)
Tendon Grease on Exposed Concrete Surfaces
Corrosion on Grease Cans, Bearing Plates or Anchorage
*Excessive Corrosion on Exposed Embedded Metal Surfaces
*Detached Embedments or Loose Bolting
*Indication of Degradation Due to Vibration
**(* The owner/agent must be notified for these noted conditions.)**

Comments and Disposition by Responsible Engineer ☐Acceptable ☐Unacceptable
Comments: ____

Inspector & Level: CLINT WEST Date: 8-20-12
Responsible Engineer: ____ Date: ____
ANII: ____ Date: ____

18a SQ 8.4 FA.12 (S)

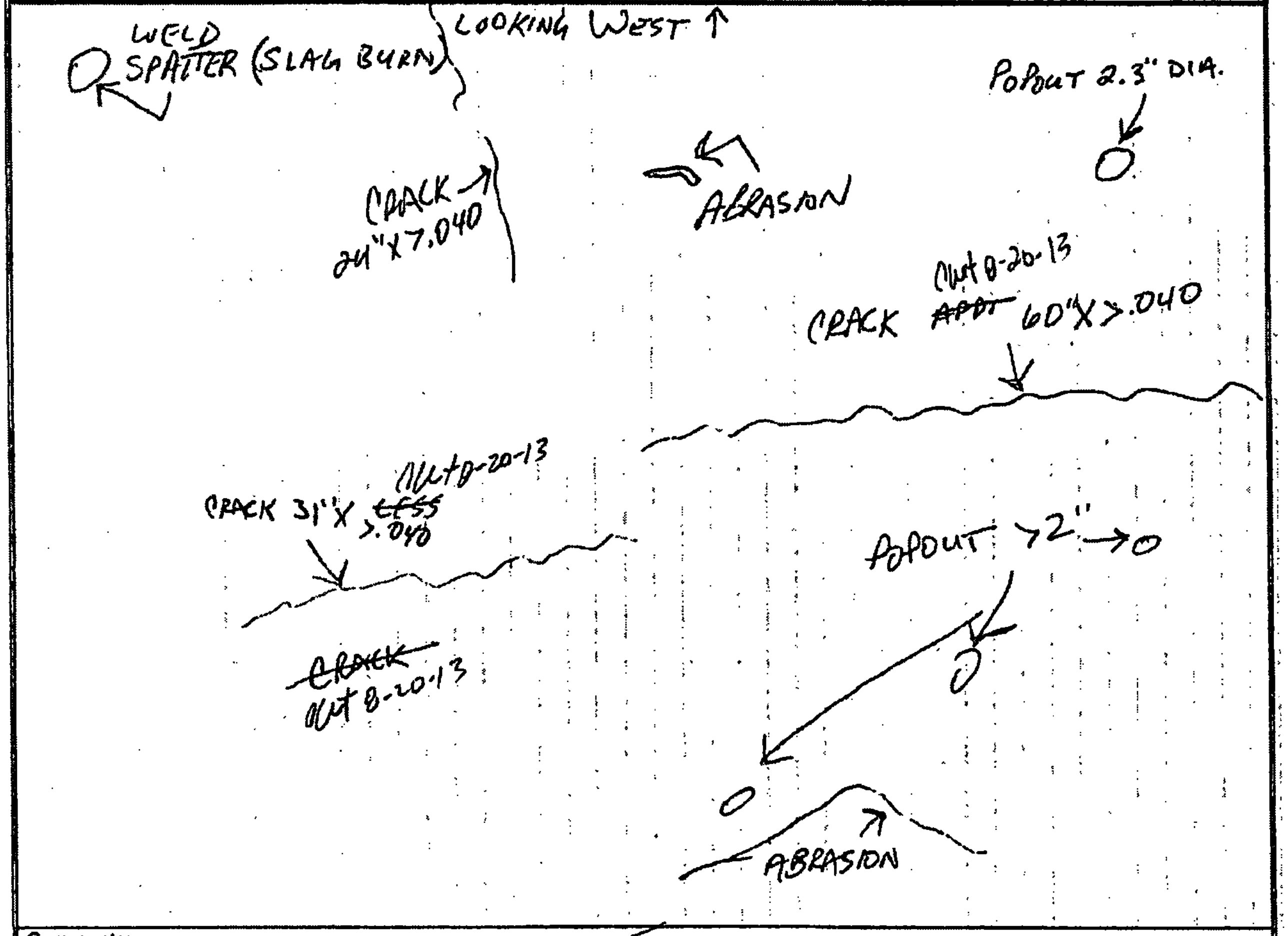
PSC
PRECISION SURVEILLANCE

**N1078 PSC PROCEDURE SQ 8.4**
**CONCRETE EXTERIOR**
**SKETCH SHEET 8.4**
**February 29, 2012**
**Page 1 of 1**
**Revision 0**

Project: FARLEY NUCLEAR STATION 2012 TENDON SURVEILLANCE

Inspection Area: 2

1. Sketch or attach photographs to provide documentation or additional details as necessary.



Comments:

2

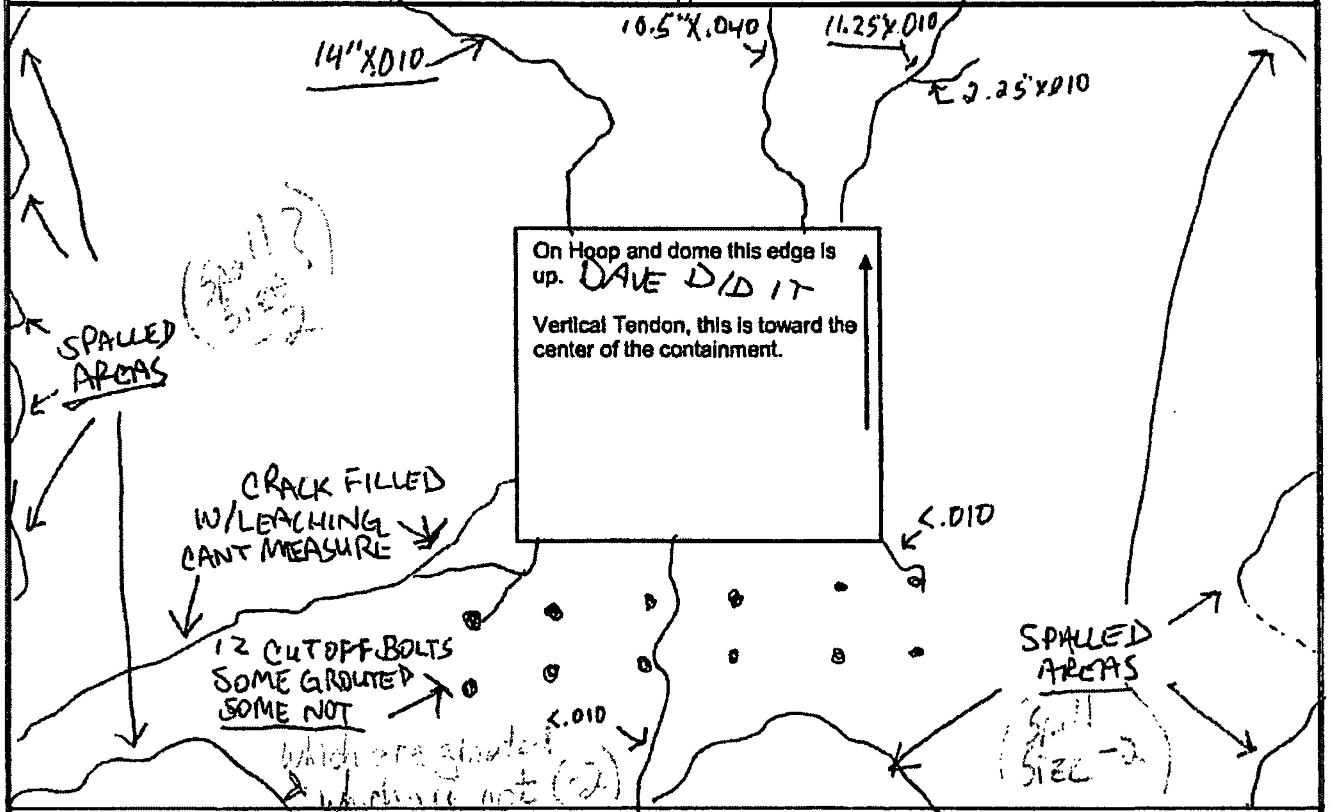
QC Inspector: CLINT WEST/ Level: ______ Date: 8-20-13

Project: FARLEY 2012 TENDON SURVEILLANCE ☒ UNIT 1 ☐ UNIT 2

Tendon No.: 1 Tendon End: WEST ~~☐ Shop~~ N/A ~~☐ Field~~

(7.4) Bearing Plate Identification #: DAVE DID IT

1. Orient the bearing plate with the sketch below.
2. Locate the bearing plate identification and document the location on the sketch.
3. Sketch all cracks, including other defects, existing on the concrete in the area surrounding the tendon anchorage for a distance of 24 inches from the edge of the bearing plate.
4. For cracks equal to or wider than 0.010 inches, document condition on an Nonconformance Report in accordance with Procedure QA 9.0, NONCONFORMANCES, for Southern Nuclear approval.



Light Conditions 50fc or greater: ☒ Yes ☐ No Auxiliary Light Source used: ☐ Yes ☒ No Describe: N/A

(7.3) Light Meter ID: N/A Date due calibration: N/A

(7.5) Cracks ≥ 0.010" ☒ Yes ☐ No Quantity: 4 Max. Width: .040 Max Length: 14" NCR#:

QC Inspector: CLINT WEST/ Level: Date: 8-23-13

QC Reviewed: Level: Date:

| | | | |
|---|---|---|---|
| PSC | *IWL VISUAL EXAMINER CERTIFICATION RECORD (EXHIBIT A)* | Document: | FRM-PQR-001 |
| | | Revision: | 0 |
| | | Date: | July 16, 2013 |
| | | Document Type: | Corporation Standards |
| | | Page: | 1 of 1 |

## IWL GENERAL AND DETAILED VISUAL EXAMINER CERTIFICATION RECORD

| Training Requirements | Initials(Examinee/Instructor) | Date |
|---|---|---|
| Training in Section XI, Subsection IWL (4 hours minimum) | RaP / CEC | 10/18/13 |
| Training shall include requirements for inservice and preservice examinations and reporting criteria for the following:(2 hours minimum) | | |
| 1) Concrete (conditions such as those described in ACI-201.1) | RaP / CEC | 10/18/13 |
| 2) Reinforcing steel | RaP / CEC | 10/18/13 |
| 3) Post-tensioning system items (e.g., wires, strands, anchorage hardware, corrosion protection medium, and free water) | RaP / CEC | 10/18/13 |
| **Written Examination** | **Grade** | **Date** |
| Written examination covering Section XI, Subsection IWL requirements and plant-specific procedure requirements for visual examination containing at least 15 questions in the following: | | |
| 1) Concrete and Reinforcing Steel | 86.6% | 10/18/13 |
| 2) Post-tensioning system components(i.e., wires, strands, anchorage hardware, corrosion protection medium, and free water | 86.6% | 10/18/13 |
| **Practical Examination** | **Grade** | **Date** |
| A practical examination using test specimens with flaws or indications to be detected by the following visual examination techniques: | | |
| 1) General and detailed visual examination of concrete | 93% | 10/18/13 |
| 2) Detailed visual examination of reinforcing steel | 93% | 10/18/13 |
| 3) Detailed visual examination of post-tensioning system components (i.e., wires, strands, and anchorage hardware) | 95% | 10/18/13 |
| **Passing grades for visual examinations shall be as follows:** | **Final Grade** | **Date** |
| An average combined grade of 80% for written and practical examinations | 90.8% | 10/18/13 |
| A minimum grade of 70% for each written and practical examination | | |

Precision Surveillance Corporation certifies that the following individual meets the minimum qualifications set forth in the Corporation Standard Document STD-PQR-001 "Personnel Qualification Requirements for General and Detailed Visual Examinations for Nuclear Power Plants".

| | |
|---|---|
| IWL Visual Examiner (Print Name): | Ronald A. Perry |
| IWL Visual Examiner (Signature): | |
| SS #(Last Four Digits) | [redacted] |
| Certification Date: | 10/18/13 PER TMI SITE |
| Certification Expiration Date: | ~~10/17/18~~ 10/17/16 SPECIFIC Request |
| P.S.C. Professional Engineer Approval(Name) | Christopher E. Coe CEC 11/5/13 |
| P.S.C. Professional Engineer Approval(Signature) | |

**QUALIFICATION OF QUALITY CONTROL INSPECTORS-PROCEDURE QA 2.10.6.1.1**

**CERTIFICATION FORM QA 2.10.6.1.1 B**

# CERTIFICATE OF QUALIFICATION

This is to certify that:

Ronald Perry SSN [redacted]

has been qualified through on-the-job experience and formal training to meet the requirements of ANSI N45.26-1973 and 1978 as:

QUALITY CONTROL INSPECTOR LEVEL II with the following limitations.
Inspections and Calibrations associated with Post-Tensioning Systems and Components.

This certification will qualify the named individual to perform Quality Control inspections, examinations and testing for the various manufactured products or services supplied, to meet the Requirements of the projects for the Precision Surveillance Corporation and within the limitations of this qualification.

This qualification becomes effective 10/17/13 and shall remain in effect until the Recertification date of 10/17/16 or until such time that the named individual leaves the employment of PSC, gives just cause for termination of the certification or requires additional training to maintain a proper Quality Control disposition.

PHYSICAL REQUIRMENTS: Eye Exam Date 10/17/13 to 10/17/14 by PSC
Eye Exam Date ________ to ________ by ________
Eye Exam Date ________ to ________ by ________

APPROVED BY: J. Bussone

Quality Control Inspector Level III

Date: 10/17/13

## QUALIFICATION OF QUALITY CONTROL INSPECTORS-PROCEDURE QA 2.10.6.1.1

## QUALIFICATION LIMITATION FORM QA 2.10.6.1.1 C

The named individual is hereby certified to perform Quality Control inspections, examinations and tests for the products of the Precision Surveillance Corporation and shall be limited in practicing those skills to those activities for which qualified as shown.

Name Ronald Perry SSN [redacted]

Quality Control Inspector Level II per ANSI N45.2.6 – 1973 or 1978

### ACTIVITIES

**POST TENSIONING SYSTEM:**

SHOP: N/A

VENDOR: N/A

FIELD: All

TESTING: N/A

OTHER: N/A

**REINFORCING STEEL:**

SHOP: N/A

**CONSTRUCTION METALS:**

STRUCTURAL FAB: N/A

WELDING: N/A

PAINTING-ANSI 101.4: N/A

OTHER: N/A

**GENERAL QUALITY ASSURANCE:**

DOCUMENT CONTROL: Yes

TEST REPORT APPROVAL: Yes

PURCHASE ORDER APPROVAL: No

NONCONFORMANCE REPORTING: Yes

CALIBRATION: Yes

10CFR21 Yes

10CFR50 and PSC QUALITY ASSURANCE: Yes

APPROVED: Gerald Bussone DATE: 10/17/13

Quality Control Inspector Level III

**RONALD A. PERRY**

SUMMARY:

Mr. Perry is a Program Engineering, Quality Assurance and NDE professional with exceptional organization, communication and leadership capabilities. Proven record of working independently and as part of a team to reach company goals. Solid problem solving and analytical thinking skills used daily to drive continuous improvement. Knowledgeable of ASME Codes, ASTM Standards, SNT-TC-1A and ANSI Standards.

TECHNICAL SKILLS:

Certified Lead Auditor per NQA-1 and ANSI N 45.2 Auditor;
PSI / ISI Development;
Engineering Program Development;
NDE Level III in three disciplines (PT, MT and VT);
Training Instructor in accordance with Systematic Approach to Training (SAT);
Procedure Development.

EXPERIENCE:

07/13 - Present PRAIRIE ISLAND NUCLEAR GENERATING PLANT

Assessor

Perform assessments of Maintenance and Radiation Protection;
Perform assessment of SGR activities of contractor personnel / programs;
Prepare and implement assessment report;
Generate CAP for nonconformances.

08/12 - 03/13 NUCRANE MANUFACTURING

QC Supervisor

Supervised QC Inspector personnel in Mechanical, Electrical, Coating, NDE and CWIs;
Supervised Receipt Inspection of safety-related and non- safety -

related parts / items;
Revised (streamlined) inspection procedures and associated inspection forms;
Interface with suppliers to resolve material and documentation deficiencies;
Interface with Engineering on resolution of material deficiencies (NCRs);
Review customer specification for compliance;
Assisted on an NQA-1 audit as a Technical Specialist.

08/10 - 08/12 MOX PROJECT
QA Specialist 5
Perform surveillance of suppliers (internationally) to ensure compliance to their QA program (ISO and NQA-1);
Review supplier procedures for compliance to codes/standards/specifications;
Prepare surveillance and supplier deficiency reports as required;
Verify corrective actions are effective and close-out deficiency reports;
Lead Auditor in accordance with the requirements of NQA-1;
Level II Receipt Inspector.

11/09 - 07/10 PEGASUS STEEL
Nuclear Quality Manager
Develop and implement a Nuclear Quality Program;
Developed and obtained ASME U and R stamp;
Responsible for housekeeping and 5-S initiatives;
Maintain Nuclear Approved Suppliers List;
Establish, delineate and review organizational quality policies;
Review Purchase Orders and establish flow down requirements;
QA Manager for ISO 90001.

12/07 - 11/09 MOX PROJECT
QA Specialist
Certified Lead Auditor per NQA-1;
Certified Level II Receipt Inspector;

Prepare and implement audit and surveillance checklists;
Perform audits and surveillances at MOX site and vendor / supplier shops;
Prepare audit and surveillance reports;
Review vendor / supplier procedures for compliance (both foreign and domestic);
Review Engineering and Procurement documents for compliance;
Review vendor / supplier QA Manuals for compliance;
Initiate Condition Reports;
Verify effective corrective has been implemented;
Familiar with commercial Grade Dedication process.

08/07 - 11/07 WELDING SERVICES INC. (WSI)
QC / NDE Inspector
Develop surveillance checklists and establish QC hold points;
Perform NDE as a Level II in MT, PT and VT disciplines;
Prepare outage summary manuals for client;
Perform surveillance activities at vendor / supplier shop.

01/07 - 05/07 NATIONAL ENRICHMENT FACILITY
QA Auditor
Perform audits;
Prepare and perform surveillances of subcontractor activities;
Review subcontractor procedures for compliance.

09/06 - 11/06 TAI (TOURGEE & ASSOCIATES, INC.)
QC / NDE Inspector
Perform visual and ultrasonic thickness examinations on Tanks and peripheral equipment;
Prepare examination reports for submittal to client;
Interface with client regarding examination results and established examination priorities.

02/06 - 03/06 LIMERICK GENERATING STATION
ISI Coordinator
Prepare examination packages;

Assign NDE technicians to perform ISI examinations;
Review NDE reports for accuracy prior to submittal to the client;
Track NDE reports and initiate nonconformance reports as required;
Develop 90 Day Summary Report for client for submittal to the NRC.

03/05 - 04/05 NINE MILE POINT NUCLEAR STATION
<u>NDE Technician</u>
Perform NDE examinations in support of refueling outage and prepare NDE reports

12/02 - 02/05 DAVIS BESSE NUCLEAR POWER STATION
<u>Senior Nuclear Specialist - BACC Program Owner</u>
Took worst Boric Acid Corrosion Control Program in nuclear history to the best;
Develop and implement a compliant BACC Program;
Track and trend boric acid leakage;
Developed and implemented inspection procedures;
Initiate and prepare responses to Condition Reports;
Developed and implemented a training and qualification program for BACC inspection personnel.

1983 - 2002 BEAVER VALLEY POWER STATION
<u>Advanced Nuclear Specialist - QA Lead Auditor (1999 - 2002)</u>
Prepare audit checklists and MAPS for continuous auditing;
Perform audits on Operations, Maintenance, Construction, Licensing, Health Physics, Engineering, Document Control / Records Management, Measuring &Testing Equipment Program;
Prepare audit reports;
Initiate Condition Reports and verify effective corrective actions have been implemented;
Perform and evaluate Self-Assessments.

<u>Supervisor NDE and NDE level III (1983 - 1999)</u>
Supervise / direct NDE personnel in the conductance of PSI and ISI

examinations;
Supervise / direct the development and implementation of NDE procedures;
Supervise / direct the development and implementation of a training and qualification program;
Interface with regulatory personnel (NRC, ANI and ANII);
Training Instructor per Systematic Approach to Training (SAT);
Prepare and implement training (NDE) per SAT;
Supervise / direct the implementation of an M&TE Program for NDE equipment;
Attend and participate in ASME Section XI Code committee meetings;
Prepared initial IWE/IWL program plan (Level II Visual Examiner for IWE / IWL).

1969 - 1979 UNITED STATES AIR FORCE
NDE Technician / Supervisor
Perform and supervise NDE personnel in the conductance of UT, MT, PT, RT, ET and VT examinations;
Received USAF Commendation Medal.

EDUCTION:

University of Maryland
Bachelor of Science Business Management - 1981;
Instructor Training (SAT);
Root Cause Analysis;
NDE Training USAF, Chanute AFB, Rantoul, IL.;
Systems Training (PWR);
Graduate of Dale Carnegie.

PASSPORT:

Number 307319512, expires 2016

## PHYSICAL TESTING OF INSPECTORS-PROC. QA 2.10.6.1.1.1
## PHYSICAL TESTING FORM QA 2.10.6.1.1.1

Name: RONALD PERRY Date 10/17/13 Retest Date 10/17/14
Title: QC INSPECTOR Wears Glasses YES

**1. PHYSICAL CHARACTERISTICS**

Rating: ACCEPTABLE Limitations
Comments NO LIMITATIONS

**2. VISUAL – FAR RANGE** Test Device B&L 713591-101 JD

Vision Rating %: Left 20/20 Right 20/20 Both 20/20
Comments ACCEPTABLE

**3. VISUAL – NEAR RANGE** Test Device BAUSCH & LOMB 14-X-69

Vision Rating Grade: Left J 1 Right J 1 Both J 1
Comments ACCEPTABLE

**4. COLOR PERCEPTION** Test Device AMERICAN OPTICAL CORP. PSEUDO-ISOCHROMATIC PLATES

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Plate: | 1 | 12 | 2 | 6 | 3 | 42 | 4 | 56 | 5 | 57 |
| | 6 | 75 | 7 | 5 | 8 | 3 | 9 | – | 10 | 7 |
| | 11 | – | 12 | – | 13 | 15 | 14 | 74 | 15 | 47 |

Score 10 Of 14 Perception ACCEPTABLE
Score shall not be less than 10 to be acceptable for perception.
Comments ACCEPTABLE

**5.OVERALL RATING**

Capability ACCEPTABLE

Examiner Paul C Title PRESIDENT QA EXAMINER Date 10/17/13

6vt1.forms.doc

## PRECISION SURVEILLANCE CORPORATION

## TRAINING SHEET

**THE PSC PERSONNEL LISTED BELOW HAVE BEEN PROVIDED AN OVERVIEW AND INDOCTRINATED TO PRECISION SURVEILLANCE CORPORATION'S QUALITY ASSURANCE MANUAL REVISION 5 (ALL SECTIONS)**

| NAME | SIGNATURE | SS# | DATE |
|---|---|---|---|
| Ronald A. Perry | R a Pry | [redacted] | 10/17/13 |
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TRAINER: JBussone

DATE: 10/17/13

PSC
PRECISION SURVEILLANCE

## PRECISION SURVEILLANCE CORPORATION

## TRAINING SHEET

THE PSC PERSONNEL LISTED BELOW HAVE BEEN PROVIDED AN OVERVIEW AND INDOCTRINATED TO THE FOLLOWING STANDARDS AND DOCUMENTS:
10CFR50 APPENDIX B, 10CFR PART 21, ANSI N45.2, ANSI N45.2.6, ANSI N45.2.10 AND THE PRECISION SURVEILLANCE CORPORATION QUALITY ASSURANCE PROCEDURES.

| NAME | SIGNATURE | SS# | DATE |
|---|---|---|---|
| Ronald A. Perry | R a Py | [redacted] | 10/17/13 |
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TRAINER: F Bussone

DATE: 10/17/13

PSC QC INSPECTOR TRAINEE: Ronald A. Perry DATE: 10/17/13

TEST SCORE: 95% PSC INSTRUCTOR: GBussone

# PRECISION SURVEILLANCE CORPORATION
# QUALITY CONTROL INSPECTOR TRAINING PROGRAM

## EXAM

1) What is the proper way to correct an error recorded on a data sheet ie: typo, obvious omission?

   a) Write in changes or correct date
   [✓ b)] Any changes made, one line thru, initial and date
   c) Write a nonconformance

2) When performing inspections what documents should you have with you?

   a) Quality Assurance Manual
   [✓ b)] Applicable Inspection Procedures
   c) Calibration reports on inspection tools

3) Quality Control Inspectors shall be completely independent from the pressures of line management / Production

   a) Customers
   b) Quality Assurance
   [✓ c)] Production

4) The distance a tendon/wire stretches when being stressed is called, ____________.

   a) Liftoff
   b) Relaxation
   [✓ c)] Elongation

5) During stressing operations, which of the following cautions shall be observed?

   a) Do not stand behind the jack when it is under load
   b) Keep fingers out of any pinch areas
   c) Be alert during shim placement and removal
   [✓ d)] All of the above

6) The tendon shall never be stressed beyond _____% of the minimum guaranteed ultimate tensile strength (Guts) of the effective wires remaining in that tendon

a) 60 %
[✓ b) 80 %]
c) 100 %

7) When tendon stressing is performed from both ends simultaneously the pressure at one end of the tendon shall not exceed the other by more than 1000 psi.

[✓ a) True]
b) False

8) During Grease Replacement, the grease temperature at the grease cap inlet is:______ degrees.

a) 120 degrees F min., 150 degrees F max.
b) 150 degrees F min., 180 degrees F max.
[✓ c) 180 degrees F min., 250 degrees F max.]

9) When cracks are detected for Anchor Heads, Shims or Bearing Plates, Exelon Engineering shall be notified by a nonconformance report.

[✓ a) True]
b) False

10) The Field Quality Control Inspectors operate under the <u>immediate</u> direction of:

a) Field Superintendent
[✓ b) Lead Quality Control Inspector]
[✓ c) PSC Manager Quality Assurance]

(.5)

11) Field Quality Control Inspectors and the Quality Assurance personnel have the authority to issue a "Stop Work Order" for any activity, material, or procedure not in conformance with:

a) Project specifications
b) Quality Assurance Manual
c) Surveillance I.S.I. Manual
[✓ d) All of the above]

12)

Field Changes that take place prior to the approval of a Field Change Request shall be documented on a __NCR__. nonconformance Report

13) Prior to applying **ANY FORCE** to a tendon the stressing adaptor must be fully engaged.

[✓ a) True]
b) False

14) During Tendon liftoff monitoring of a tendon, a 0.030" thick feeler gauge (shim stock) is inserted into the shim stack until _________ consecutive liftoff/lock-off readings have been taken.

a) Two (2)
[✓ b) Three (3)]
c) Four (4)

15) Steel rulers are calibrated every:

a) 6 months
[✓ b) 1year] ± 0,01"
c) 5 years

16) When should Quality Control Documents be <u>signed</u> by the inspector?

a) Before the next step
b) At the end of the day
[✓ c) After all information for the inspections have been entered]

17) Who controls the Measuring and Test Equipment used by PSC Inspectors?

a) PSC Superintendent
b) Utility employees
[✓ c) PSC Quality Control or Quality Assurance personnel]

18) Where are all quality related documents pertaining to the project kept?

a) In the inspector's desk
[✓ b) Field office file or jobsite vault]
c) With the PSC Superintendent

19) All Lead Field Quality Control Inspectors shall be qualified to a minimum of Level __ capability in accordance with the requirements of ANSI N45.2.6.

a) I
[✓ b) II]
c) III

20) In the event of conflict between any TMI procedure and an SQ procedure, which governs?

a) The SQ Procedure
[✓ b)] The TMI Procedure Owner
c) Neither

The Board of Regents of the

# University of Maryland

In recognition of the successful completion of the requisite course of study and on nomination of the Faculty of the

**University College**

by virtue of authority granted by charter of the State of Maryland hereby confers upon

**Ronald Albert Perry**

the degree of

**Bachelor of Science**

with all the honors, rights, and privileges thereunto appertaining.

In witness whereof this Diploma, signed by the authorized officers of the University and sealed with the corporate seal of the University, is granted.

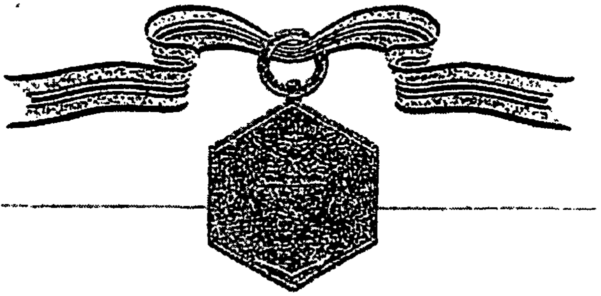
Given at College Park on the thirtieth day of August in the year nineteen hundred eighty one.

Peter F. O'Malley
Chairman, Board of Regents

John S. Toll
President

Chancellor

Maryly Van Leer Peck
Dean



# DEPARTMENT OF THE AIR FORCE

THIS IS TO CERTIFY THAT

## THE AIR FORCE COMMENDATION MEDAL

HAS BEEN AWARDED TO

STAFF SERGEANT RONALD A. PERRY

FOR

MERITORIOUS SERVICE
26 AUGUST 1973 - 20 APRIL 1977

GIVEN UNDER MY HAND IN THE CITY OF WASHINGTON
THIS 5TH DAY OF APRIL 1977

JAMES E. HILL
LIEUTENANT GENERAL, USAF
COMMANDER

SECRETARY OF THE AIR FORCE

AF FORM 2224, JUL 70

A

SAFE

| | | | | |
|---|---|---|---|---|
| LAST NAME-FIRST NAME-MIDDLE NAME<br>PERRY RONALD ALBERT | 2. SEX<br>M | ...OF ...TH | YEAR 1946 | MONTH Oct | DAY 22 |

| | | | | | | |
|---|---|---|---|---|---|---|
| DEPARTMENT, COMPONENT AND BRANCH OR CLASS<br>AIR FORCE RegAF | GRADE, RATE OR RANK<br>SSgt | b. PAY GRADE<br>E-5 | 7. DATE OF RANK | YEAR 1976 | MONTH Jan | DAY 01 |

| | | |
|---|---|---|
| SELECTIVE SERVICE NUMBER<br>NA | 5. SELECTIVE SERVICE LOCAL BOARD NUMBER, CITY, STATE AND ZIP CODE<br>NA | c. HOME OF RECORD AT TIME OF ENTRY INTO ACTIVE SERVICE *(Street, RFD, City, State and ZIP Code)*<br>Westbrook, ME |

| | |
|---|---|
| a. TYPE OF SEPARATION<br>Discharge | b. STATION OR INSTALLATION AT WHICH EFFECTED<br>Travis AFB CA 94535 |

| | | | | |
|---|---|---|---|---|
| c. AUTHORITY AND REASON<br>[redacted] ------------------------------------------ | d. EFFECTIVE DATE | YEAR 1979 | MONTH Jun | DAY 26 |

| | | |
|---|---|---|
| e. CHARACTER OF SERVICE<br>HONORABLE | f. TYPE OF CERTIFICATE ISSUED<br>DD Form 256AF | 10. REENLISTMENT CODE<br>-------------- |

| | |
|---|---|
| 11. LAST DUTY ASSIGNMENT AND MAJOR COMMAND<br>51 CRS (PACAF) | 12. COMMAND TO WHICH TRANSFERRED<br>NA |

| | | | | | | |
|---|---|---|---|---|---|---|
| 13. TERMINAL DATE OF RESERVE/MSS OBLIGATION | | | 14. PLACE OF ENTRY INTO CURRENT ACTIVE SERVICE *(City, State and ZIP Code)* | 15. DATE ENTERED ACTIVE DUTY THIS PERIOD | | |
| YEAR | MONTH | DAY | | YEAR | MONTH | DAY |
| NA | | | Limestone, ME | 1975 | Jul | 02 |

| | | | | | |
|---|---|---|---|---|---|
| 16a. PRIMARY SPECIALTY NUMBER AND TITLE<br>42772-<br>Nondestructive Inspection Specialist | b. RELATED CIVILIAN OCCUPATION AND D.O.T. NUMBER<br>NA | 18. RECORD OF SERVICE | YEARS | MONTHS | DAYS |
| | | (a) NET ACTIVE SERVICE THIS PERIOD | 03 | 11 | 25 |
| | | (b) PRIOR ACTIVE SERVICE | 06 | 03 | 04 |
| 17a. SECONDARY SPECIALTY NUMBER AND TITLE<br>None, | b. RELATED CIVILIAN OCCUPATION AND D.O.T. NUMBER<br>NA | (c) TOTAL ACTIVE SERVICE (a+b) | 10 | 02 | 29 |
| | | (d) PRIOR INACTIVE SERVICE | 00 | 00 | 00 |
| | | (e) TOTAL SERVICE FOR PAY (c+d) | 10 | 02 | 29 |
| | | (f) FOREIGN AND/OR SEA SERVICE THIS PERIOD | 02 | 00 | 21 |

| | |
|---|---|
| 19. INDOCHINA OR KOREA SERVICE SINCE AUGUST 5, 1964<br>☒ YES ☐ NO 751 Days | 20. HIGHEST EDUCATION LEVEL SUCCESSFULLY COMPLETED *(In Years)*<br>SECONDARY/HIGH SCHOOL 12 YRS *(1-12 grades)* COLLEGE 03 YRS |

| | | | | | |
|---|---|---|---|---|---|
| 21. TIME LOST *(Preceding Two Yrs)* | 22. DAYS ACCRUED LEAVE PAID | 23. SERVICEMEN'S GROUP LIFE INSURANCE COVERAGE | 24. DISABILITY SEVERANCE PAY | 25. PERSONNEL SECURITY INVESTIGATION | |
| | | | | a. TYPE | b. DATE COMPLETED |
| NO TIME LOST | 60 days | ☐ $10,000 ☐ $5,000<br>X$20,000<br>☐ $10,000 ☐ NONE | ☐ NO ☐ YES<br>AMOUNT NA | *ENTNAC | Apr 69 |

26. DECORATIONS, MEDALS, BADGES, COMMENDATIONS, CITATIONS AND CAMPAIGN RIBBONS AWARDED OR AUTHORIZED

AFLSA w/1OLC AFR 900-48; AFGCM w/2OLC (28 Mar 75-27 Mar 78) AFR 900-48; AFCM SO G-35 HQ Eighth AF (SAC) 5 Apr 77

27. REMARKS

DAFSC:42772/Svc Schools:Mgt for AF Supervisors (Mgt-1) Jan 76; 8 AF NCO Leadership School May 76; Defense Spectrometric Oil Analysis Operator/Evaluator Crs/C3AZR42752 May 77/Blood Group:A Positive/Individual requests a copy of DD Form 214/Pay/*Ref item 25a:Security clearance filed DOD NAC, file #98-5198/

| | |
|---|---|
| 28. MAILING ADDRESS AFTER SEPARATION *(Street, RFD, City, County, State and ZIP Code)*<br>22 Lassell St.<br>Portland, ME (Cumberland Co.) 04072 | 29. SIGNATURE OF PERSON BEING SEPARATED<br>Ronald A. Perry |
| 30. TYPED NAME, GRADE AND TITLE OF AUTHORIZING OFFICER<br>Wallace H. Riley, MSgt, USAF<br>NCOIC, Separations Unit | 31. SIGNATURE OF OFFICER AUTHORIZED TO SIGN<br>W Riley |

DD FORM 1 NOV 72 214 PREVIOUS EDITIONS OF THIS FORM ARE OBSOLETE. *THIS IS AN IMPORTANT RECORD SAFEGUARD IT.* REPORT OF SEPARATION FROM ACTIVE DUTY

1.

RTL A5.611A

**Duquesne Light**

# Certificate of Qualification

| | | |
|---|---|---|
| Name<br>RONALD A PERRY | Employee #<br>4297 | Social Security #<br>[redacted] |

This individual is certified in accordance with Duquesne Light Company Procedure QSP 2.12, Rev. 0, "Written Practice for Qualification and Certification of Visual Examination Personnel for Class MC and Metallic Liners of Class CC Components and Class CC Concrete Components" **Visual Examination Level III VT-1C and VT-3C**

**Examination Results**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Date | 7-18-1990* | Basic Examination | | | | Grade | 92 |
| Date | 7-27-1992 * | Method Examination | | | | Grade | 81 |
| Date | 2-2-1999 | Specific | 93 | | | | |
| Date | 2-2-1999 | Practical | 93 | Average | 93 | Grade | 93 |
| | | | | | | Average | 88.66 |

| | |
|---|---|
| Certification Date<br>**2-17-1999** | Certification Expiration Date<br>**2-17-04** |
| Initial Certification in this Method<br>**YES** | Recertification in this Method<br>**NO** |

Eye Examination date at time of certification
**10-9-1998**

Restrictions/Limitations

***Credit for the Basic Examination and Visual Method is being applied as permitted by QSP 2.12 paragraph 3.4.2 (H) (1) (2) (3).**

**IWE/IWL training was provided by EPRI on 2/1-2/2, 1999. General, Specific and Practical (Level II) examinations were administered. Scores are documented on the EPRI training record (attached).**

| | |
|---|---|
| Responsible Engineer, PE / Date<br>PE-024749-E/2-18-99 | NDE Supervisor / Date<br>2/18/99 |

RTL A5.611A

**Duquesne Light**

# Certificate of Qualification

| | | |
|---|---|---|
| Name<br>**Ronald A. Perry** | Employee #<br>**4297** | Social Security #<br>[redacted] |

This individual is certified in accordance with Duquesne Light Company Procedure QSP 2.3, Rev. 5, "Written Practice for Qualification and Certification of Nondestructive Examination and Testing Personnel", and is qualified to perform examinations in the following capacity: **NDE Level III in LIQUID PENETRANT TESTING**

**Examination Results**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Date | 08/19/92* | Basic Examination | | | | Grade* | 97.30% |
| Date | 09/04/97 | Method Examination | | | | Grade | 89.23% |
| Date | 07/29/97 | Specific | 94.6% | | | | |
| Date | 09/04/97 | Practical | 100% | Average | 97.3 | Grade | 97.30% |
| | | | | | | Average | 94.6% |

| | |
|---|---|
| Certification Date<br>**09/05/1997** | Certification Expiration Date<br>**09/05/2002** |
| Initial Certification in this Method<br>**No** | Recertification in this Method<br>**Yes** |

Eye Examination date at time of certification
**9/25/96**

Restrictions/Limitations
None

*Note: Basic Examination still valid in accordance with Code Case N-489 and QSP 2.3, Revision 5

| | |
|---|---|
| NDE Level III/Date<br>Timothy E Hummel L-III 9-5-97 | |
| NDE Supervisor/Date<br>J. Procopio 9/5/97 | Manager, Quality Services / Date<br>K.L. Ostrowski / 9/5/97 |

RTL A5.611A

**Duquesne Light**

# Certificate of Qualification

| | | |
|---|---|---|
| Name<br>**Ronald A. Perry** | Employee #<br>**4297** | Social Security #<br>[redacted] |

This individual is certified in accordance with Duquesne Light Company Procedure QSP 2.3, Rev. 5, "Written Practice for Qualification and Certification of Nondestructive Examination and Testing Personnel", and is qualified to perform examinations in the following capacity: **NDE Level III in LIQUID PENETRANT TESTING**

**Examination Results**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Date | 08/19/92* | Basic Examination | | | | Grade* | 97.30% |
| Date | 09/04/97 | Method Examination | | | | Grade | 89.23% |
| Date | 07/29/97 | Specific | 94.6% | | | | |
| Date | 09/04/97 | Practical | 100% | Average | 97.3 | Grade | 97.30% |
| | | | | | | Average | 94.6% |

| | |
|---|---|
| Certification Date<br>**09/05/1997** | Certification Expiration Date<br>**09/05/2002** |
| Initial Certification in this Method<br>**No** | Recertification in this Method<br>**Yes** |

Eye Examination date at time of certification
**9/25/96**

Restrictions/Limitations
None

*Note: Basic Examination still valid in accordance with Code Case N-489 and QSP 2.3, Revision 5

| | |
|---|---|
| NDE Level III/Date<br>Timothy C Hummel L-III 9-5-97 | |
| NDE Supervisor/Date<br>J Procopio 9/5/97 | Manager, Quality Services / Date<br>K.L. Ostrowski / 9/5/97 |

RTL A5.611A

**Duquesne Light**

# Certificate of Qualification

| | | |
|---|---|---|
| Name<br>**Ronald A. Perry** | Employee #<br>**4297** | Social Security #<br>[redacted] |

This individual is certified in accordance with Duquesne Light Company Procedure QSP 2.3, Rev. 4, "Written Practice for Qualification and Certification of Nondestructive Examination and Testing Personnel", and is qualified to perform examinations using the following NDE method: **Level II Ultrasonic Limited***

**Examination Results**

| | | | |
|---|---|---|---|
| Date<br>**1-16-96** | General Score (Gg)<br>**93.3** | Weight (Wg)<br>**.3** | Score<br>**28** |
| Date<br>**1-16-96** | Specific Score (Gs)<br>**100** | Weight (Ws)<br>**.3** | Score<br>**30** |
| Date<br>**1-25-96** | Practical Score (Gp)<br>**92** | Weight (Wp)<br>**.4** | Score<br>**36.8** |
| | | | Composite Grade (Gc)<br>**94.8** |

| | |
|---|---|
| Certification Date<br>**1-25-96** | Certification Expiration Date<br>**1-25-99** |
| Initial Certification in this Method<br>**NO** | Recertification in this Method<br>**YES** |

Eye Examination date at time of certification
**9-29-95**

Restrictions/Limitations
***Limited to ultrasonic thickness measurements using straight beam transducers in combination with digital readout UT instruments (Krautkramer DME, DM Scope and Panametrics 5222).**

Level III Signature/Date
Timothy E Hemmel L-III 1-25-96

## SUMMARY STUDENT RECORD OF INDIVIDUAL TRAINING

I. BACKGROUND

1. LAST NAME - FIRST NAME - MIDDLE INITIAL
PERRY, RONALD A.

| | | | |
|---|---|---|---|
| AFSN | 11916988 | GRADE | Amn |
| DOB | 22 Oct 46 | TAMSD | 27 Mar 69 |
| DOS | 26 Mar 73 | PAFSC | 51010 |

2. STUDENT SQUADRON
3347

| | |
|---|---|
| 3. ARRIVAL DATE<br>690514 | 4. ENTRY DATE<br>690723 |
| 5. SOURCE<br>Lackland | 6. ASG STATUS<br>Pipeline |

7. ORGANIZATION (Parent)
CHANUTE AFB, IL

AQE

8. APTITUDE & AFQT SCORES

| | | | |
|---|---|---|---|
| GENERAL | 65 | ADMINISTRATIVE | 70 |
| MECHANICAL | 40 | ELECTRONICS | 45 |
| RADIO OPERATOR | | AFQT | 72-11 |

9. EDUCATION (Circle highest completed)
1 2 3 4 5 6 7 8 9 10 11 12 13 14 [✓ 15] 16

II DISPOSITION

| | |
|---|---|
| 1. TERMN. DATE<br>21 Oct 69 | 2. DATE DEPART<br>21 Oct 69 |

3. ELIMINATED (Date & reason)
☐ WITH PREJUDICE
☐ WITHOUT PREJUDICE
☐ NON ACADEMIC

4. TRANSFERRED TO
824 CSG
APO SAN FRANCISCO 96239

III. CLASS CHANGES

CLASS AND PROGRESS CHANGES

| CLASS | DATE ASGD | REASON |
|---|---|---|
| | | |

IV. ACHIEVEMENT

1. COURSE TITLE & NUMBER
NON-DESTRUCTIVE INSPECTION SPECIALIST COURSE, 3ABR53630

| | |
|---|---|
| 2. CLASS NUMBER<br>690723 | 3. ACTIVITY ASSIGNED<br>Dept of WSST, Metallurgy Branch |

| 4. BLOCK TITLES | | 5. ATTENDANCE 1 | 2 | 3 | 4 | 5 | 6. HRS | 7. PERF TEST GR | 8. WRIT TEST GR | 9. BLK GR |
|---|---|---|---|---|---|---|---|---|---|---|
| I. | Introduction to Non-Destructive Inspection, Basic Metallurgy & Optical Inspection | | | | | | 60 | 94% | 77% | 85% |
| II. | Basic Electricity, Magnetic Particle & Penetrant Inspection | | | | | | 60 | 90% | 96% | 93% |
| III. | Theory of Radiography, Radiographic Equipment | | | | | | 60 | 96% | 85% | 91% |
| IV. | Radiographic Inspection | | | | | | 60 | 86% | 75% | 81% |
| V. | Ultrasonic Inspection & Leak Detection | | | | | | 60 | [illegible] | [illegible] | [illegible] |
| VI. | Ultrasonic Thickness Measurement & Eddy Current Inspection | | | | | | 60 | 97% | 85% | 91% |

Eugene L Holdren Jr
EUGENE L. HOLDREN, JR, Capt

| | |
|---|---|
| 10. CERTIFIED<br>Chief, Metallurgy Branch | 11. FINAL COURSE GRADE<br>87% |

FORM 156
JUL 66

PREVIOUS EDITIONS OBSOLETE

# NDE CERTIFICATION

This is to certify that Ronald A. Perry is qualified to perform visual examinations.

Satisfactory training has been completed in accordance with A4.2 (Written Practice for Qualification and Certification of Nondestructive Examination and Testing Personnel).

Level of Certification : III

Date of Certification : 8/6/90

Expiration Date : 8/5/95

## Summary of Qualifications

Examination Results:

| | | | |
|---|---|---|---|
| Basic | 92 | Percentile Weight : (.3) | 27.6 |
| Method | 81 | Percentile Weight : (.3) | 24.3 |
| Specific | 91 | Percentile Weight : (.4) | 36.4 |
| | | Composite Score : | 88.3 |

Eye Examination Expiration Date: 8/23/90

Certified By: Date 8-7-90
Vice President, Nuclear Group

# CERTIFICATE OF RETRAINING

Awarded By

## ELECTRIC POWER RESEARCH INSTITUTE

**NONDESTRUCTIVE EVALUATION CENTER**
1300 Harris Blvd. • P. O. Box 217097
CHARLOTTE, NC 28221

EPRI NDE CENTER
J.A. Jones Applied Research Company

*Ronald Perry*

Participated in the Retraining of the Course

*Visual Examination Technology 103*

*July 23-27, 1990*

and is therefore entitled to this certificate
of classroom retraining as approved by the EPRI NDE Center
(Examination scores and details of course content available from the EPRI NDE Center)

Presented By *EPRI NDE Center*
(Sponsoring Organization)

Henry M. Stephens Jr.
Henry M. Stephens, Jr.
Training Manager

EPRI NDE CENTER

J.A. Jones Applied Research Company

## CONTINUING EDUCATION UNITS

Awarded By

# ELECTRIC POWER RESEARCH INSTITUTE

**NONDESTRUCTIVE EVALUATION CENTER**
1300 Harris Blvd. • P. O. Box 217097
CHARLOTTE, NC 28221

*Ronald Perry*

Attended the Continuing Education Course

*Level III Basic Course*

*July 16-18, 1990*

and is therefore entitled to this certificate
of classroom training as approved by the EPRI NDE Center
(Examination scores and details of course content available from the EPRI NDE Center)

Presented By *EPRI NDE Center*
(Sponsoring Organization)

2.0
CEUs Awarded

Henry M. Stephens, Jr.
Henry M. Stephens, Jr.
Training Manager

EPRI NDE Center

## Performance Documentation Summary
## EPRI NDE Center

## Visual Examination Technology 102
## IWE/IWL
## Level II Visual Examination

Name: Ronald A. Perry

Date: February 2, 1999

| Type of Visual Examination | Number of Reportable Indications | Number of Indications Found* | Points (20 Points Each Section) 80 Points Total |
|---|---|---|---|
| Bolting | 2 | 2 | 17 |
| Coated Surfaces | 1 | 1 | 19 |
| Concrete | 3 | 3 | 19 |
| Weldment | 2 | 2 | 19 |
| *This practical examination required that you identify 80% of the conditions listed above. Failure to record 80% of the known indications will result in failure regardless of composite practical examination score. | | Percent of Indications Found: 100 % | Percent of Composite Practical Score 93 % |

This information is provided for informational purposes only. Official scores are only recorded on the transcript supplied by the EPRI NDE Center, 1300 Harris Blvd., Charlotte, NC 28262 - 704/547-6110

8/97d

forms\ve2d-pds.doc

# CERTIFICATE OF RETRAINING

Awarded By

EPRI

1300 Harris Blvd. • P.O. Box 217097
CHARLOTTE, NC 28221

EPRI

## *Ronald A. Perry*

**Attended the Continuing Education Course**

***Visual Examination - Level III***

***July 24-28, 2000***

**and is therefore entitled to this certificate**
**of classroom training as approved by the EPRI NDE Center**
**(Examination scores and details of course content available from the EPRI NDE Center)**

**Presented By** ***EPRI NDE Center***
**(Sponsoring Organization)**

Michael Allgaier

***Michael Allgaier***
**Course Director**

Henry M. Stephens, Jr.

***Henry M. Stephens, Jr.***
**Manager, NDE Training**

# CONTINUING EDUCATION UNITS

Awarded By

## ELECTRIC POWER RESEARCH INSTITUTE

**NONDESTRUCTIVE EVALUATION CENTER**
1300 Harris Blvd. • P. O. Box 217097
CHARLOTTE, NC 28221

EPRI NDE CENTER
CHARLOTTE, NORTH CAROLINA

*Ronald Perry*

Attended the Continuing Education Course

*NDE Instructor Training*

*June 7-11, 1993*

and is therefore entitled to this certificate
of classroom training as approved by the EPRI NDE Center
(Examination scores and details of course contents available from the EPRI NDE Center)

Presented By *EPRI NDE Center*
(Sponsoring Organization)

4.0
CEUs Awarded

Henry M. Stephens, Jr.
Training Manager

**MOX**
FUEL FABRICATION FACILITY

**Shaw** AREVA
MOX SERVICES, LLC

THIS IS TO CERTIFY THAT
Ronald Perry

IS **HEREBY** QUALIFIED AS A
**Lead Auditor**

This certification is based on an evaluation of employee qualifications in accordance with ANSI/ASME-NQA-1. The employee's education, experience, training, and ability have been evaluated and summarized on a qualification form. This form and records to substantiate qualifications are on file in the MOX Services Project Record Center.

9 MAR 09
Date

MOX Services Quality Assurance Manager

PEGASUS
STEEL

## Record of Lead Auditor Qualification

NAME: Ronald A. Perry DATE: 20 Nov. 09

| QUALIFICATION POINT REQUIREMENTS | CREDITS |
|---|---|
| **EDUCATION:** UNIVERSITY / DEGREE / DATE UNIV. of MARYLAND, MD 1981 4 CREDITS MAX<br>1. UNDER GRADUATE<br>2. GRADUATE | 2 |
| **EXPERIENCE:** COMPANY / DATES 9 CREDITS MAX<br>1. TECHNICAL ( 0-5 CREDITS ) and 16 YEARS CONSTRUCTION AND NDE<br>2. NUCLEAR INDUSTRY ( 1 CREDIT), or<br>3. QUALITY ASSURANCE (2 CREDITS ), or<br>4. AUDITING ( 3 CREDITS )<br>5. NUCLEAR QUALITY ASSURANCE ( 3 CREDITS ) or<br>6. NUCLEAR QUALITY ASSURANCE AUDITING (4 Credits) 8 YEARS OF AUDITING | 5<br>4 |
| **PROFESSIONAL ACCOMPLISHMENT:** CERTIFICATE / DATE 2 CREDITS MAX<br>1. P.E.<br>2. SOCIETY | |
| **MANAGEMENT:** JUSTIFICATION / EVALUATOR / DATE 2 CREDITS MAX | |
| (MINIMUM CREDITS REQUIRED 10) **TOTAL CREDITS** | 11 |

**AUDIT COMMUNICATION SKILLS** EVALUATED BY:

**AUDIT TRAINING COURSES**

| | COURSE TITLE AND TOPIC | DATE COMPLETE |
|---|---|---|
| 1. J-E-T-S, INC. | LEADING EFFECTIVE ASSESSMENTS | NOV. 1995 |
| 2. | | |

**AUDIT PARTICIPATION:**

| LOCATION | AUDIT ( PROJECT / ACTIVITY ) | DATE PERFORMED |
|---|---|---|
| 1. SAVANNAH RIVER SITE | DCS-08-A01 | 25 FEB. 09 |
| 2. SAVANNAH RIVER SITE | DCS-08-A10 | 13 OCT. 08 |
| 3. CLEVELAND, OH | BASF-08-VE118 | 22 SEPT. 08 |
| 4. CLEVELAND, OH | ERICO-08-VE119 | 16 SEPT. 08 |
| 5. ARNPRIOR, ON CANADA | NUT-09-VE03 | 27 JAN 09 |

**EXAMINATION:**

TYPE: ORAL SCORE: 96 DATE: 20 NOV. 09

**AUDITOR CERTIFIED BY:** CEO
SIGNATURE /TITLE DATE: 20 NOV. 09

| | | | | | |
|---|---|---|---|---|---|
| ANNUAL EVALUATION SIGNATURE / DATE | | | | | |
| | | | | | |

## WELDING SERVICES, INC.
## CERTIFICATE OF QUALIFICATION

We hereby certify that EMPLOYEE Ronald A. Perry SSN: [redacted]
is qualified to perform the duties and assume responsibility of Visual Weld and Mechanical Inspection
LEVEL II Effective: 08-24-2007 to 08-24-2010

THIS CERTIFICATION IS BASED ON THE FOLLOWING, AS CHECKED
1. X RECORD OF EDUCATION, EXPERIENCE AND TRAINING
2. X QUALIFICATION EXAMINATIONS

| SECTION | GRADE |
|---|---|
| GENERAL | 89.7 |
| SPECIFIC | 92.0 |
| PRACTICAL | 94.0 |
| COMPOSITE GRADE | 91.9 |

The above-named individual has satisfactorily completed training requirements of WSI QAP 2.7, Rev.13. Supporting documents are maintained by WSI and may be examined by Authorized Client, Regulatory and Insurance Company representatives.

**EXPERIENCE:** US Air Force: 1969-1979, NDE Specialist with experience in PT, MT, RT, UT, ET, and VT including and Quality Control. GE Nuclear: Currently Certified Level II PT, MT, VT-1 and VT-2. Over 30 years experience in NDE and Quality control functions with extensive NDE Experience in the Nuclear Power Industry.
**TRAINING:** 80 Hours Visual Inspection, Level II and III, USAF. 4 Hours refresher training, WSI, 7/2007.
**EDUCATION:** HS Diploma, University of Maryland, Bachelor of Science Degree, August, 1981.
**THIS CERTIFICATION MEETS:** ASNT/CP-189-95(1), ASME B&PV Code Sect. XI,Div.1, IWA-2300, and SNT-TC-1A

R. R. Leimenstoll, NDE Level III
08/24/2007
DATE

B. Greene, V.P., Quality Assurance
9/13/07
DATE

### VISION EXAMINATION DATES AND RESULTS

| EXAMINATION DATE | DUE DATE | RESULTS | EXAMINER |
|---|---|---|---|
| 08/24/2007 | 08/23/2008 | Satisfactory | R.R. Leimenstoll, NDE Level III |
| | | | |
| | | | |

### RESULTS OF PERIODIC EVALUATION

| DATE | RESULTS | INSPECTION ACTIVITIES | EVALUATOR |
|---|---|---|---|
| | | | |
| | | | |
| | | | |

Shaw|AREVA
MOX SERVICES, LLC

# MOX SERVICES
# CERTIFICATE OF QUALIFICATION
## ANSI N45.2.6/NQA-1 – QUALITY

WE HEREBY CERTIFY THAT EMPLOYEE Ronald Perry IS
Name

QUALIFIED TO PERFORM THE DUTIES AND ASSUME THE RESPONSIBILITIES FOR INSPECTIONS AND TESTS IN THE FOLLOWING ACTIVITIES/TASKS WITHIN THE QUALITY DISCIPLINE:

| LEVEL | ACTIVITY/TASK | CERTIFICATION BASIS | RESTRICTIONS (See Remarks) |
|---|---|---|---|
| | ☐ 435 M&TE Equipment | | ☐YES ☐NO |
| II | ☒ 445 Receipt Inspection/Preventative Maintenance | 1, 2 and 3 | ☐YES ☒NO |
| | ☐ 460 Shop Inspection | | ☐YES ☐NO |
| | ☐ 461 Mechanical * | | ☐YES ☐NO |
| | ☐ 462 Electrical * | | ☐YES ☐NO |
| | ☐ 463 Civil/Structural * | | ☐YES ☐NO |
| | ☐ 464 Welding * | | ☐YES ☐NO |
| | ☐ 470 ANSI Level III Designee | | ☐YES ☐NO |

* Project Specific Certification when required

EFFECTIVE PERIOD OF CERTIFICATION: FROM 28 Jul 09 To 28 Jul 12

THIS CERTIFICATION IS BASED UPON SATISFACTORY COMPLETION OF THE REQUIREMENTS OF PP 3-27, REVISION IN EFFECT AT THE TIME OF CERTIFICATION. THE BASIS FOR CERTIFICATION IS:

1. RECORD OF EXPERIENCE, EDUCATION, AND TRAINING
2. WRITTEN OR ORAL EXAMINATION
3. PROFICIENCY DEMONSTRATION (PRACTICAL EXAMINATION)

SUPPORTING DOCUMENTS ARE MAINTAINED BY QUALITY ASSURANCE AND MAY BE EXAMINED ·· AUTHORIZED CLIENT, REGULATORY AND INSURANCE COMPANY REPRESENTATIVES.

Signed: ______________________ 22 JUL 09
Discipline Level III Date

Signed: ______________________ 28 JUL 09
Quality Department Management Date

**REMARKS AND RESTRICTION DETAILS:** N/A

PP3-27E
Revision 1

PORTLAND CEMENT
ASSOCIATION

5420 Old Orchard Road, Skokie, Illinois 60076

# Recommendation for College Credit

This is to certify that

Ronald Albert Perry

has successfully completed the following course which is recommended for college credit by the American Council on Education.

Course LEVEL I INSPECTION TECHNICIAN

Credits 1

Date June 13, 1981

Records and transcripts of examination grades are available and will be issued upon request.

American Council on Education
Program on Noncollegiate Sponsored Instruction
One Dupont Circle
Washington, D.C. 20036

Authorized by

Edward L. Kawala

*Director, Educational Services*
Portland Cement Association

PCA
PORTLAND CEMENT
ASSOCIATION

# CERTIFICATE OF ACHIEVEMENT

Ronald Albert Perry

*has completed the 5-day course*

## Level I Inspection Technician (Nuclear)

*conducted by the Portland Cement Association in accordance with Appendix VII, ASME Section III, Division 2, Code for Concrete Reactor Vessels and Containments, covering the Reinforcing Material Technician and Concrete Material Technician as described by Appendix E of the Code and has successfully passed the examination and performance demonstration. In recognition of that accomplishment, this Certificate of Achievement is awarded this* 18th *day of* June*, 19*81.

Roger E. Wilson
**LEVEL III INSPECTION ENGINEER**
**PORTLAND CEMENT ASSOCIATION**

R. E.
**PRESIDENT**
**PORTLAND CEMENT ASSOCIATION**

RTL A5.610E

**FENOC**
FirstEnergy Nuclear Operating Company

# Nuclear Quality Assessment

EMPLOYEE IDENTIFICATION

LEAD AUDITOR CERTIFICATION RECORD

| | | |
|---|---|---|
| NAME<br>Ronald A. Perry | SOCIAL SECURITY NUMBER<br>[redacted] | EMPLOYEE NUMBER<br>4297 |

QUALIFICATION REQUIREMENTS (RESUME ON FILE - Initial DCA Date 1-4-01)

| EDUCATION (4 POINTS MAXIMUM) | | | |
|---|---|---|---|
| UNDERGRADUATE SCHOOL<br>University of Maryland | DEGREE<br>B. S. Business Management | DATE<br>8/30/81 | POINTS<br>2 |
| UNDERGRADUATE SCHOOL | DEGREE | DATE | |
| GRADUATE SCHOOL | DEGREE | DATE | POINTS |
| GRADUATE SCHOOL | DEGREE | DATE | |

| EXPERIENCE (9 POINTS MAXIMUM) | | | |
|---|---|---|---|
| INDUSTRY (5 POINTS MAXIMUM)<br>AND | COMPANY<br>Commonwealth Edison<br>Duquesne Light Company and FENOC | DATES<br>7/80 TO 8/81<br>5/83 TO Present | POINTS<br>5 |
| NUCLEAR INDUSTRY (NI) – 1 POINT<br>OR | | | |
| QUALITY ASSURANCE (QA) – 2 POINTS<br>OR | COMPANY<br>Duquesne Light Company (Auditing 1/28/94 TO 4/29/94)<br>Duquesne Light Company (Auditing 2/14/96 TO 4/23/96)<br>Duquesne Light Company / FENOC (Auditing 5/99 TO Present) | DATES | POINTS |
| AUDITING (AU) – 2 POINTS<br>OR | | DATES | POINTS |
| NUCLEAR QA (NQA) – 3 POINTS<br>OR | | DATES | POINTS |
| COMBINED NQA, AU – 4 POINTS | | DATES<br>1/94 TO Present | POINTS<br>4 |

| PROFESSIONAL ACCOMPLISHMENT (2 POINTS MAXIMUM) | | | | |
|---|---|---|---|---|
| PROFESSIONAL ENGINEER | | | DATE | POINTS |
| SOCIETY | DATE | SOCIETY | DATE | POINTS |

| MANAGEMENT JUSTIFICATION (2 POINTS MAXIMUM) | |
|---|---|
| EXPLANATION Mr. Perry has successfully completed the Lead Auditor Qualification Examination and has demonstrated the ability to effectively conduct quality assurance audits. | POINTS<br>2 |
| TOTAL POINTS | 13 |

| AUDIT COMMUNICATION SKILLS | | | |
|---|---|---|---|
| VERBAL ☒<br>WRITTEN ☒ | EVALUATED BY<br>M. A. Regan | TITLE<br>Supv. NQA | DATE<br>1-4-01 |

| AUDIT TRAINING COURSES | |
|---|---|
| COURSE TITLE OR TOPIC<br>Audit Training - Commonwealth Edison (8Hrs) | DATE<br>8/1/80 |
| COURSE TITLE OR TOPIC<br>Leading Effective Assessments - J-E-T-S, Inc (16Hrs) | DATE<br>11/8/95 |

| AUDIT PARTICIPATION | | |
|---|---|---|
| LOCATION<br>Beaver Valley Power Station | AUDIT<br>BV-C-99-06 Measuring and Test Equipment Program | DATE<br>5/10 - 6/25/99 |
| LOCATION<br>Beaver Valley Power Station | AUDIT<br>BV-C-99-13 QC / NDE Programs | DATE<br>7/16 – 8/13/99 |
| LOCATION<br>Beaver Valley Power Station | AUDIT<br>BV-C-99-12 Environmental Program | DATE<br>9/8 – 10/27/99 |
| LOCATION<br>Beaver Valley Power Station | AUDIT<br>BV-C-99-15 Training | DATE<br>10/26 – 12/21/99 |
| LOCATION<br>Beaver Valley Power Station | AUDIT<br>BV-C-00-01 Security and Access Authorization | DATE<br>1/31 – 3/15/2000 |

| CERTIFICATION AS A QUALIFIED AUDITOR | | | |
|---|---|---|---|
| EXAMINATION DATE<br>11/8/95 | CERTIFIED BY (SIGNATURE)<br>M. A. Regan | TITLE<br>Manager, NQA | DATE<br>1-4-01 |

For R. L. Hansen

# FirstEnergy Nuclear Operating Company
# EMPLOYEE BIOGRAPHICAL DATA

## I. BASIC INFORMATION

|   |   |
|---|---|
| 1. NAME<br>Ronald A. Perry | 2. SOCIAL SECURITY NO.<br>[redacted] |
| 3. JOB TITLE<br>Senior QA Specialist | 4. DEPARTMENT<br>Quality Services Audit and Surveillances |
| 5. COMPANY LOCATION<br>Beaver Valley | |

6. INDICATE THE DEGREES YOU HAVE EARNED (CHECK ALL THAT APPLY) AND THE DEGREE TYPE.

High School or Equivalent. Major: Falmouth HS, Falmouth, ME College
Associate's Degree. Major:
Bachelor's Degree. Major: Bachelor of Science Business Management, University of Maryland 1981
Master's Degree. Major:
Doctorate. Major:

7. LIST PROFESSIONAL CERTIFICATIONS, LICENSES, OR MEMBERSHIPS YOU HOLD.

NDE Level III - Visual Examination method (VT). This includes 1C and 3C per ASME XI IWE/IWL
NDE Level III - Penetrant Examination method (PT)
NDE Level III - Magnetic Particle Examination method (MT)
NDE Level IIL - Ultrasonic Examination method (UT)

8. LIST ANY SPECIAL TRAINING AND/OR EDUCATION YOU HAVE RECEIVED.

EPRI VT Level II training for ASME XI IWE/IWL (Visual examination of Containment) - Feb. 1999
EPP Training 1998-1999
Thermal Infrared Testing - Level I - Infrared Education Center (40 hours) Jan. 1997
Lead Auditor Training - 1996
Dale Camegie Course - Jan. 1996
EPRI Level III Visual Examination Training - 1990 and 1995
NDE Instructor Training - EPRI NDE Center (40 hours) June, 1993
ISI of Nuclear Plant Components - Technical Seminars (21 hours) May, 1988
Systematic Approach to Training (SAP) for Instructor - DLCo - 1988

## II. SKILLS AND WORK EXPERIENCE

9. LIST YOUR CURRENT AND PREVIOUS WORK EXPERIENCE, BEGINNING WITH YOUR CURRENT POSITION. INCLUDE: START DATE, END DATE, JOB TITLE, COMPANY, DEPARTMENT AND MAJOR RESPONSIBILITIES/ASSIGNMENTS. ALSO, LIST ANY SPECIAL SKILLS, KNOWLEDGE, OR EXPERTISE YOU POSSESS.

**May 16 to Present - SR QA Specialist, DLCo., QSAS**
Perform Audits and Surveillances of BVPS site groups as directed by QSAS Supervisor.
Participate on Blue Team EPP in the capacity of Information Coordinator
**May 16, 1983 to May 16, 1999 - NDE Specialist/ NDE Supervisor**
Perform and direct NDE examinations at BVPS. Maintain NDE Level II and III certifications as noted above.
Responsible for establishing a training program for the certification of NDE personnel. Prepare and implement training programs in support of qualification and certification of site personnel.
Review and acceptance of NDE reports, interpret examination results, and prepare Condition Reports for unsat conditions.
Maintain familiarity with ASME Codes.
Prepare 90 Day Summary Report.
Assist in the development and implementation of an ASME XI IWE/IWL Program.
Prepare and implement NDE procedures.

## II. Skills and Work Experience - Continued

9. Continued

Provide NDE training to contractor personnel performing examinations at BVPS.

## III. MAJOR ACCOMPLISHMENTS

10. DESCRIBE YOUR MOST SIGNIFICANT CAREER ACCOMPLISHMENTS OR SUCCESSES.

Maintain Level III certifications. Perform the majority of NDE training and certification at BVPS.

Developed and implemented technical and administrative procedures for the ISI department

Participated on various working groups on the ASME XI Code

Commendation Medal while serving in the United States Air Force 1976

Maintenance Supervisor for over 300 aircraft maintenance personnel at Loring AFB, ME

## IV. OTHER

11. PROVIDE ANY ADDITIONAL COMMENTS OR INFORMATION NOT ADDRESSED IN OTHER SECTIONS THAT YOU BELIEVE WOULD BE OF INTEREST.

Familiar with ASME Code as well as site administrative procedures. Continually upgrade myself by volunteering my services and expertise.

I CERTIFY THAT THE INFORMATION GIVEN ON THIS DOCUMENT IS ACCURATE AND COMPLETE TO THE BEST OF MY KNOWLEDGE.

Employee Signature ______________________________ Date ______________

|  |  |  |
|---|---|---|
| PSC<br>PRECISION SURVEILLANCE | *IWL VISUAL EXAMINER CERTIFICATION RECORD (EXHIBIT A)* | Document: FRM-PQR-001<br>Revision: 0<br>Date: July 16, 2013<br>Document Type: Corporation Standards<br>Page: 1 of 1 |

## IWL GENERAL AND DETAILED VISUAL EXAMINER CERTIFICATION RECORD

|  |  |  |
|---|---|---|
| **Training Requirements** | **Initials(Examinee/Instructor)** | **Date** |
| Training in Section XI, Subsection IWL (4 hours minimum) | RaP / CEC | 10/18/13 |
| Training shall include requirements for inservice and preservice examinations and reporting criteria for the following:(2 hours minimum) |  |  |
| 1) Concrete (conditions such as those described in ACI-201.1) | RaP / CEC | 10/18/13 |
| 2) Reinforcing steel | RaP / CEC | 10/18/13 |
| 3) Post-tensioning system items (e.g., wires, strands, anchorage hardware, corrosion protection medium, and free water) | RaP / CEC | 10/18/13 |
| **Written Examination** | **Grade** | **Date** |
| Written examination covering Section XI, Subsection IWL requirements and plant-specific procedure requirements for visual examination containing at least 15 questions in the following: |  |  |
| 1) Concrete and Reinforcing Steel | 86.6% | 10/18/13 |
| 2) Post-tensioning system components(i.e., wires, strands, anchorage hardware, corrosion protection medium, and free water | 86.6% | 10/18/13 |
| **Practical Examination** | **Grade** | **Date** |
| A practical examination using test specimens with flaws or indications to be detected by the following visual examination techniques: |  |  |
| 1) General and detailed visual examination of concrete | 93% | 10/18/13 |
| 2) Detailed visual examination of reinforcing steel | 93% | 10/18/13 |
| 3) Detailed visual examination of post-tensioning system components (i.e., wires, strands, and anchorage hardware) | 95% | 10/18/13 |
| **Passing grades for visual examinations shall be as follows:** | **Final Grade** | **Date** |
| An average combined grade of 80% for written and practical examinations | 90.8% | 10/18/13 |
| A minimum grade of 70% for each written and practical examination |  |  |

Precision Surveillance Corporation certifies that the following individual meets the minimum qualifications set forth in the Corporation Standard Document STD-PQR-001 "Personnel Qualification Requirements for General and Detailed Visual Examinations for Nuclear Power Plants".

|  |  |
|---|---|
| IWL Visual Examiner (Print Name): | Ronald A. Perry |
| IWL Visual Examiner (Signature): |  |
| SS #(Last Four Digits) | [redacted] |
| Certification Date: | 10/18/13 |
| Certification Expiration Date: | 10/17/18 |
| P.S.C. Professional Engineer Approval(Name) | Christopher E. Cox |
| P.S.C. Professional Engineer Approval(Signature) |  |

*IWL VISUAL EXAMINER RECORD OF EXPERIENCE*
*(EXHIBIT F)*

| | |
|---|---|
| Document: | FRM-PQR-006 |
| Revision: | 0 |
| Date: | July 16, 2013 |
| Document Type: | Corporation Standards |
| Page: | 1 of 2 |

# IWL VISUAL EXAMINER RECORD OF EXPERIENCE

| | Name | Electronic Signature | SS# (last four digits) | Work Experience Verification Date mm/dd/yyyy |
|---|---|---|---|---|
| IWL Visual Examiner | Ronald Perry | | [redacted] | 10/18/2013 |
| PSC P.E. Approval | Christopher E. Cox | | [redacted] | 10/18/13 |

Note: By signing the above, I acknowledge that the following education and work experience is valid and true to the best of my knowledge. The work experience may be the same or similar to the General and Detailed Visual Examination, requirements set forth by ASME, Section XI, Subsection IWL.

Fill in the form below with the dates(mm/dd/yyyy) that are applicable to the type of work performed.

| Nuclear Power Plants | Visual Examination | Repair/Replacement | Modification(s) | Periodic Test(s) | Manufacturing, Construction,Fabrication or Installation | Visual Examinations | Dimensional Verifications |
|---|---|---|---|---|---|---|---|
| Oconee<br>2007<br>WSI | Level II<br>Mechanical,<br>VT,PT,MT | | | | | | Dimensional Verification of sleeves |
| Catawba<br>2007<br>WSI | Level II<br>Mechanical,<br>VT,PT,MT | | | | | | |
| Merc Plant<br>Pharmaceutical<br>2008 | Level II<br>VT of Tanks | | | | | | |
| Limerick<br>2008 | Level II<br>VT,PT,MT | | | | | | |

**PSC**

*IWL VISUAL EXAMINER RECORD OF EXPERIENCE (EXHIBIT F)*

| | |
|---|---|
| Document: | FRM-PQR-006 |
| Revision: | 0 |
| Date: | July 16, 2013 |
| Document Type: | Corporation Standards |
| Page: | 1 of 2 |

## IWL VISUAL EXAMINER RECORD OF EXPERIENCE

(ADDITIONAL SHEET ADDED FOR WORK EXPERIENCE)

| | Name | Electronic Signature | SS# (last four digits) | Work Experience Verification Date mm/dd/yyyy |
|---|---|---|---|---|
| | | | | |
| IWL Visual Examiner | Ronald Perry | Ra P | [redacted] | 10/18/2013 |
| | | | | |
| PSC P.E. Approval | Christopher E. Cox | | [redacted] | 10/18/13 |

Note: By signing the above, I acknowledge that the following education and work experience is valid and true to the best of my knowledge. The work experience may be the same or similar to the General and Detailed Visual Examination, requirements set forth by ASME, Section XI, Subsection IWL.

Fill in the form below with the dates(mm/dd/yyyy) that are applicable to the type of work performed.

| Nuclear Power Plants | Visual Examination | Repair/Replacement | Modification(s) | Periodic Test(s) | Manufacturing, Construction, Fabrication or Installation | Visual Examinations | Dimensional Verifications |
|---|---|---|---|---|---|---|---|
| | | | | | | | |
| Nine Mile Point 2005 | Level II VT,PT,MT | | | | | | |
| | | | | | | | |
| First Energy 1986-2005 | Level III VT,PT,MT | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

| | | |
|---|---|---|
| PSC | *IWL VISUAL EXAMINER RECORD OF EXPERIENCE (EXHIBIT F)* | Document: FRM-PQR-008<br>Revision: 0<br>Date: July 16, 2013<br>Document Type: Corporation Standards<br>Page: 2 of 2 |

Please initial the following section that is most applicable to your level of education and experience.

___ I am a high school graduate or have an equivalent degree with a minimum of one-year experience in IWL related or similar activities.

___ I am a high school graduate or have an equivalent degree with a completed two-year associates degree in the construction or science field and a minimum of 6 months experience in IWL related or similar activities.

x I am a high school graduate or have an equivalent degree with a completed four-year bachelor's degree in the construction or science field and a minimum of 3 months experience in IWL related or similar activities.

Please fill in the Work Experience Form as thorough as possible. Dates should be noted as month/day/year(mm/dd/yyyy).

**Work Experience Form**

| | | |
|---|---|---|
| Company: | | Responsibilities: |
| Welding Services Incorporated | | Perform ISI examination as a Level II in PT, MT & VT |
| Location: | | |
| Oconee/Catawba | | |
| | | |
| From: | 08/2007 | |
| To: | 11/2007 | |
| | | |
| Company: | | Responsibilities: |
| Tourgee & Associates | | Perform examination of tanks and peripheral equipment as a VT Level II |
| Location: | | |
| Merc Plant in Danville, PA | | |
| | | |
| From: | 9/11/08 | |
| To: | 11/11/08 | |
| | | |
| Company: | | Responsibilities: |
| Sonic Systems International | | ISI Coordinator-Level II VT, MT, PT |
| Location: | | |
| Limerick | | |
| | | |
| From: | 02/2008 | |
| To: | 03/2008 | |

| | | |
|---|---|---|
| | *IWL VISUAL EXAMINER RECORD OF EXPERIENCE*<br>*(EXHIBIT F)* | Document: FRM-PQR-006<br>Revision: 0<br>Date: July 16, 2013<br>Document Type: Corporation Standards<br>Page: 2 of 2 |

(ADDITIONAL SHEET ADDED FOR WORK EXPERIENCE)

Please initial the following section that is most applicable to your level of education and experience.

___ I am a high school graduate or have an equivalent degree with a minimum of one-year experience in IWL related or similar activities.

___ I am a high school graduate or have an equivalent degree with a completed two-year associates degree in the construction or science field and a minimum of 6 months experience in IWL related or similar activities.

x I am a high school graduate or have an equivalent degree with a completed four-year bachelor's degree in the construction or science field and a minimum of 3 months experience in IWL related or similar activities.

Please fill in the Work Experience Form as thorough as possible. Dates should be noted as month/day/year(mm/dd/yyyy).

**Work Experience Form**

| | | |
|---|---|---|
| **Company:** | | **Responsibilities:** |
| Sonic Systems International | | Perform ISI examination as a Level II in PT, MT & VT |
| **Location:** | | |
| Nine Mile Point | | |
| | | |
| **From:** | 03/2005 | |
| **To:** | 04/2005 | |
| | | |
| **Company:** | | **Responsibilities:** |
| First Energy/Duquesne Ligth | | QA Auditor; NDE Specialist; NDE Supervisor-Supervised the development and implementation |
| **Location:** | | of a NDE ISI Department. Developed NDE related and administrative procedures. Level III in |
| Beaver Valley, Davis Besse | | PT, MT and VT. Level II in UT. As a QA Lead Auditor performed assessment of maintenance, |
| | | licensing, engineering, construction, radiation protection, operations, document control/records |
| **From:** | 05/16/1983 | management; M&TE Program-prepare audit reports and initiate deficiency reports as req'd. |
| **To:** | 02/15/2005 | |
| | | |
| **Company:** | | **Responsibilities:** |
| | | |
| **Location:** | | |
| Limerick | | |
| | | |
| **From:** | | |
| **To:** | | |

| | | | |
|---|---|---|---|
| PSC | *IWL-2000*<br>*WRITTEN EXAMINATION*<br><br>*CONCRETE & REINFORCING STEEL* | **Document:** | EXM-PQR-001 |
| | | **Revision:** | 0 |
| | | **Date:** | July 16, 2013 |
| | | **Document Type:** | Corporation Standards |
| | | **Page:** | 1 of 3 |

NAME: Ronald A. Perry DATE: 10/18/13

SOCIAL SECURITY NUMBER: [redacted]

GRADE: 13/15 = 86.7% GRADED BY: P.E. 10/18/13

I have neither given, received nor observed any aid or information regarding this exam prior to or during its administration that could compromise this exam's integrity. I also understand my obligation to report any exam compromise by others prior, during, or subsequent to the exam administration.

I acknowledge that this examination is a way of demonstrating my knowledge of the subject associated with this examination and that I have had the opportunity, on my request, to review this entire examination with the instructor to ensure my understanding of the subject matter.

I have read and understand the above statements: R a P 10/18/13

Student Signature Date

**FILL IN ONE CIRCLE AS THE ANSWER FOR EACH QUESTION**

| | A | B | C | D | | | A | B | C | D | | | A | B | C | D | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | ○ | ○ | ○ | ● | ✓ | 6 | ● | ○ | ○ | ○ | ✓ | 11 | ○ | ● | ○ | ○ | ✓ |
| 2 | ● | ○ | ○ | ○ | ✓ | 7 | ○ | ○ | ○ | ● | ✓ | 12 | ○ | ● | ○ | ○ | ✓ |
| 3 | ○ | ○ | ● | ○ | ✓ | 8 | ○ | ◎ | ☒ | ○ | | 13 | ● | ○ | ○ | ○ | ✓ |
| 4 | ○ | ○ | ● | ○ | ✓ | 9 | ○ | ○ | ○ | ● | ✓ | 14 | ○ | ○ | ● | ○ | ✓ |
| 5 | ○ | ☒ | ○ | ◎ | | 10 | ● | ○ | ○ | ○ | ✓ | 15 | ○ | ● | ○ | ○ | ✓ |

1. What is the function of the ANII?

a) To verify compliance with NRC regulations
b) To provide another approval signature on forms
c) To ensure nuclear safety
[✓ d)] To verify compliance with applicable requirements of the ASME Code

2. General Visual inspections are required to be performed on:

[✓ a)] Exterior Containment concrete surface and grease caps.
b) Tendon button heads.
c) Jacks/Rams used for stressing
d) All of the above

3. What is the character height of the lower case letters for Detailed Visual Inspections?

a) 0.010"
b) 0.105"
[✓ c)] 0.044"
d) 0.500"

4. What degradation is defined by the breaking away of small portions of a concrete surface due to localized internal pressure which leaves a shallow, typically conical depression?

a) Exudation
b) Laitance
[✓ c)] Popout
d) Encrustation

5. What is an optical comparator?

a) A device to determine color resolution
b) A device to evaluate vision
c) A device to measure surface lighting intensity
[✓ d) None of the above]

measure size of letters

6. Efflorescence is a sign of

[✓ a)] Mineral leaching
b) Concrete additives
c) Nothing
d) Surface coating

7. Who may perform IWL Visual examinations without certification?

a) QC Personnel
b) Level II ISI personnel
c) A manager or supervisor of ISI programs
[✓ d)] None of the above

8. Per ASME Section XI, subsection IWL what are to be given a general visual examination?

a) The safety shoes craft personnel are wearing
[✓ b) The tendon gallery ceiling]
c) Containment tendon strand wedges or wire button heads
d) The condition of hard hats worn by personnel

| | | | |
|---|---|---|---|
| | *IWL-2000*<br>*WRITTEN EXAMINATION*<br>*CONCRETE & REINFORCING STEEL* | Document: | EXM-PQR-001 |
| | | Revision: | 0 |
| | | Date: | July 16, 2013 |
| | | Document Type: | Corporation Standards |
| | | Page: | 3 of 3 |

9. When should the character height of near-distance test charts be measured?

   a) After the inspection
   b) When requested by the Registered Engineer
   c) When a Relevant Condition is found
   [✓ d)] Before use of it

10. In tendon anchorage areas, acceptable cracks in the concrete adjacent to the bearing plates do not exceed.

   [✓ a)] 0.010 inch in width
   b) 0.100 inch in width
   c) 0.001 inch in width
   d) 1.000 inch in width

11. What amendment to 10 CFR 50 incorporated by reference the requirements of ASME Section XI, 1992 Edition with 1992 Addenda?

   a) 1992 Addenda
   [✓ b)] 10 CFR 50.55a.
   c) Appendix A
   d) 10 CFR 10.30

12. A detailed visual inspection requires what maximum examination distance?

   a) 7 feet
   [✓ b)] 2 feet
   c) 35 feet
   d) 4 feet

13. How often is Level II re-certification required?

   [✓ a)] Every 5 years
   b) Every 3 years
   c) Every 3 months
   d) Every year

14. Which of the following degradation mechanisms to rebar is associated with changes in the permeability of concrete, presence of an electrolyte, or microbiological attack?

   a) Irradiation
   b) Fatigue
   [✓ c)] Corrosion
   d) Thermal effects

15. Level II minimum education required for certification is?

   a) MBA degree
   [✓ b)] High school or equivalent
   c) No education
   d) One year of college

| PSC | *IWL-2000*<br>*WRITTEN EXAMINATION*<br><br>*POST-TENSIONING COMPONENTS* | Document: | EXM-PQR-002 |
|---|---|---|---|
| | | Revision: | 0 |
| | | Date: | July 16, 2013 |
| | | Document Type: | Corporation Standards |
| | | Page: | 1 of 3 |

NAME: Ronald A Perry DATE: 10/18/13

SOCIAL SECURITY NUMBER: [redacted]

GRADE: 13/15 = 86.6% GRADED BY: , P.E. 10/18/13

I have neither given, received nor observed any aid or information regarding this exam prior to or during its administration that could compromise this exam's integrity. I also understand my obligation to report any exam compromise by others prior, during, or subsequent to the exam administration.

I acknowledge that this examination is a way of demonstrating my knowledge of the subject associated with this examination and that I have had the opportunity, on my request, to review this entire examination with the instructor to ensure my understanding of the subject matter.

I have read and understand the above statements: R a Py 10/18/13

Student Signature Date

**FILL IN ONE CIRCLE AS THE ANSWER FOR EACH QUESTION**

| | A | B | C | D | | | A | B | C | D | | | A | B | C | D | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | ○ | ○ | ○ | ● | ✓ | 6 | ○ | ○ | ● | ○ | ✓ | 11 | ○ | ◎ | ⊗ | ○ | |
| 2 | ○ | ○ | ○ | ● | ✓ | 7 | ● | ○ | ○ | ○ | ✓ | 12 | ○ | ○ | ● | ○ | ✓ |
| 3 | ○ | ○ | ● | ○ | ✓ | 8 | ◎ | ○ | ○ | ⊗ | | 13 | ○ | ● | ○ | ○ | ✓ |
| 4 | ○ | ○ | ○ | ● | ✓ | 9 | ● | ○ | ○ | ○ | ✓ | 14 | ● | ○ | ○ | ○ | ✓ |
| 5 | ○ | ○ | ● | ○ | ✓ | 10 | ● | ○ | ○ | ○ | ✓ | 15 | ○ | ● | ○ | ○ | ✓ |

1. Per IWL what tendon anchorages are exempt from Detailed Examination?

   a) Inaccessible due to structural obstructions
   b) Inaccessible due to radiological hazards
   c) Inaccessible due to safety concerns
   [✓ d)] All of the above

2. Subsection IWL contains requirements for a Responsible Engineer. He must be an experienced Registered Professional Engineer. What is he responsible for?

   a) Submittal of the report to the Owner documenting results of examinations and repairs
   b) Evaluation of examination results
   c) Approval, instruction, and training of concrete examination personnel
   [✓ d)] All of the above

3. PSC Qualification for IWL Examiners certifications comply to:

   a) IWE 92
   b) IWL 2001 edition with 2003 addenda
   [✓ c)] IWL 2010 edition with 2011 addenda
   d) ACI 301

4. What is detailed examination used to detect on Containment Post Tensioning Systems (tendon anchorage) selected for in-service inspection?

   a) Dissolved water in the grease
   b) Amount of grease in the grease can
   c) Grease can grease level
   [✓ d)] Evidence of free water

5. The tendon bearing plate is to be given what kind of visual inspection?

   a) Close-Up
   b) General
   [✓ c)] Detailed
   d) None

6. What is the typical PSC procedure used for Anchorage Inspection?

   a) SQ 2.0
   b) SQ 12.1
   [✓ c)] SQ 8.0
   d) SQ 4.0

7. Following the re-tensioning of a tendon that has been de-tensioned a Detailed inspection is used to detect:

   [✓ a)] Broken wires or strands.
   b) Amount of nitrates in the grease.
   c) Temperature of the concrete.
   d) If the grease can has been galvanized.

8. Which of the following is not typical equipment used for IWL examination?
   [✓ a)] Pressure gage
   b) Flashlight
   c) Camera
   ~~d)~~ Optical Comparator

9. Following the re-tensioning of a tendon that has been de-tensioned a Detailed inspection is used to detect:

   [✓ a)] Broken wires or strands.
   b) Amount of nitrates in the grease.
   c) Temperature of the concrete.
   d) If the grease can has been galvanized.

10. Per PSC Qualification for IWL examinations who approves the qualifications of the Examiners?

    [✓ a)] Responsible Engineer (P.E.)
    b) IWL Supervisor
    c) Project Manager
    d) Project Superintendent

11. What is General Examination used to detect on Containment Post Tensioning Systems (tendon anchorage) selected for in-service inspection?

    a) Type of galvanizing on Grease can
    b) ~~Gasket seal on Grease Can~~
    [✓ c)] Cracks in anchorage hardware
    d) None of the above

12. What is Detailed Examination used to detect on Containment Post Tensioning Systems (tendon anchorage) selected for in-service inspection?

    a) Chemistry of shim material
    b) Material type of shim material
    [✓ c)] Displacement of shims
    d) Diameter of Shims

13. What is Detailed Examination used to detect on Containment Post Tensioning Systems (tendon anchorage) selected for in-service inspection?

    a) Shim finish
    [✓ b)] Missing button heads
    c) Anchor head finish
    d) Bushing hardness

14. For General and Detailed Examinations what is the minimum near distance vision acuity the examiner must have?

    [✓ a)] at least 20/25 Snellen in at least one eye.
    b) None
    c) 20/20
    d) 40/40 or better

15. For nuclear plants that completed their Structural Integrity Test 20 years ago how often must the Containment Post-Tensioning System IWL Examination of tendon anchorages be performed on tendons selected for in-service inspection per IWL?

    a) Every 6 months
    [✓ b)] Every 5 years
    c) Every 3 years
    d) Every 2 years

PSC
PRECISION SURVEILLANCE

# IWL-2000
# GENERAL & DETAILED VISUAL EXAMINATION OF CONCRETE

## PRACTICAL EXAMINATION CHECKLIST

| | |
|---|---|
| Document: | EXM-PQR-003 |
| Revision: | 0 |
| Date: | July 16, 2013 |
| Document Type: | Corporation Standards |
| Page: | 1 of 3 |

---

NAME: Ronald A. Perry DATE: 10/18/13

SOCIAL SECURITY NUMBER: [redacted]

EXAM NUMBER: C

GRADE: 93% INSTRUCTOR/GRADED BY: , P.E. 10/18/13

I have neither given, received nor observed any aid or information regarding this exam prior to or during its administration that could compromise this exam's integrity. I also understand my obligation to report any exam compromise by others prior, during, or subsequent to the exam administration.

I acknowledge that this examination is a way of demonstrating my knowledge of the subject associated with this examination and that I have had the opportunity, on my request, to review this entire examination with the instructor to ensure my understanding of the subject matter.

I have read and understand the above statements: R a P 10/18/13
Student Signature Date

| POINT VALUE | INSPECTION POINTS | POINTS GRANTED/COMMENTS |
|---|---|---|
| 10 | Select procedure<br>Verify revision | +10 |
| 10 | Select form<br>Verify revision | +10 |
| 5 | Select equipment<br>Verify calibration/resolution | +3 / (-2) |
| 5 | Verify adequacy of lighting<br>Prior to and during inspection | +5 |
| 5 | Record part/item number<br>On inspection form | +5 |
| 15 | Inspect component/part<br>Identify discontinuities | +15 |
| 15 | Compare discontinuities to<br>Recording criteria in procedure | +13 / (-2) |
| 25 | Correctly record discontinuities | +22 / (-3) |
| 5 | Sign and date form | +5 |
| 5 | Complete form<br>Accurate and legible | +5 |
| | TOTAL | 93/100 |

N1091 PSC PROCEDURE SQ 8.4
CONCRETE EXTERIOR
DATA SHEET SQ 8.4
09/03/13
Page 1 of 1
Revision 0

## VISUAL EXAMINATION – GENERAL VISUAL EXAMINATION

Project TMI Surveillance # 40TH Year 2013
Inspection Area: C-2
Equipment Used

### Concrete Surface Condition

| Containment Surface (Findings and Description) | NI | IO | RI |
|---|---|---|---|
| cracks as noted on sketch | ☐ | ☐ | ☒ |
| several popouts noted on S side | ☐ | ☒ | ☐ |
| II made mede indentations | ☐ | ☐ | ☒ |
| scaling noted on N end of inspection area | ☐ | ☒ | ☐ |
|  | ☐ | ☐ | ☐ |
|  | ☐ | ☐ | ☐ |
|  | ☐ | ☐ | ☐ |
|  | ☐ | ☐ | ☐ |
|  | ☐ | ☐ | ☐ |
|  | ☐ | ☐ | ☐ |
|  | ☐ | ☐ | ☐ |
|  | ☐ | ☐ | ☐ |
|  | ☐ | ☐ | ☐ |
|  | ☐ | ☐ | ☐ |
|  | ☐ | ☐ | ☐ |
|  | ☐ | ☐ | ☐ |

*(Use as many sketch sheets (page 2) as needed to report any Recordable Indication (RI) or Information Only (IO) findings for the purpose of documentation and orientation.)*

### Recordable Indications to be Examined For (PSC Procedure 8.4)

Leaching or Chemical Attack
Abrasion or Erosion Degradation
Popouts and Voids
Cracks
Scaling
Spalls
Corrosion Staining on the Concrete Surface
Exposed Reinforcing Steel
Surface Patches or Repairs

Deterioration of any Concrete Coating (if applicable)
Tendon Grease on Exposed Concrete Surfaces
Corrosion on Grease Cans, Bearing Plates or Anchorage
*Excessive Corrosion on Exposed Embedded Metal Surfaces
*Detached Embedments or Loose Bolting
*Indication of Degradation Due to Vibration
**(* The owner/agent must be notified for these noted conditions.)**

Comments and Disposition by Responsible Engineer ☐ Acceptable ☐ Unacceptable
Comments:

Inspector & Level: Ron Perry Ra Pry II Date: 10/18/13
Responsible Engineer: Date:
ANII: Date:

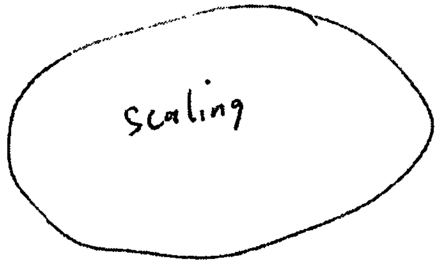
**N1091 PSC PROCEDURE SQ 8.4**
**CONCRETE EXTERIOR**
**SKETCH SHEET 8.4**
**09/03/13**
**Page 1 of 1**
**Revision 0**

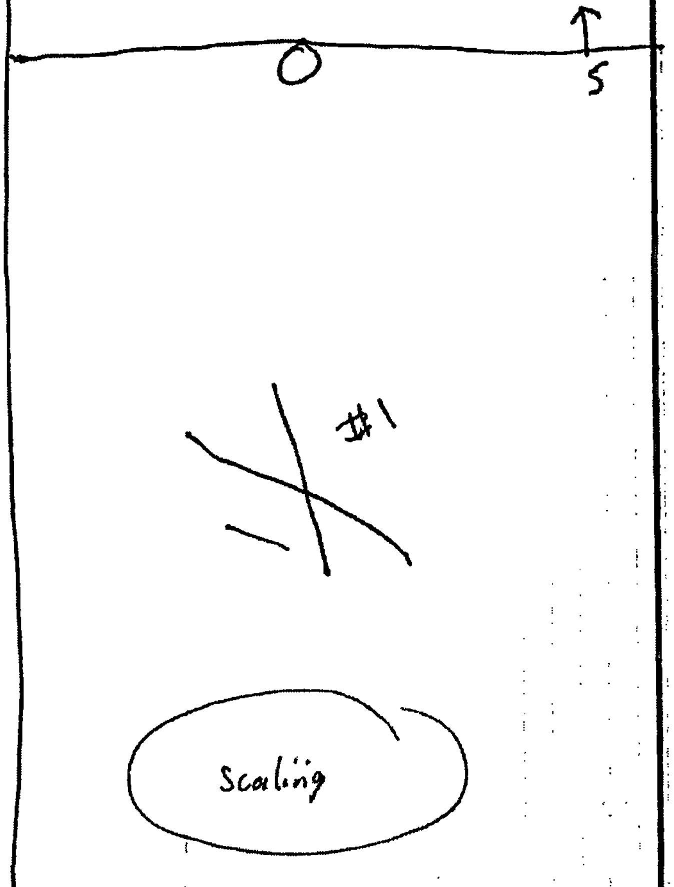
**Project:** TMI 2013 40TH YEAR TENDON SURVEILLANCE

**Inspection Area:** C-2

**1. Sketch or attach photographs to provide documentation or additional details as necessary.**

Give - Dimensional Information of inspection area





**Comments:**

Any "None" - 2

**QC Inspector:** R a P　　**Level:** II　　**Date:** 10/18/13

PRECISION SURVEILLANCE

N1091 PSC PROCEDURE SQ 8.4
CONCRETE EXTERIOR
DATA SHEET SQ 8.4
09/03/13
Page 1 of 1
Revision 0

## VISUAL EXAMINATION – GENERAL VISUAL EXAMINATION

Project TMI Surveillance # 40TH Year 2013

Inspection Area: C-1

Equipment Used [redacted]-1

### Concrete Surface Condition

| Containment Surface (Findings and Description) | NI | IO | RI |
|---|---|---|---|
| cracks as noted on sketch (Passive) | ☐ | ☐ | ☒ |
| popouts and indentations noted randomly in area | ☐ | ☒ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ |

***(Use as many sketch sheets (page 2) as needed to report any Recordable Indication (RI) or Information Only (IO) findings for the purpose of documentation and orientation.)***

Recordable Indications to be Examined For (PSC Procedure 8.4)

- Leaching or Chemical Attack
- Abrasion or Erosion Degradation
- Popouts and Voids
- Cracks
- Scaling
- Spalls
- Corrosion Staining on the Concrete Surface
- Exposed Reinforcing Steel
- Surface Patches or Repairs
- Deterioration of any Concrete Coating (if applicable)
- Tendon Grease on Exposed Concrete Surfaces
- Corrosion on Grease Cans, Bearing Plates or Anchorage
- *Excessive Corrosion on Exposed Embedded Metal Surfaces
- *Detached Embedments or Loose Bolting
- *Indication of Degradation Due to Vibration

**(* The owner/agent must be notified for these noted conditions.)**

Comments and Disposition by Responsible Engineer ☐ Acceptable ☐ Unacceptable

Comments:

Inspector & Level: Ron Perry RaPy II Date: 10/18/13

Responsible Engineer: Date:

ANII: Date:

20 SQ 8.4.TMI.13 ISI

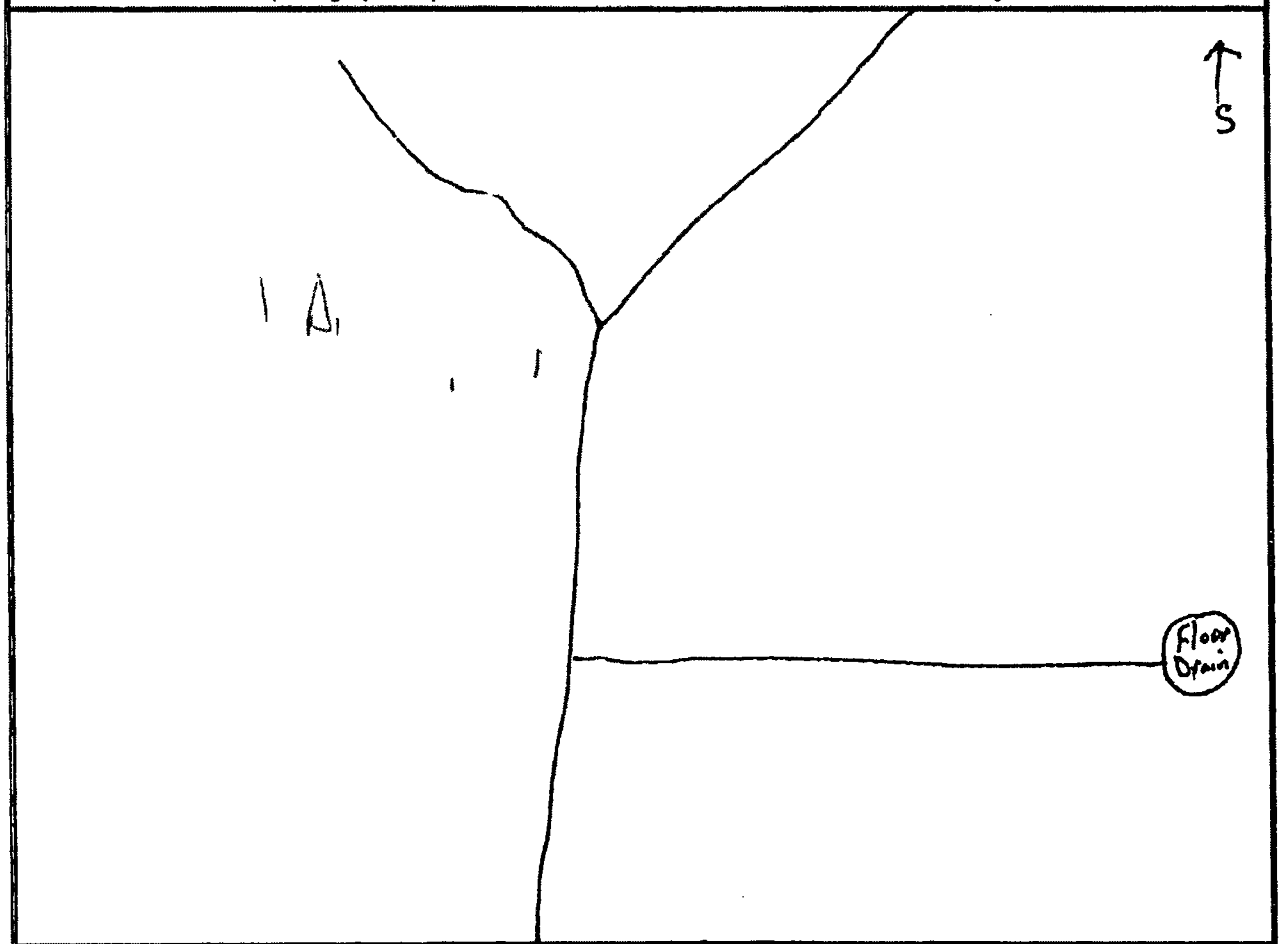
**PRECISION SURVEILLANCE**

**N1091 PSC PROCEDURE SQ 8.4**
**CONCRETE EXTERIOR**
**SKETCH SHEET 8.4**
**09/03/13**
**Page 1 of 1**
**Revision 0**

Project: TMI 2013 40TH YEAR TENDON SURVEILLANCE

Inspection Area: C-1

1. Sketch or attach photographs to provide documentation or additional details as necessary.



Comments: Indentations noted randomly in area due to dropped eqmt. Popouts were noted randomly - all measured less then 2" in length Majority lengths of cracks were greater than 0.040" in width (passive)

QC Inspector: R a P
Level: II
Date: 10/18/13

20 SQ 8.4.TMI.13 ISI

| | | | |
|---|---|---|---|
| PSC | *IWL-2000*<br>*DETAILED VISUAL EXAMINATION OF REINFORCING STEEL*<br><br>*PRACTICAL EXAMINATION CHECKLIST* | Document:<br>Revision:<br>Date:<br>Document Type:<br>Page: | EXM-PQR-004<br>0<br>July 16, 2013<br>Corporation Standards<br>1 of 3 |

NAME: Ronald A. Perry DATE: 10/18/13

SOCIAL SECURITY NUMBER: [redacted]

EXAM NUMBER: B

GRADE: 93% INSTRUCTOR/GRADED BY: , P.E. 10/18/13

I have neither given, received nor observed any aid or information regarding this exam prior to or during its administration that could compromise this exam's integrity. I also understand my obligation to report any exam compromise by others prior, during, or subsequent to the exam administration.

I acknowledge that this examination is a way of demonstrating my knowledge of the subject associated with this examination and that I have had the opportunity, on my request, to review this entire examination with the instructor to ensure my understanding of the subject matter.

I have read and understand the above statements: R a P 10/18/13

Student Signature Date

| POINT VALUE | INSPECTION POINTS | POINTS GRANTED/COMMENTS |
|---|---|---|
| 10 | Select procedure<br>Verify revision | +10 |
| 10 | Select form<br>Verify revision | +10 |
| 5 | Select equipment<br>Verify calibration/resolution | +10 |
| 5 | Verify adequacy of lighting<br>Prior to and during inspection | +5 |
| 5 | Record part/item number<br>On inspection form | ~~+5~~ [illegible] +3/(-2) |
| 15 | Inspect component/part<br>Identify discontinuities | +11/(-4) |
| 15 | Compare discontinuities to<br>Recording criteria in procedure | +15 |
| 25 | Correctly record discontinuities | +25 |
| 5 | Sign and date form | +4/(-1) |
| 5 | Complete form<br>Accurate and legible | +5 |
| | TOTAL | 93/100 |

PSC PRECISION SURVEILLANCE

N1091 PSC PROCEDURE SQ 8.3
BEARING PLATE INSPECTION
DATA SHEET SQ 8.3
09/03/13
Page 1 of 1
Revision 0

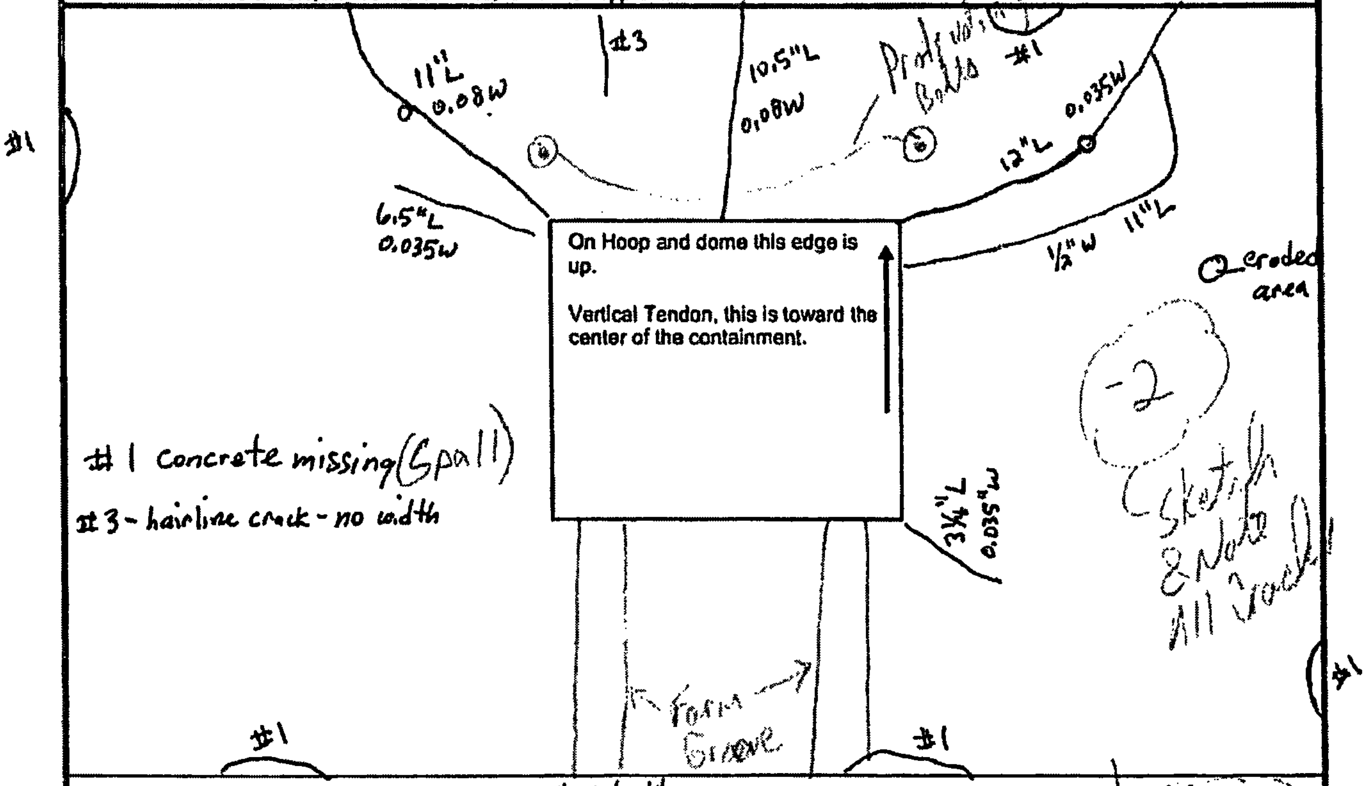
Practical

Project: TMI 2013 TENDON SURVEILLANCE ☐ UNIT 1

Tendon No.: B-1 Tendon End: ____ ☐ Shop ☐ Field

(7.4) Bearing Plate Identification #: ____ This should say - "None Found"

1. Orient the bearing plate with the sketch below.
2. Locate the bearing plate identification and document the location on the sketch.
3. Sketch all cracks, including other defects, existing on the concrete in the area surrounding the tendon anchorage for a distance of 24 inches from the edge of the bearing plate.
4. For cracks equal to or wider than 0.010 inches, document condition on an Nonconformance Report in accordance with Procedure QA 9.0, NONCONFORMANCES, for Exelon approval.



On Hoop and dome this edge is up.

Vertical Tendon, this is toward the center of the containment.

#1 concrete missing (Spall)
#3 - hairline crack - no width

Auxiliary Light Source used: ■ Yes ☐ No Flashlight

(7.3) Illumination source; outdoors

(7.5) Cracks ≥ 0.010" ■ Yes ☐ No Quantity: see sketch Max. Width: see sketch Max Length: see sketch NCR#: xxxx

QC Inspector: R a P Level: II Date: 10/18/13

QC Reviewed: ____ Level: ____ Date: ____

19 SQ 8.3 TMI.13 ISI

PSC PRECISION SURVEILLANCE

**N1091 PSC PROCEDURE SQ 8.3**
**BEARING PLATE INSPECTION**
**DATA SHEET SQ 8.3**
**09/03/13**
**Page 1 of 1**
**Revision 0**

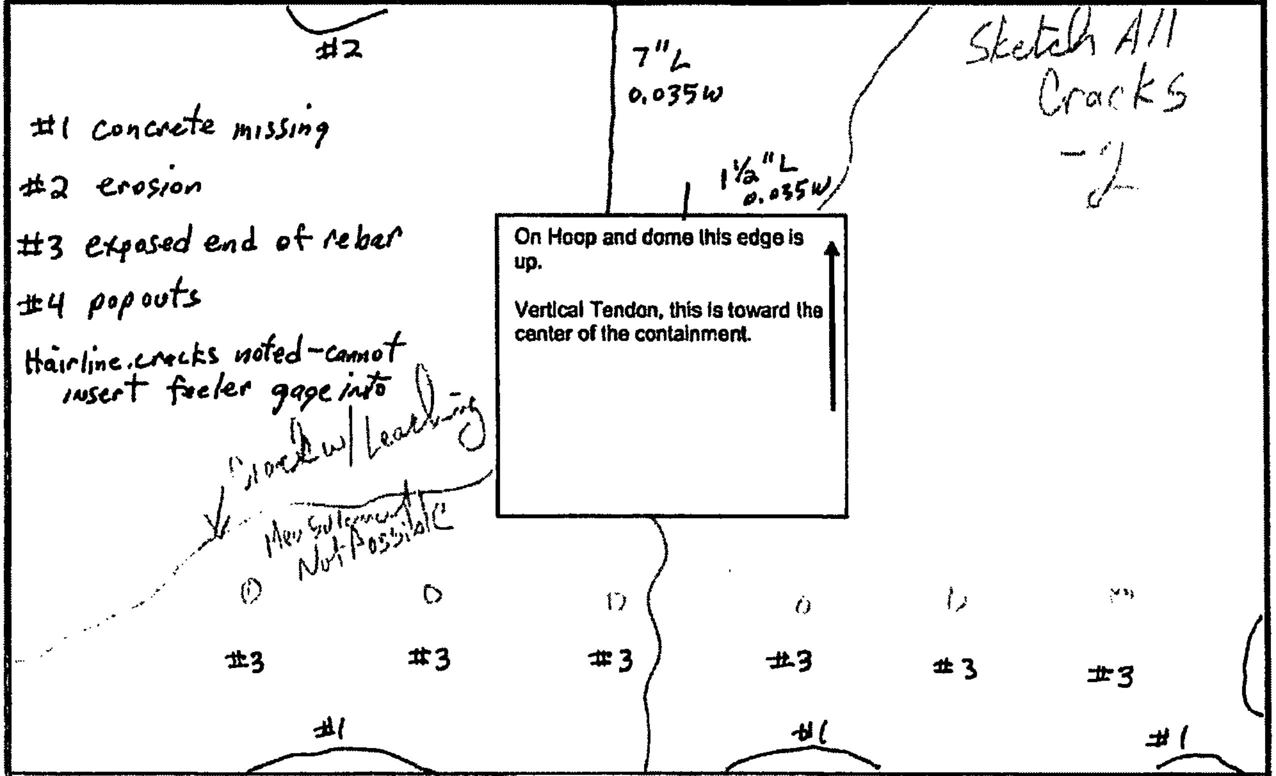
Practical

Project: TMI 2013 TENDON SURVEILLANCE ☐ UNIT 1

Tendon No.: B-2 Tendon End: ______ ☐ Shop ☐ Field

(7.4) Bearing Plate Identification #: "None Found"

1. Orient the bearing plate with the sketch below.
2. Locate the bearing plate identification and document the location on the sketch.
3. Sketch all cracks, including other defects, existing on the concrete in the area surrounding the tendon anchorage for a distance of 24 inches from the edge of the bearing plate.
4. For cracks equal to or wider than 0.010 inches, document condition on an Nonconformance Report in accordance with Procedure QA 9.0, NONCONFORMANCES, for Exelon approval.



On Hoop and dome this edge is up.

Vertical Tendon, this is toward the center of the containment.

Auxiliary Light Source used: ☒ Yes ☐ No Flashlight

(7.3) Illumination source: outdoors

(7.5) Cracks ≥ 0.010" ☒ Yes ☐ No Quantity: 2 Max. Width: 0.035 Max Length: see sketch NCR#: xxxx

QC Inspector: Ra Ry Level: II Date: 10/18/31

QC Reviewed: ______ Level: ______ Date: ______

19 SQ 8.3 TMI.13 ISI

|  |  |  |
|---|---|---|
| PSC | IWL-2000<br>DETAILED VISUAL EXAMINATION OF POST-TENSIONING SYSTEM COMPONENTS<br><br>PRACTICAL EXAMINATION CHECKLIST | Document: EXM-PQR-005<br>Revision: 0<br>Date: July 16, 2013<br>Document Type: Corporation Standards<br>Page: 1 of 3 |

NAME: Ronald A. Perry DATE: 10/18/13

SOCIAL SECURITY NUMBER: [redacted]

EXAM NUMBER: A

GRADE: 95% INSTRUCTOR/GRADED BY: Christopher E. Cox, P.E. 10/18/13

I have neither given, received nor observed any aid or information regarding this exam prior to or during its administration that could compromise this exam's integrity. I also understand my obligation to report any exam compromise by others prior, during, or subsequent to the exam administration.

I acknowledge that this examination is a way of demonstrating my knowledge of the subject associated with this examination and that I have had the opportunity, on my request, to review this entire examination with the instructor to ensure my understanding of the subject matter.

I have read and understand the above statements: Ronald Perry 10/18/13
Student Signature Date

| POINT VALUE | INSPECTION POINTS | POINTS GRANTED/COMMENTS |
|---|---|---|
| 10 | Select procedure<br>Verify revision | +10 |
| 10 | Select form<br>Verify revision | +9/(-1) |
| 5 | Select equipment<br>Verify calibration/resolution | +5 |
| 5 | Verify adequacy of lighting<br>Prior to and during inspection | +4/(-1) |
| 5 | Record part/item number<br>On inspection form | +5 |
| 15 | Inspect component/part<br>Identify discontinuities | +15 |
| 15 | Compare discontinuities to<br>Recording criteria in procedure | +15 |
| 25 | Correctly record discontinuities | +25 |
| 5 | Sign and date form | +3/(-2) |
| 5 | Complete form<br>Accurate and legible | +4/(-1) |
|  | TOTAL | +95% |

PRECISION SURVEILLANCE

**N1091 PSC PROCEDURE SQ 8.0**
**ANCHORAGE INSPECTION**
**Data Sheet 8.0A**
09/03/13
Page 1 of 1
Revision 0
Revision: 1, 10/04/13

**Project:** TMI 2013 TENDON SURVEILLANCE ☐ UNIT 1

**(7.3)Tendon No.:** A-1 **Tendon End:** ____ [✓ ☐ Field]

## ANCHORAGE INSPECTION CRITERIA

☒ As-Found ☐ Post De-Tensioning / Pre-Wire Removal ☐ Post Re-Tensioning — Q.C. Signoff

**0 & 8.7.1 - CORROSION & CRACK INSPECTION**

| | | | | Q.C. Signoff |
|---|---|---|---|---|
| (8.7) Buttonheads | Level: A (1) | (9.1) Cracks | ☐ Yes (2) ☒ No ☐ N/A | RAP 10/18/13 |
| (8.7) Anchorhead | Level: A (1) | (9.1) Cracks | ☐ Yes (2) ☒ No ☐ N/A | |
| (8.7) Shims | Level: A (1) | (9.1) Cracks | ☐ Yes (2) ☒ No ☐ N/A | |
| (8.7) Bearing Plate | Level: B (1) | (9.1) Cracks | ☐ Yes (2) ☒ No ☐ N/A | |

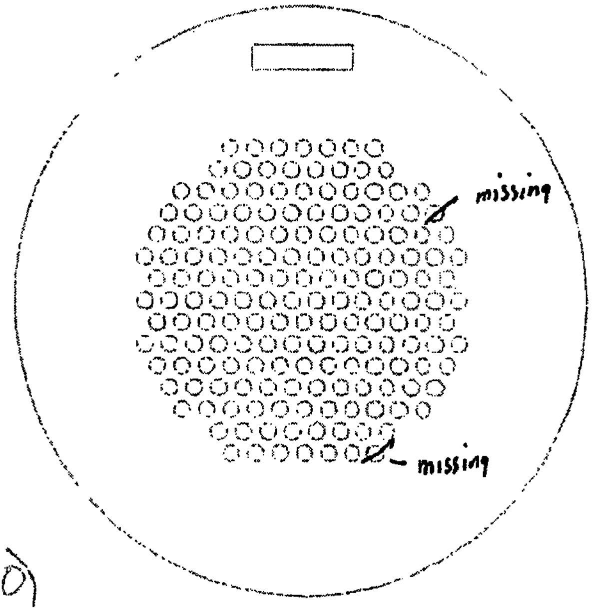
(1) – Corrosion Level of C requires a NCR. (2) Compose a sketch of the cracks on Sketch Sheet 8.0 and initiate a NCR.

**10.0 - BUTTONHEAD INSPECTION**

| | |
|---|---|
| ◗ | Offsize (Malformed) |
| ◒ | Protruding/unseated wire/buttonheads |
| Ø | Broken/missing wire/buttonheads |
| ● | Previously identified as missing |
| ⊘ | Discontinuous – removed this surveillance. |
| ⊗ | wire(s) removed during this surveillance for testing |

(10.2) Anchorhead I.D. none found
Located on Sketch: ☐ Yes ☒ No
(10.4) Missing Buttonheads Found:
☒ Yes ☐ No Quantity: 2

Additional Information:
Note Shim Stack Height (IO)



RAP 10/18/13

(11.2) Number of Protruding Buttonheads (◒): 0
(11.3) Number of Missing Buttonheads (Ø, ⊘): 2
(11.4) Total of Protruding + Missing Buttonheads: 2
(11.5) Total # of Effective Buttonheads Seated: 168
(8.3) Illumination source Flashlight
(8.5) Shim Gap Inspection: ☒ Acceptable ☐ Un-Acceptable
(11.6) Continuity Test Requested? ☐ Yes ☒ No
Wires Identified? ☐ Yes ☒ No
RAP 10/18/13

(11.7) Overall Results ☐ Acceptable ☒ Un-Acceptable Customer Notified NCR#: xxxxx

QC Reviewed: R a A Level: II Date: 10/18/13

#1 Shims are not aligned parallel offset 1/8" on S side; 5/32" N side
Bearing plate has general oxidation – no loss of material
Punch marks (hammer) noted on face – Anchorhead — Shims

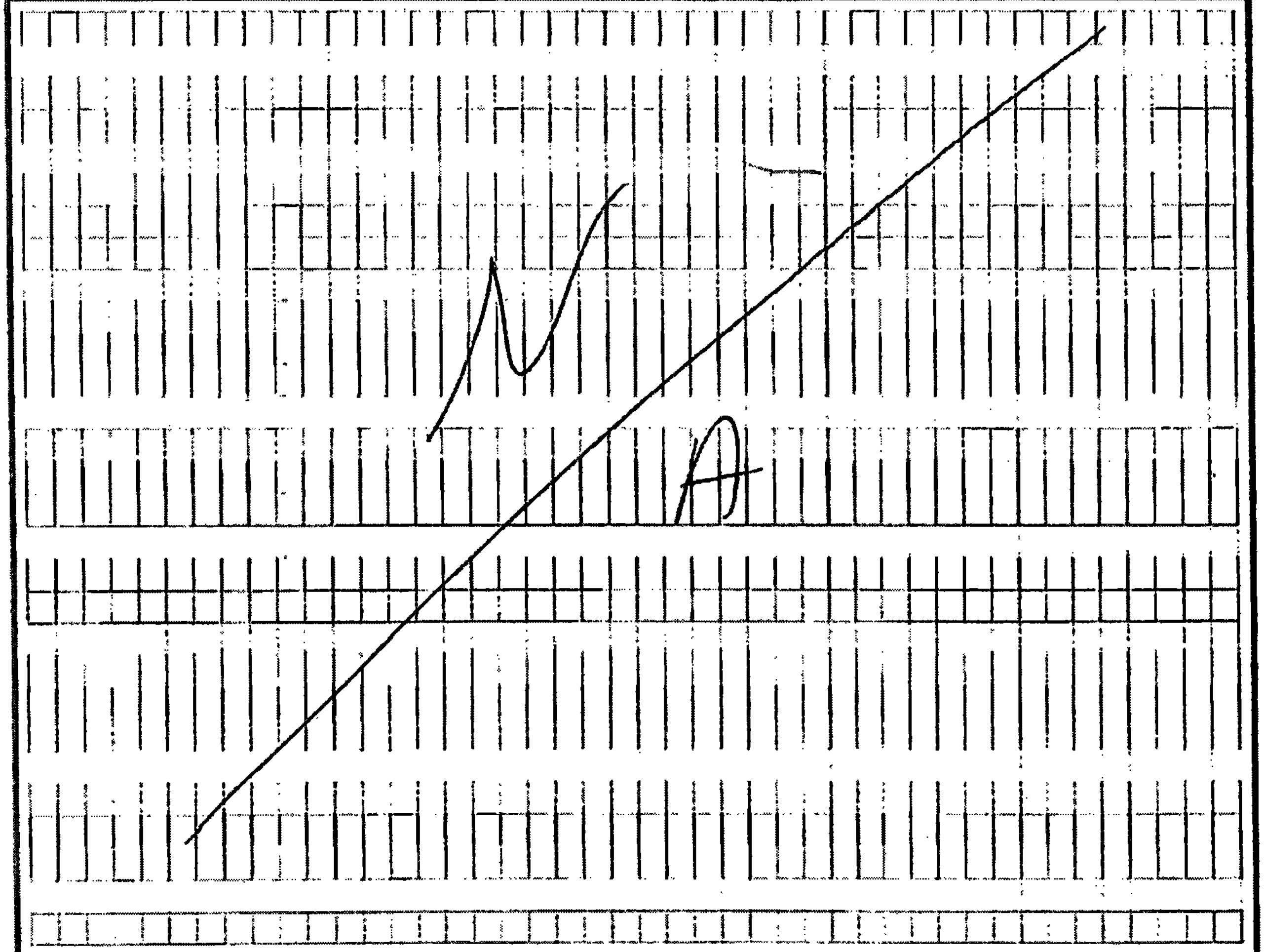
PSC PRECISION SURVEILLANCE

**N1091 PSC PROCEDURE SQ 8.0**
**ANCHORAGE INSPECTION**
**Sketch Sheet 8.0**
**09/03/13**
**Page 1 of 1**
**Revision 0**
**Revision: 1, 10/04/13**

Project: Exelon 2013 TENDON SURVEILLANCE ☐ UNIT 1

Tendon No.: ______ Tendon End: ______ ☐ Shop ☐ Field

(9.2) Sketch each crack as it appears in the anchorheads/bushings, shims and bearing plates. Identify each Unit by number; record the location of the anchorhead or bushing identification and apply to the sketch. Use as many Sketch Sheets as necessary being sure to list the page number below and to apply a Sketch Number to each unit with cracks. Ensure a Nonconformance Report in accordance with Procedure QA 9.0, NONCONFORMANCES, for Exelon approval.



N/A

QC Inspector: R a P Level: II Date: 10/18/13

QC Reviewed: ______ Level: ______ Date: ______

PRECISION SURVEILLANCE

N1091 PSC PROCEDURE SQ 8.0
ANCHORAGE INSPECTION
Data Sheet 8.0A
09/03/13
Page 1 of 1
Revision 0
Revision: 1, 10/04/13

Project: TMI 2013 TENDON SURVEILLANCE ☐ UNIT 1

(7.3)Tendon No.: A-2 Tendon End: ( -1 ) [✓ ☐ Field]

## ANCHORAGE INSPECTION CRITERIA

■ As-Found ☐ Post De-Tensioning / Pre-Wire Removal ☐ Post Re-Tensioning | Q.C. Signoff

**0 & 8.7.1 - CORROSION & CRACK INSPECTION**

| | | | | | | |
|---|---|---|---|---|---|---|
| (8.7) Buttonheads | Level: A [1] | (9.1) Cracks | ☐ Yes [2] | ■ No | ☐ N/A | -1 |
| (8.7) Anchorhead | Level: A [1] | (9.1) Cracks | ☐ Yes [2] | ■ No | ☐ N/A | |
| (8.7) Shims | Level: A [1] | (9.1) Cracks | ☐ Yes [2] | ■ No | ☐ N/A | |
| (8.7) Bearing Plate | Level: B [1] | (9.1) Cracks | ☐ Yes [2] | ■ No | ☐ N/A | |

[1] – Corrosion Level of C requires a NCR. [2] Compose a sketch of the cracks on Sketch Sheet 8.0 and initiate a NCR.

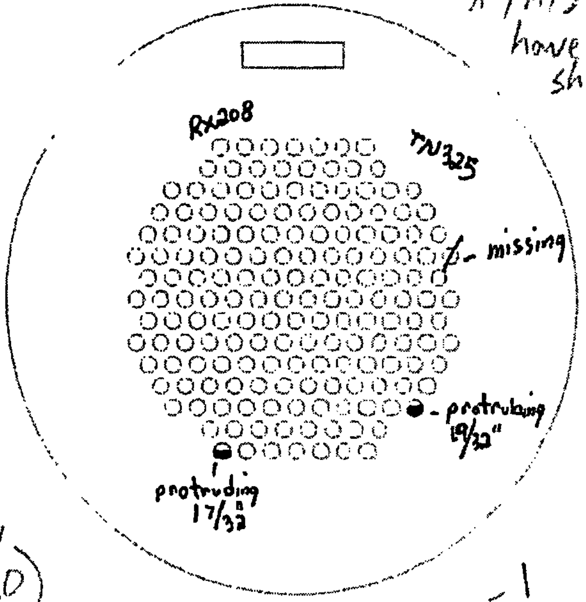
**10.0 - BUTTONHEAD INSPECTION**

| | |
|---|---|
| ◗ | Offsize (Malformed) |
| ◒ | Protruding/unseated wire/buttonheads |
| Ø | Broken/missing wire/buttonheads |
| ● | Previously identified as missing |
| [Ø] | Discontinuous – removed this surveillance. |
| ⊗ | wire(s) removed during this surveillance for testing |

(10.2) Anchorhead I.D. RX 208
Located on Sketch: ■ Yes ☐ No
(10.4) Missing Buttonheads Found:
■ Yes ☐ No Quantity: 1

Additional Information:
Note Shim Stack Height (ID)

X This should have been Data sheet 8.0B (-1)



-1

| | | | |
|---|---|---|---|
| (11.2) Number of Protruding Buttonheads (◒): | 2 | (8.3) Illumination source | |
| (11.3) Number of Missing Buttonheads (Ø, [Ø]): | 1 | (8.5) Shim Gap Inspection: ☐ Acceptable ■ Un-Acceptable | |
| (11.4) Total of Protruding + Missing Buttonheads: | 3 | (11.6) Continuity Test Requested? ☐ Yes ☐ No | |
| (11.5) Total # of Effective Buttonheads Seated: | 167 | Wires Identified? ☐ Yes ☐ No | |

(11.7) Overall Results ☐ Acceptable ■ Un-Acceptable Customer Notified NCR#: xxx

QC Reviewed: Level: II Date: 10/18/13

18 SQ 8.0.TMI.13 ISI Rev 1

Shim separation on N end almost touching – S end gap was 15/16"
Shim on N. side had numerous hammer indentations – Shims have mill scale
protruding buttonheads: 1 - 17/32" ; 1 - 19/32" in height

N1091 PSC PROCEDURE SQ 8.0
**ANCHORAGE INSPECTION**
Sketch Sheet 8.0
09/03/13
Page 1 of 1
Revision 0
Revision: 1, 10/04/13

Project: Exelon 2013 TENDON SURVEILLANCE ☐ UNIT 1

Tendon No.: ______ Tendon End: ______ ☐ Shop ☐ Field

(9.2) Sketch each crack as it appears in the anchorheads/bushings, shims and bearing plates. Identify each Unit by number; record the location of the anchorhead or bushing identification and apply to the sketch. Use as many Sketch Sheets as necessary being sure to list the page number below and to apply a Sketch Number to each unit with cracks. Ensure a Nonconformance Report in accordance with Procedure QA 9.0, NONCONFORMANCES, for Exelon approval.

N/A

QC Inspector: ______ Level: II Date: 10/18/13

QC Reviewed: ______ Level: ______ Date: ______